



# Financing Investment: Final Report

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## Contents

Bank of England framework .....	3
Financial stability risks.....	48
Dissecting bank lending: a recap .....	80
UK dividends and tech companies.....	90
Industrial Strategy .....	102
The technology cycle and economic statistics.....	132
Clusters, scale-ups and equity funding.....	144
UK challenger banks.....	178
Alternative lenders .....	188

# Chapter I: Bank of England framework

# Bank of England framework

## Summary

- The Bank of England should maintain its operational independence and its remit should be extended.
- The Bank of England should be set a productivity growth target of 3% per annum.<sup>1</sup> Using credit guidance, macroprudential supervision and interest rates, the Bank of England will be expected to set out how its policies are contributing to this target.
- Taking into account government policy decisions, the Bank of England will then need to assess what further policy adjustments are required to secure the 3% productivity growth target.
- The next government should set out, as soon as is practicable, a formal agreement between the Bank of England and the government showing how each will work with the other towards the 3% productivity target over the Parliament.
- In light of this agreement, the Bank of England Governor – after discussion with the Monetary Policy Committee and Financial Policy Committee members – will respond to each Budget in writing to the Chancellor. The letter should describe how the Government’s fiscal position (including tax and spend policies) announced in the Budget is expected to impact on the 3% productivity growth target, as well as explaining any policy reactions required by the Bank. The Governor will take electoral commitments made by the governing party (in the manifesto) as given, commenting on the general economic outlook and productivity-promoting investment, including research & development.
- The inflation (Consumer Price Index) target should remain at 2%. The Bank of England Governor would still be expected to write a letter to the Chancellor of the Exchequer if inflation is more than 1% away from the 2% target.
- The Bank of England should have more policy tools at its disposal through credit guidance. Existing policy tools (macroprudential) will need to be used more intensively. The Bank of England should provide a detailed account of how all the tools at its disposal will be used to ensure inflation remains within ‘target range’.<sup>2</sup> Faster productivity growth should improve the Bank of England’s policy latitude and ensure inflation does not overshoot the target.

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<sup>1</sup> The pace of technological change suggest that governments should be aiming for a higher rate of increase in productivity than recent historic averages. The y/y rate for labour productivity has averaged 2.4% since 1950 (total value added of the UK economy divided by the total number of hours worked). The 3% target represents a small increase over this average. The current rapid advances in the global semiconductor industry hold the key to faster productivity growth (see Chapter 6 for more on semiconductors). Source: “A Millennium of Macroeconomic Data”, Bank of England, <https://www.bankofengland.co.uk/statistics/research-datasets>.

<sup>2</sup> The inflation target set by the Chancellor of the Exchequer is 2% (Consumer Price Index). There is no explicit ‘target range’. However, “If inflation moves away from target by more than 1 percentage point in either direction”, the Bank of England Governor is expected to send an open letter to the Chancellor, detailing the Monetary Policy Committee’s strategy to returning inflation to target. See “Exchange of letters between

- The Bank of England will be expected to work with the Strategic Investment Board to increase private sector investment into critical areas of technology. It will be expected to collaborate with the National Investment Bank (NIB), UK Research & Innovation and the National Transformation Fund (NTF). The Bank of England (with the Office for Budget Responsibility) will need to evaluate the impact of spending through the NTF and lending by the NIB (on productivity, the potential growth path of the economy and the multipliers).

### Bank of England framework

This review proposes that the Bank of England maintains its ‘operational’ independence. However, its remit should be expanded.

An additional target will be introduced: productivity growth of 3% per annum. The Bank of England will be required to explain how its policies are impacting upon productivity and, therefore, the potential growth path of the economy.<sup>3</sup>

The Bank of England will have three explicit policies at its disposal – credit guidance, macroprudential supervision and interest rates.

Spending through the National Transformation Fund (NTF) and lending by the National Investment Bank (NIB) will influence productivity growth too.<sup>4</sup> The NTF and NIB will fall outside the auspices of the Bank of England. The spending of the NTF and lending by the NIB will need to be treated as exogenous variables by the Bank of England. The Bank of England will then need to assess what further policy adjustments are required to secure 3% productivity growth, subject to the Government’s targets for public sector current borrowing.

A focus on long-term, productive investment will be needed to increase the competitiveness of the UK economy and eradicate persistent current account deficits. A detailed analysis of lending across sectors is a prerequisite to stemming the flow of money into speculative real estate.

Faster productivity growth should, *ceteris paribus*, put downward pressure on inflation. Low and stable inflation delivered through sustained improvements in productivity will, in turn, make it easier to keep bond yields low.<sup>5</sup> Low financing costs can then underpin a bigger shift towards investment that delivers faster productivity growth, cementing a virtuous cycle of low inflation and quicker real GDP growth.

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the Governor and the Chancellor regarding CPI Inflation – February 2018”, Bank of England, February 8<sup>th</sup> 2018, <https://www.bankofengland.co.uk/letter/2018/cpi-inflation-february-2018>.

<sup>3</sup> See Chapter 5 for a full explanation of how the Bank of England will work with the Strategic Investment Board. Note: the potential growth path of the economy is essentially determined by the sum of the population growth rate and the trend growth rate for productivity. Since the Bank of England cannot control the size of the population, a focus on the potential growth path is effectively the same as targeting productivity.

<sup>4</sup> If the Royal Bank of Scotland (RBS) remains under public sector control, lending by the National Investment Bank will be through RBS.

<sup>5</sup> See *The U.S. Economic Recovery*, Graham Turner, 2014, 2Q T Limited (Publishing).

Aiming for faster productivity growth will help the Bank of England to keep inflation close to target. It should not simply have to rely on interest rates. Of course, technology-driven investment increases the risks of periodic deflation. So long as productivity is rising in line with the target (3% per annum), periods of mild deflation will not represent a systemic threat. Deflation matters more if it is accompanied by, or is a symptom of, weak demand: it is less of a problem when it is the result of advances in technology.

Well-capitalised banks alongside effective, water-tight macroprudential rules are essential. However, monetary policy also needs to be closely aligned with the Government's industrial strategy to underpin financial stability.

The Financial Policy Committee (FPC) and the Monetary Policy Committee will be required to work more closely (hold joint meetings). Indeed, under the new policy framework set out in this review, credit guidance will be administered by the FPC.

The Monetary Policy Committee will be required to assimilate sectoral analysis on lending into its policy decisions. Shifts in lending between different sectors will be factored into forecasts for the output gap of the economy.

The Monetary Policy Committee will also be required to work with the Office for National Statistics and other statisticians to develop more reliable estimates for productivity, productive investment (see Box 2) and unit labour costs.<sup>6</sup>

#### The mandate

According to the Bank of England Act 1998, the monetary policy objectives of the Bank of England are:

- a. To maintain price stability; and
- b. Subject to that, to support the economic policy objectives of Her Majesty's Government, including its objectives for growth and employment.

The Chancellor's letter to the Governor on November 22<sup>nd</sup> 2017 clarifies price stability:

"I confirm that the operational target for monetary policy remains an inflation rate of 2 per cent, measured by the 12-month increase in the Consumer Prices Index. The inflation target of 2 per cent applies at all times. This reflects the primacy of price stability and the inflation target in the UK monetary policy framework."

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<sup>6</sup> As indicated in 'Proposal: changing the Bank of England mandate', this will need to extend to non-labour costs and (unit) profit margins.

The focus on price stability is self-evident. The mandate also ‘supports’ growth and employment, so long as inflation-targeting is not jeopardised. Nevertheless, it is unclear what role part (b) of the remit truly serves. The Bank of England uses macroeconomic models based on the concept of a natural rate of unemployment<sup>7</sup> (or NAIRU<sup>8</sup>). In other words, there exists a level of unemployment consistent with a 2% inflation target. At this point, the economy is assumed to be running at full potential. Excess capacity would put downward pressure on inflation and vice versa.

In short, achieving inflation of 2% over the medium to long-term is seen as a sufficient condition for ‘full employment’. Support for the government’s “economic policy objectives” is, therefore, implicit in any inflation-targeting framework. Part (b) of the mandate is superfluous.

Policymakers do have some leeway to ‘see through’ volatile and transitory price movements. Monetary policy tightening in response to transitory factors can unnecessarily raise unemployment and risk hysteresis.<sup>9</sup> Ultimately, however, unemployment objectives (under the current mandate) are subservient to price stability.<sup>10</sup>

#### Transitory deviations in inflation

What constitutes a transitory shift in prices is also open to debate. A rise in inflation in response to a currency devaluation may be regarded as a ‘one-off’. However, the reasons for a weaker exchange rate need to be explored too. Sterling fell heavily following the European Union referendum in June 2016.<sup>11</sup> It is tempting to see this as a reaction to the economic uncertainty that would ensue.

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<sup>7</sup> See “The Phillips Curve: lower, flatter or in hiding?”, Sir Jon Cunliffe, Bank of England, November 14<sup>th</sup> 2017, p. 4, <https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/the-phillips-curve-lower-flatter-or-in-hiding-speech-by-jon-cunliffe.pdf>. Indeed, “for nearly 5 decades the essential framework of a labour market impacted by inflation expectations that clears with lags around a natural rate of unemployment over the business cycle (or trade cycle in Phillips’ original work) has played a fundamental role in modern macroeconomic models, including those used as part of their forecasting machinery by monetary policy makers, like the Bank of England.” See also p. 6: “The Phillips curve framework depends on the concept of a natural, equilibrium, level of unemployment – the level to which unemployment would return eventually when supply and demand for labour are in balance. Within the framework this level is the anchor - unemployment below this level leads to upward pressure on pay (and hence inflation) and vice versa.”

<sup>8</sup> Ibid. p. 4. “The natural rate of unemployment, sometimes referred to as  $U^*$ , typically refers to equilibrium unemployment in the long-run. However, there may be temporary factors that affect the level of unemployment consistent with stable inflation, and therefore the medium-term equilibrium unemployment rate, sometimes called the NAIRU – the ‘non-accelerating inflation rate of unemployment’. For example, persistent weakness in demand can mean that more people will remain in unemployment for some time, which makes it difficult to re-enter employment. Once those temporary factors have dissipated, the equilibrium rate will tend back towards the natural rate of unemployment – the level to which unemployment would return eventually when supply and demand for labour are in balance in the long run.”

<sup>9</sup> See “Macroeconomic Research After the Crisis”, Janet Yellen, Federal Reserve, October 14<sup>th</sup> 2016, <https://www.federalreserve.gov/newsevents/speech/yellen20161014a.htm>.

<sup>10</sup> It could be argued that the Bank of England’s monetary policy mandate should be changed to something akin to that of the Federal Reserve’s. According to the Federal Reserve website, “The Congress established the statutory objectives for monetary policy – maximum employment, stable prices, and moderate long-term interest rates – in the Federal Reserve Act.” However, again, “maximum employment” will be constrained by the rate of unemployment that policymakers believe is consistent with stable prices.

<sup>11</sup> The JP Morgan Nominal Broad Effective Exchange Rate Index averaged 108.042 in May 2016. The EU referendum was held on June 23<sup>rd</sup> 2016. The trade-weighted index fell to a daily average of 99.013 in July 2016.

Nevertheless, the decline in the value of sterling cannot be divorced from the persistent current account deficits incurred by the UK. Rising goods inflation reflects, in effect, not just the depreciation of sterling, but a failure to satisfy internal demand and a weak domestic capability across a wide range of goods industries. Sectors where inflation rose sharply in response to the EU referendum have low export to import ratios (see Table I.A).<sup>12</sup> In some cases, the lack of domestic alternatives implied that consumers were unable to switch from more expensive imports.

Inflation subsequently climbed above target: by February 2018, it had fallen back below 3.0%.<sup>13</sup> Indeed, the Bank of England recently revised down its inflation forecast.<sup>14</sup> In this respect, the reluctance of the Monetary Policy Committee to raise interest rates as inflation rose was arguably correct. Pushing interest rates higher in response to this rise in inflation after the EU referendum would not have helped: the correct policy prescription is to focus on the long-term investment that would raise the capacity of UK manufacturing and reduce the reliance on imports.

The Bank of England acknowledged the point in the May 2018 Inflation Report:

“While aggregate demand has evolved broadly as expected, potential supply growth is estimated to have slowed by more than expected. That has reflected weaker-than-expected potential productivity, with slower-than-expected growth in output per hour judged to have reflected slower underlying productivity growth”.<sup>15</sup>

Nevertheless, the case for leaving policy on hold was couched in a narrow context, one that was delineated by the Monetary Policy Committee’s (MPC) mandate. The MPC cited the transitory nature of sterling’s depreciation and, self-evidently, the exchange rate was not likely to carry on falling *ad infinitum*. The MPC was right to argue that the second-round effects – in terms of higher gains in nominal wages – may be limited.

That said, a Bank of England with a much broader remit, working more closely with a Strategic Investment Board and ‘wired’ into the Government’s industrial strategy, could have made a different argument. With the correct mix of policies, low interest rates can support a shift towards productive investment, improving competitiveness, and reducing the risks of another sharp decline in sterling in the future.<sup>16</sup>

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<sup>12</sup> Source: Office for National Statistics.

<sup>13</sup> Source: Office for National Statistics. The consumer price index (change, year-on-year) accelerated to 2.298% in February 2017 and hit 3.092% in November 2017. It then eased to 2.708% in February 2018.

<sup>14</sup> Source: Bank of England, Inflation Report, May 2018, p. 30, Table 5.B, <https://www.bankofengland.co.uk/-/media/boe/files/inflation-report/2018/may/inflation-report-may-2018.pdf?la=en&hash=50C30B6F32DE7CB3232EA2F0A025D849EEC1EBAA>.

<sup>15</sup> Ibid. p. 41.

<sup>16</sup> The correct mix refers to the requisite macroprudential tools and focus on long-term investment.



## The Phillips Curve

The natural rate of unemployment is, of course, unobservable. Policymakers must estimate the supply potential of the economy, but this cannot be done with any great degree of accuracy. For example, the Office for Budget Responsibility's productivity growth forecasts have been consistently too optimistic since the financial crisis of 2007/08 (see Chart I.1).<sup>17</sup>

Table I.A

	CPI, % ch y/y, February 2018	Trade balance, £ bn, 4-quarter moving total, Q4 2017	Exports/ imports ratio
<b>Total goods</b>	<b>2.886</b>	<b>-135.58</b>	<b>0.706</b>
Major appliances & small electric goods	8.112	-4.03	0.191
Furniture, furnishings & carpets*	6.168	-5.17	0.190
Garments*	5.442	-12.55	0.365
Footwear (including repairs)	2.785	-3.61	0.337
(Personal) transport spare parts & accessories*	4.006	-8.74	0.454
Games, toys & hobbies**	3.656	-1.57	0.361

\* = Inflation figure is for August 2017

\*\* = Inflation figure is for November 2017

Source: Office for National Statistics

As Sir Jon Cunliffe notes: “The post-crisis uncertainty over productivity and the dependence of economic growth on labour supply has ... led the MPC to depend more on the labour market as a guide to spare capacity in the economy and on the relationship between pay and unemployment as a guide to domestically generated inflationary pressure in the pipeline.”<sup>18</sup>

However, this relationship is not fixed. Indeed, “simple lines of best fit suggest that the relationship between the unemployment rate and nominal wage growth [i.e. Phillips Curve] has moved lower and flatter over time”.<sup>19</sup> UK wage growth has consistently undershot forecasts of the Monetary Policy Committee (MPC) during the post-crisis period. At the same time, MPC members have

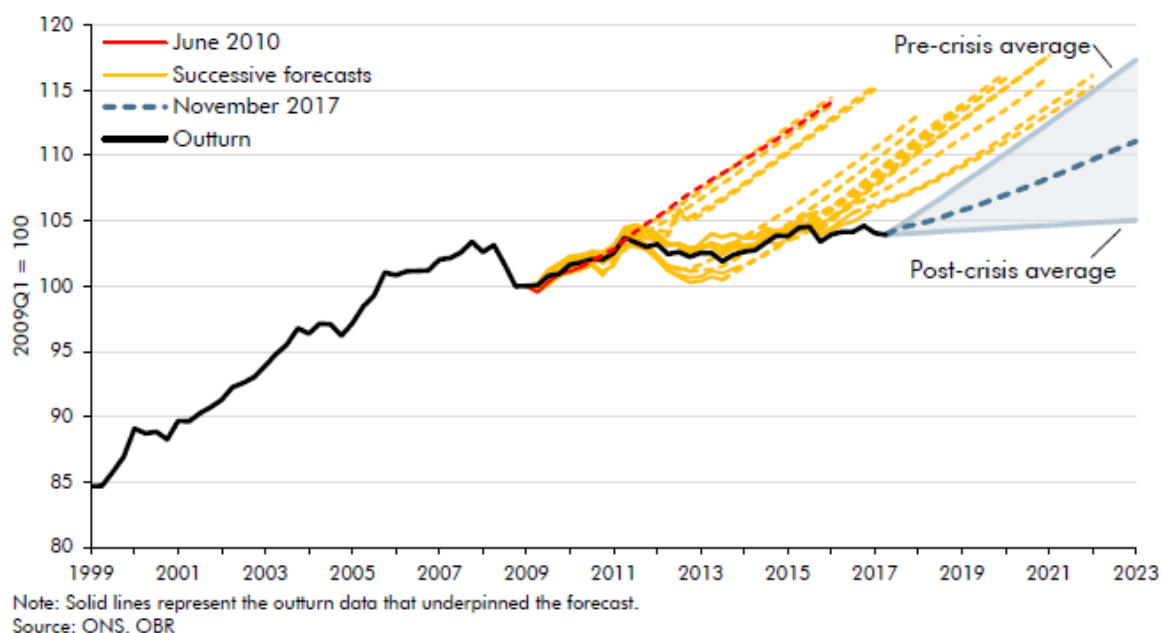
<sup>17</sup> See “Economic and fiscal outlook”, Office for Budget Responsibility, November 22<sup>nd</sup> 2017, p. 9, <http://obr.uk/efo/economic-fiscal-outlook-november-2017/>. It is hoped, that within the Bank of England, and with the benefit of sectoral information/input from the Strategic Investment Board, the ability of the Office for Budget Responsibility to track productivity growth will be strengthened.

<sup>18</sup> See “The Phillips Curve: lower, flatter or in hiding?”, Sir Jon Cunliffe, Bank of England, November 14<sup>th</sup> 2017, p. 12, <https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/the-phillips-curve-lower-flatter-or-in-hiding-speech-by-jon-cunliffe.pdf>. “Our framework, however, depends crucially on our estimation of the Phillips curve – both the slope and level. Given the uncertainties I have described and the serial disappointments we have had in recent years in forecasting the impact of unemployment on pay growth, there is in my view a not immaterial risk that the trade-off is not as it currently appears and that domestic inflation pressure will undershoot the Committee’s collective expectation.”

<sup>19</sup> Ibid. p. 4.

underestimated how fast unemployment would fall during this cycle.<sup>20</sup> The MPC revised down its estimate of the “equilibrium unemployment rate” in its February 2017 Inflation Report<sup>21</sup> (from 5% to 4½%) and again in the February 2018 Inflation Report (to 4¼%).<sup>22</sup> In the US, the Federal Open Market Committee has been forced to lower its estimate of the “longer run” jobless rate.<sup>23</sup>

Chart I.1: OBR productivity growth forecasts versus outturns



Claudio Borio – Head of the Bank for International Settlements’ (BIS) Monetary and Economic Department – recently presented evidence showing that “for G7 countries, the response of inflation to a measure of labour market slack has tended to decline and become statistically indistinguishable from zero. In other words, inflation no longer appears to be sufficiently responsive to tightness in

<sup>20</sup> Ibid. Charts 3 and 4, p. 15.

<sup>21</sup> See “Inflation Report: February 2017”, Bank of England, February 2<sup>nd</sup> 2017, p. 20, <https://www.bankofengland.co.uk/-/media/boe/files/inflation-report/2017/february-2017.pdf?la=en&hash=FI FDC F03241263662F06E6DEC3591E7518CB2C54>. “Previously the MPC’s best collective judgement was that the equilibrium unemployment rate had remained close to its pre-crisis rate of around 5%. Given developments in wage growth, unemployment and recruitment difficulties over the past year, however, the MPC now judges that the equilibrium unemployment rate is more likely to be around 4½%.”

<sup>22</sup> See “Inflation Report: February 2018”, Bank of England, February 8<sup>th</sup> 2018, p. 23, <https://www.bankofengland.co.uk/-/media/boe/files/inflation-report/2018/february/inflation-report-february-2018.pdf?la=en&hash=555ED88EF574D368B81BF703480C1987EEBBA883>.

<sup>23</sup> See FOMC Projection Materials, available at <https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm>. For example, in the projection materials for the March 15<sup>th</sup>/16<sup>th</sup> 2016 meeting, the median estimate for the longer run unemployment rate was trimmed from 4.9% to 4.8%. It has since (at the FOMC meeting of March 20<sup>th</sup>-21<sup>st</sup> 2018) been trimmed to 4.5%, although this remains a long way above the median estimate for the jobless rate in Q4 2019 (3.6%).

labour markets.”<sup>24</sup> Inflation may be less responsive to *domestic* slack because of the greater globalisation of product, capital and labour markets. *Global* slack now matters to a far larger degree.<sup>25</sup>

Looking ahead, “Just as globalisation, technological advances threaten labour’s pricing power – think robots as opposed to foreign workers. And both reduce incumbent firms’ pricing power – through cheaper products, as they cut costs; through newer products, as they make older ones obsolete; and through more transparent prices, as they make shopping around easier. No doubt, globalisation has been the big shock since the 1990s. But technology threatens to take over in future.”<sup>26</sup>

Technology-led disruption is one of the biggest challenges facing the UK economy. The Monetary Policy Committee has highlighted the potential job losses from automation.<sup>27</sup>

However, the new job opportunities that can arise from technological change should not be underestimated either.<sup>28,29</sup>

The UK has shown that it can be effective in adopting Information & Communication Technology (ICT). Nevertheless, it does not enjoy the full benefits that come from the development of core technologies.<sup>30</sup> Hence, the UK may be more prone than many of its competitors to the deflation that follows rapid growth in ICT investment.

#### Rethinking the natural rate of unemployment

Some economists suggest that the data does not support the “natural rate hypothesis”.<sup>31</sup> Others have expressed concern about the “usefulness of the very concept.”<sup>32</sup> The Head of the Monetary and

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<sup>24</sup> See “Through the looking glass”, Claudio Borio, Bank for International Settlements, September 22<sup>nd</sup> 2017, p. 2, <https://www.bis.org/speeches/sp170922.pdf>.

<sup>25</sup> See “Global value chains the increasingly global nature of inflation”, Raphael Auer, Claudio Borio, Andrew Filardo, VOX, April 28<sup>th</sup> 2017, <https://voxeu.org/article/global-value-chains-and-increasingly-global-nature-inflation>.

<sup>26</sup> See “Through the looking glass”, Claudio Borio, Bank for International Settlements, September 22<sup>nd</sup> 2017, p. 6, <https://www.bis.org/speeches/sp170922.pdf>.

<sup>27</sup> See “Labour’s Share”, Andrew Haldane, Bank of England, November 12<sup>th</sup> 2015, <https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/labours-share.pdf?la=en&hash=D6F1A4C489DA855C8512FC41C02E014F8D683953>.

<sup>28</sup> See “Seven Jobs Robots Will Create – or Expand”, Wall Street Journal, April 29<sup>th</sup> 2018, [https://www.wsj.com/articles/seven-jobs-robots-will-creator-expand-1525054021?mod=djemTECH\\_h&tesla=y](https://www.wsj.com/articles/seven-jobs-robots-will-creator-expand-1525054021?mod=djemTECH_h&tesla=y).

<sup>29</sup> See “Intelligent Machines Will Teach Us – Not Replace Us”, Wall Street Journal, May 7<sup>th</sup> 2018, [https://www.wsj.com/articles/intelligent-machines-will-teach-us-not-replace-us-1525704147?mod=djemTECH\\_h&tesla=y](https://www.wsj.com/articles/intelligent-machines-will-teach-us-not-replace-us-1525704147?mod=djemTECH_h&tesla=y).

<sup>30</sup> The lack of core capability in technology is reflected in the widening of the UK’s trade deficit for many tech-related sectors. See Appendices 2 and 3 in Chapter 7.

<sup>31</sup> See “The Natural Rate Hypothesis: an idea past its sell-by date”, Roger E A Farmer, Bank of England, September 17<sup>th</sup> 2013, <https://www.bankofengland.co.uk/quarterly-bulletin/2013/q3/the-natural-rate-hypothesis-an-idea-past-its-sell-by-date>.

<sup>32</sup> See “Through the looking glass”, Claudio Borio, Bank for International Settlements, September 22<sup>nd</sup> 2017, p. 13, <https://www.bis.org/speeches/sp170922.pdf>.

Economic Department at the Bank for International Settlements<sup>33</sup> has warned, “There are obvious risks in basing policy on unobservable variables, especially when the maintained hypotheses underlying their measurement are not very reliable. This is precisely the case for the natural interest rate, given the elusive nature of the Phillips curve and the evidence on the role of saving-investment imbalance proxies discussed in this presentation. The dog may end up chasing its tail.”<sup>34</sup>

Indeed, these models are largely backward-looking: if unemployment has fallen, without any subsequent pick-up in inflationary pressures, then the natural rate of unemployment is presumed to have declined. This has no forecasting power: “If one takes the model as true, it becomes almost a tautology to say that, since inflation is not rising and economies are close to full employment, the natural rate must have fallen. Indeed, it is common for policymakers to revise their estimates of potential output or the non-accelerating inflation rate of unemployment (NAIRU) – two other unobservable variables – assuming that the Phillips curve relationship holds, i.e. if inflation fails to rise, potential output is revised upwards and the NAIRU downwards.”<sup>35</sup>

#### The importance of financial stability

Some economists argue that central banks should refrain from keeping rates too low for too long – even if inflation remains well anchored – to limit the risk of asset price bubbles. Others including Phillip Turner – former Deputy Head of the Monetary and Economic Department at the Bank for International Settlements – have argued that the interest rate lever is too blunt. Macroprudential policies should have a more prominent role. Higher interest rates in the UK (compared to the US) clearly failed to prevent speculation and the ensuing asset price bubble.<sup>36</sup>

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<sup>33</sup> See “About the BIS – overview”, Bank for International Settlements, <https://www.bis.org/about/index.htm?m=1%7C1>. The Bank for International Settlements (BIS) is an “international financial organisation owned by 60 member central banks.” The mission of the BIS is “to serve central banks in their pursuit of monetary and financial stability, to foster international cooperation in those areas and to act as a bank for central banks.”

<sup>34</sup> See “Through the looking glass”, Claudio Borio, Bank for International Settlements, September 22<sup>nd</sup> 2017, p. 13, <https://www.bis.org/speeches/sp170922.pdf>. Note: in his speech, Claudio Borio refers to the natural rate of interest, not the natural rate of unemployment. However, the natural rate of interest is inextricably tied to the natural rate of unemployment.

<sup>35</sup> Ibid. p. 9.

<sup>36</sup> See “Did central banks cause the last financial crisis? Will they cause the next?”, Philip Turner, London School of Economics and Political Science Special Papers, November 2017, p. 29, [http://www.lse.ac.uk/fmg/assets/documents/papers/special-papers/SP249.pdf?from\\_serp=1](http://www.lse.ac.uk/fmg/assets/documents/papers/special-papers/SP249.pdf?from_serp=1). “The UK kept short-term rates above US rates until 2006 – but this did not protect them from the GFC (Global Financial Crisis). Some UK banks were reckless, especially in their investments in US assets notwithstanding their higher (local) interest rate environment. The Bank of Canada’s interest rate policy was the opposite to that followed by the Bank of England. By mid-2003, they also had policy rates well above US levels. But thereafter, facing an inflation outlook very similar to the UK, they cut rates aggressively, and kept them low until late-2005. (An additional factor was that the rise in oil prices was already pushing up the Canadian dollar). Low interest rates, however, did not induce their banks to become overextended. This was because of much stricter regulation pre-crisis (notably the existence of a leverage ratio and limits on banks’ off-balance sheet exposures to securitised products) and because a less contestable domestic banking market allowed fatter margins. Canadian banks weathered the crisis much better than UK banks despite Canada’s closer financial and economic links to

A former deputy governor and chief economist at the Bank of England made the point too, when he argued that hiking interest rates to quell the runaway boom in house prices would not have worked: there was a need for a second policy instrument.<sup>37</sup>

Trying to restrain lending through credit controls or macroprudential tools has critical advantages. Pushing interest rates higher may slow the pace of borrowing, but it can also deter investment in productive sectors. To quell 'speculative' investment, interest rates may need to rise to levels that are inconsistent with the inflation target, while damaging the potential growth path of the economy. Pushing interest rates higher may be tantamount to a "remedy which cures the disease by killing the patient".<sup>38</sup>

Indeed, it is arguably the overt use of interest rates to manage the economy that has precipitated the economic instability of recent decades. The lack of restraint and control over banks increased the risk that companies and households will be subsumed by bad debts.<sup>39</sup>

Macroprudential tools should be viewed as a *secular* policy, one that mitigates the effects of an unstable economic cycle and reduces the risks of boom and bust. Implemented effectively – eliminating regulatory arbitrage – should reduce 'speculation', shifting the focus of investment away from financial to more productive assets.<sup>40</sup> This in turn would underpin the ability of the authorities to deliver low inflation. In short, macroprudential tools should be an important complement to a future Labour Government's industrial strategy.

The Bank of England has taken some important steps in this direction. There is now a more explicit acknowledgement of the role that macroprudential tools can play in complementing monetary policy.

Nevertheless, the failure of macroprudential policies to prevent another big rise in consumer credit borrowing needs to be addressed urgently.<sup>41</sup> Non-bank lenders, derivatives and the Collateralised Loan Obligation (CLO) market require further examination too. The role of 'covenant lite' leveraged loan transactions, which back CLOs, needs to be scrutinised closely.<sup>42</sup> Terms usually structured to

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the United States, which was at the centre of the GFC. Following US monetary policy did not create a crisis for the Canadian banking system."

<sup>37</sup> See *The U.S. Economic Recovery*, Graham Turner, 2QT Limited (Publishing), 2014, p. 252.

<sup>38</sup> See *The General Theory of Employment, Interest and Money*, John Maynard Keynes, Macmillan Cambridge University Press, 1973, p. 323.

<sup>39</sup> Source: Bank of England. The UK household debt-to-income ratio surged from 85.9% in Q4 1996 to a record 147.0% in Q2 2008. Bank rate was hiked from 3.5% in late-2003, eventually reaching 5.75% by mid-2007 (with a brief pause and dip between mid-2004 and mid-2006). The debt burden on households made relatively modest interest rate increases unbearable. The debt service ratio for households was as low as 8.6% in Q2 1999, but rose precipitously to 13.3% in Q3 2007.

<sup>40</sup> See *The General Theory of Employment, Interest and Money*, John Maynard Keynes, Macmillan Cambridge University Press, 1973, p. 376.

<sup>41</sup> See Chapter 2.

<sup>42</sup> See "Little room for error as investors chase leveraged loan boom", Financial Times, November 10<sup>th</sup> 2017, <https://www.ft.com/content/635b1266-c560-11e7-a1d2-6786f39ef675>.

protect investors have been stripped down. The capital strength and investor protections of CLOs through the 2008 financial crisis were superior to the current CLO issuance, which may not provide an adequate cushion in any future financial shock.

Exchange traded funds (ETFs) are another product that needs to be monitored. Critics argue that ETFs are disproportionately affected by market disruptions, with the prospect of a liquidity mismatch (between an ETF and its underlying investment). This in turn affects the underlying securities and financial markets.<sup>43</sup> Others point to the resilience of ETFs to recent market corrections (e.g. the rise in corporate bond yields from June 2015 and February 2016): the liquidity risks are overplayed. More analysis is required.

#### Proposal: changing the Bank of England mandate

Monetary policy, macroprudential policy and the Government's industrial strategy need to be integrated. The Bank of England – alongside the National Transformation Fund, the National Investment Bank and UK Research & Innovation – will be represented on the Strategic Investment Board (see Chapter 5 – Industrial Strategy). The Strategic Investment Board will in turn provide direction for the Bank of England in respect of credit guidance. It will also provide data that will strengthen the Bank of England's ability to hit the 3% productivity target.

The post-crisis period has shown that low interest rates, combined with enhanced macroprudential powers, cannot guarantee an 'adequate' flow of credit to productive sectors. Banks currently have a strong incentive to lend against real estate collateral.<sup>44</sup> Without a big shift in investment priorities to

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<sup>43</sup> See "SEC-NYU Dialogue on Exchange-Traded Products", Michael S. Piwowar, U.S. Securities and Exchange Commission, September 8<sup>th</sup> 2017, <https://www.sec.gov/news/speech/speech-piwowar-2017-09-08>. See also "Could ETFs Fall Into a Liquidity Jam?", Wall Street Journal, March 21<sup>st</sup> 2018, <https://www.wsj.com/articles/return-of-volatility-raises-liquidity-question-for-etfs-1521627574?mod=djem10point>.

<sup>44</sup> Regulatory capital requirements for bank lending favour home mortgage loans (seen as a safe asset class with a risk weighting of 35%), over SME lending collateralised by commercial property (risk weighting of 75%) or immovable property (risk weighting of 100%). Unsecured loans to persons and small firms have the same risk weighting (75%). See "Regulation (EU No 575/2013 on prudential requirements for credit institutions and investment firms", European Union, 2013, pp. 321/85-88, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:321:0006:0342:EN:PDF>. Risk weighting methodologies used between new entrant banks and incumbents favour the more sophisticated models employed by the incumbents. It allows for a lower level of regulatory capital to be held. See *Financing Investment: Interim Report*, GFC Economics Ltd & Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, p. 102. Despite the addition of the SME Support Factor which brought down the risk weighting to SMEs to an equivalent of Basel II levels from the new Basel III levels, there is limited evidence that this has supported SME bank lending. See "Working Paper: impact of credit regulation on SMEs credit", BBVA, January 2017, p. 8, <https://www.bbva-research.com/wp-content/uploads/2017/09/WP-17-01.pdf>. See also "Response to the European Commission's public consultation on the possible impact of the CRR and CRD IV on bank financing of the economy", Bank of England, October 2015, pp. 3-4, answer 8.2, <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/crd-iv/boe-response-to-ec-consultation-on-possible-impact-of-crr-crd-iv-on-bank-financing-of-economy.pdf?la=en&hash=55795D8EB89344F97C37B8765C562D630EA6A3F9>.

target faster productivity growth, standards of living will not rise: the UK will also remain overly dependent upon speculative capital inflows to finance its persistent current account deficit.<sup>45</sup>

The Bank of England will need to use credit guidance to influence the flow of credit both quantitatively and qualitatively. Already, the Financial Policy Committee (FPC) has significant powers to adjust risk weights for specific sectors to achieve stated goals: “sectoral capital requirements provide the FPC with a means for varying the risk weights on banks’ exposures to three specific sectors: residential property, commercial property and other parts of the financial sector. The FPC expects to apply this tool if exuberant lending conditions in one of these sectors pose risks to financial stability.”<sup>46</sup>

These powers could be strengthened to influence lending to specific industries. The Bank of England will be required to take a more active role in the allocation of credit in the economy. Credit for the purchase of land and property could be redirected in favour of lending to productive sectors such as manufacturing or professional, scientific & technical activities. This will need to be done within the confines of Basel III.<sup>47</sup>

Nevertheless, there is scope under Pillar 2 rules for the Prudential Regulation Authority (PRA) to influence lending by banks. It can review and amend its Pillar 2A methodologies for the assessment of risks (credit, market, operational, counterparty credit, credit concentration and interest rate risks in the non-trading book). The PRA can set a bank’s Pillar 2A capital requirement. It can also use stress testing to push changes in Pillar 2.<sup>48</sup> To support a bank’s capital adequacy, specific risk weightings can be introduced for different sectors of the economy. For example, these can be used to reflect the risks banks run if they are too heavily weighted to consumer finance and mortgage lending. Improved analytics may allow for reductions of Pillar 2 capital requirements for small & medium-sized enterprise lending in certain sectors of the economy, to support the Industrial Strategy.<sup>49</sup>

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<sup>45</sup> See *Financing Investment: Interim Report*, GFC Economics Ltd & Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, p. 46.

<sup>46</sup> See “The Financial Policy Committee’s approach to setting the countercyclical capital buffer”, Bank of England, April 2016, p. 10, <https://www.bankofengland.co.uk/-/media/boe/files/statement/2016/the-financial-policy-committees-approach-to-setting-the-countercyclical-capital-buffer.pdf?la=en&hash=DE1BDDDA9A8628694A5881D6559DE782AFF3A7B1>.

<sup>47</sup> This is implemented by The Capital Requirements Regulation (575/2013) (CRR) and Capital Requirements Directive (2013/36/EU) (CRD), jointly ‘CRD IV’. For further reading see “Implementing Basel III in Europe: CRD IV package”, European Banking Authority, <https://www.eba.europa.eu/regulation-and-policy/implementing-basel-iii-europe>.

<sup>48</sup> See “The PRA’s methodologies for setting Pillar 2 capital”, Prudential Regulation Authority, April 2018, <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/statement-of-policy/2018/the-pras-methodologies-for-setting-pillar-2a-capital-update-april-2018-effective-october-2018.pdf?la=en&hash=0BEBEDA5B65EF3AE72596708A4DDE722B2F128AE>.

<sup>49</sup> MYbank (Alibaba) and WeBank (Tencent) use advanced analytics for SME lending – leveraging off their bigger parent entities data and analytics skills. See “MYbank Deepens Push for Business Big Banks Won’t Touch”, Bloomberg, July 2<sup>nd</sup> 2017, <https://www.bloomberg.com/news/articles/2017-07-02/jack-ma-s-bank-deepens-push-for-business-big-lenders-won-t-touch>.

The Bank of England will need to work intensively with banks to reduce the reliance on lending collateralised by real estate. Banks will be required to show they are raising the share of loans backed by intellectual property instead.

A suppression of real estate or mortgage lending should not make it harder for first-time buyers. The Bank of England needs to play its part in a more equitable distribution of lending for property, asking banks to prioritise low-income households and first-time buyers, while simultaneously shifting lending to more productive sectors.<sup>50</sup> The Help to Buy scheme was designed to address some of these issues. However, it is not clear whether this scheme has resolved the problem of accessibility to the housing market for first-time buyers (see Box 1). Indeed, critics argue that the scheme is “increasingly giving taxpayer funded loans to higher earners”.<sup>51</sup>

The distribution of wages will be *partly* determined by forces beyond the control of the Bank of England. Nevertheless, policies set by the Bank of England – including strengthened credit guidance – will eventually impact on wages. Detailed reports on the relationship between wage and productivity growth in different sectors will help to ensure credit guidance is more effective. Faster wage increases in sectors that are delivering or witnessing productivity improvements may be less inflationary. Micro productivity and unit labour costs data will need to assume a greater role in the Bank’s deliberations. It will be important to take a longer-term perspective of the trend in unit labour costs, not overreacting to short-term swings in the data. Analysis of unit labour costs needs to be complemented with more accurate, comprehensive data on non-labour costs, and profit margins.<sup>52</sup>

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As much as regulatory capital contributes to a bank’s cost structure, banks such as MYbank use better and significantly cheaper Chinese made technology to sell banking services. See “Alibaba backed online lender MYbank owes cost-savings to home-made tech”, Reuters, February 1<sup>st</sup> 2018, <https://uk.reuters.com/article/us-china-banking-mybank/alibaba-backed-online-lender-mybank-owes-cost-savings-to-home-made-tech-idUKKBNI FL3S6>.

<sup>50</sup> Effective regulation will avoid a repeat of the problems that led to the sub-prime crisis. In the US, the Dodd-Frank Wall Street Reform and Consumer Protection Act have addressed many of the problems that led to poor underwriting of mortgages prior to the financial crisis of 2007/08. “Highly risky loan products, like negative amortization mortgages, are now banned. Borrowers must document their employment and debt levels. Lenders must disclose all the costs involved in each loan, and, perhaps most important, lenders must verify a borrower's ability to repay the mortgage”. See “How Dodd-Frank changed housing, for good and bad”, CNBC, July 16<sup>th</sup> 2015, <https://www.cnbc.com/2015/07/16/how-dodd-frank-changed-housing-for-good-and-bad.html>.

<sup>51</sup> See “Government's Help to Buy housing scheme increasingly benefiting higher earners”, The Independent, May 29<sup>th</sup> 2018, <https://www.independent.co.uk/news/uk/politics/help-to-buy-housing-scheme-government-benefits-high-earners-property-prices-labour-a8372961.html>.

<sup>52</sup> The Bureau of Economic Analysis provides an estimate for prices, profits and the total unit cost of real gross value added for non-financial corporate businesses. This is broken down into labour and non-labour costs. Non-labour costs are sub-divided into: 1) Consumption of fixed capital; 2) Taxes on production and imports less subsidies plus business current transfer payments (net); 3) Net interest and miscellaneous payments. For example, see “Gross Domestic Product: Third Quarter 2017 (Third Estimate)”, US Bureau of Economic Analysis, December 21<sup>st</sup> 2017, p. 18, Table I3, [https://bea.gov/newsreleases/national/gdp/2017/pdf/gdp3q17\\_3rd.pdf](https://bea.gov/newsreleases/national/gdp/2017/pdf/gdp3q17_3rd.pdf). The BEA also provides a breakdown of profits by industry / sector. See p. 17, Table I2.



Understanding how employment is changing in response to technology and how this is impacting on real wages will be important too. The Bank of England will also need to examine closely the median wage and the distribution of wages to gauge potential risks for financial stability (in respect of rising consumer credit borrowing) and the risks of technology pushing inflation towards the ‘zero bound’.

The Bank of England will be expected to articulate its role within the new industrial strategy and communicate this effectively to markets, which may not take a longer-term perspective of important shifts in the mix of government policies.<sup>53</sup> There is a risk that fixed income markets will view any pick-up in economic growth as a potential source of inflation: as argued above, this may not be the case. An economy expanding due to strong investment in technology and infrastructure will, in the longer run, be less prone to inflation. The market’s response to proactive investment policies will, therefore, need to be assessed closely. Where appropriate, the Bank of England will be required to develop a convincing narrative, backed by strong critical analysis, to show how higher research & development, alongside other forms of productive investment, can reduce long-term inflation expectations.

#### Framework for credit guidance

The banks have not done enough to support companies in sectors that are critical to raising the productive potential of the UK economy. Credit guidance is a new policy tool for the Bank of England designed to correct this flaw with monetary policy.

Credit guidance can be used as a tool to influence the pace of economic growth (macro-policy) as well as the distribution of lending (micro-policy). For a *neutral* setting on credit guidance, total bank lending will be allowed to rise in line with the projected increase in nominal GDP as forecast by the Office for Budget Responsibility. Lending should rise more quickly than nominal GDP to sectors deemed more critical to productivity. Lending should rise less quickly than nominal GDP to sectors deemed less critical to productivity. These differentials in growth rates are to be set by the Bank of England.

Credit guidance can be tweaked: the annual rise in total bank lending can be higher than the increase in nominal GDP if the Bank of England wants faster economic growth. Equally, the rise in total bank lending can be slower than nominal GDP if the Bank of England wants to cool economic growth. Credit guidance can be used as a macro-policy tool.

However, it can also be used as a micro-policy tool, varying risk weightings across sectors (and across banks). This can be used to influence lending between sectors critical to productivity. It can also be used to shape the lending of individual banks.

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<sup>53</sup> Keynes’ liquidity preference theory provides a useful framework for understanding why fixed-income investors react ‘adversely’ to a potential acceleration in economic growth. Investors become increasingly reluctant to hold longer-dated securities at low levels of yields, because of the potential losses they may incur should these yields start to rise. For more, see *The U.S. Economic Recovery*, Graham Turner, 2QT Limited (Publishing), 2014, Chapter 3.

Using data from a wide spectrum of sources, the Strategic Investment Board will identify the sectors that are critical to productivity (see Chapter 5).

### **Box 1: Help to buy<sup>54</sup>**

With a help to buy equity loan, the government lends the borrower up to 20% of the value of a new-build property (the upper limit for buyers in all London boroughs was increased to 40% from February 1<sup>st</sup> 2016). The buyer puts up a minimum cash deposit of 5%: a mortgage from a commercial lender covers the remainder (i.e. 75%, or 55% in London).

Help-to-buy equity loans are available to first-time buyers and existing homeowners. The property must be a newly-built home with a value of no more than £600,000. Homeowners in this scheme are not permitted to sublet the property or own any other properties simultaneously.

The government equity loan is ‘interest-free’ for the first five years. After five years the borrower must begin paying an interest fee of 1.75% on this loan, rising each year by the annual increase in the RPI plus 1%.

The equity loan must be repaid after 25 years, or earlier if the home is sold. The repayment amount will equal the proportion of the initial market value of the home that was funded by this loan.

Since the launch of the ‘Help to Buy: Equity Loan Scheme’, 144,826 properties have been bought with an equity loan (latest data are for Q3 2017).<sup>55</sup> Equity loans have totalled £7.39 billion, helping to buy £35.31 billion worth of properties.<sup>56</sup> First-time buyers have accounted for 81% of these home purchases.<sup>57</sup>

#### **Criticisms**

Help-to-buy equity loans have been criticised for benefitting housebuilders and raising prices.<sup>58</sup> According to one study, homes sold under the scheme carry a ‘premium’ of 5%.<sup>59</sup> Another study found that the price of new builds has outstripped existing homes by around 15% since the start of help to buy.<sup>60</sup> In other words, the scheme has done little to boost affordability. The IMF had criticised the scheme back in 2013, warning that it would boost demand for housing without necessarily raising supply.

<sup>54</sup> See “How does it work? – Help to Buy”, HM Government, <https://www.helptobuy.gov.uk/equity-loan/equity-loans/>.

<sup>55</sup> See “Help to Buy (Equity Loan scheme) and Help to Buy: NewBuy statistics: Data to 30 September 2017, England”, Ministry of Housing, Communities & Local Government, January 11<sup>th</sup> 2018, p. 1, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/672965/20180111\\_HTB\\_EL\\_and\\_HTB\\_NewBuy\\_statistical\\_release.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/672965/20180111_HTB_EL_and_HTB_NewBuy_statistical_release.pdf).

<sup>56</sup> Ibid.

<sup>57</sup> Ibid.

<sup>58</sup> See “Reform Help to Buy to encourage more homes over profit, housebuilder Avant says”, The Telegraph, March 12<sup>th</sup> 2018, <https://www.telegraph.co.uk/business/2018/03/12/reform-help-buy-encourage-homes-profit-housebuilder-avant-says/>.

<sup>59</sup> See “Housebuilders charge premium for Help to Buy properties”, Financial Times, August 8<sup>th</sup> 2017, <https://www.ft.com/content/d763c9fa-7c31-11e7-9108-edda0bcbc928>.

<sup>60</sup> See “Help to buy has mostly helped housebuilders boost profits”, The Guardian, October 21<sup>st</sup> 2017, <https://www.theguardian.com/money/blog/2017/oct/21/help-to-buy-property-new-build-price-rise>.

## Data risks

Reliable economic data is critical to the implementation of a successful monetary and macroprudential policy. The Bank of England will need to work closely with relevant agencies to understand the potential errors and pitfalls with different sources of economic data, to reduce the risks of a policy mistake (see Chapter 6 for more). A detailed risk assessment of the data used will be required, particularly for tracking policy targets (inflation, productivity and, by implication, unit labour costs and productive investment).

Just one sector alone underlines the scale of the challenge: productivity in the telecoms sector has not, according to a recent discussion paper by the Economic Statistics Centre of Excellence (ESCoE), been recorded properly in recent years.<sup>61</sup> There has been a sizeable disconnect between technological performance and economic ‘output’ in this sector. Between 2010 and 2015, data usage in the UK telecoms industry expanded by around 900%, but real gross value added for this sector declined by 4%.<sup>62</sup> There have been rapid gains in data transmission performance, but these have not been reflected in the price level.

This paper concluded that the current output deflator for telecoms services “is upward biased and that telecommunications services prices could have fallen between 35% and 90% between 2010 and 2015, considerably more than the current deflator”.<sup>63</sup> Output and productivity in the telecoms services sector should be much higher. The Office for National Statistics has said it is “committed to changing its service producer price index in the main ‘blue book’ revisions of 2019”.<sup>64</sup>

This does not, of course, imply that real GDP or productivity growth at the aggregate level are incorrectly measured. The statistics in question are related to prices charged to businesses. If quality-adjusted prices charged by the telecoms sector are in fact lower – and real output higher – then businesses would be consuming a far greater quantity of telecoms services. Gross value added (GVA) is calculated as output less intermediate consumption. Therefore, while the GVA of the telecoms sector would rise, the GVA of other sectors would fall by an equal amount.

Nevertheless, the findings of ESCoE’s discussion paper remain important for two reasons. Firstly, it suggests that the pace of technological progress has not slowed. Secondly, it may have significant implications for the Consumer Price Index: a rapid pace of innovation should be expected to show up in consumer prices too.

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<sup>61</sup> See “A Comparison of Approaches to Deflating Telecoms Services Output”, Mo Abdirahman, Diane Coyle, Richard Heys & Will Stewart, Economic Statistics Centre of Excellence and Office for National Statistics, December 2017, <https://www.escoe.ac.uk/wp-content/uploads/2017/02/ESCoE-DP-2017-04.pdf>.

<sup>62</sup> Ibid. p. 1.

<sup>63</sup> Ibid.

<sup>64</sup> See “ONS’s crossed telecom wires raise questions over inflation figures”, Financial Times, January 18<sup>th</sup> 2018, <https://www.ft.com/content/abc14c66-fb78-11e7-a492-2c9be7f3120a>.

Indeed, the paper – co-authored by two statisticians at the Office for National Statistics – acknowledges that there are major issues with the calculation of the telecommunications services and equipment consumer price index.

For mobile phone charges, the Office for National Statistics (ONS) obtains “representative consumer profiles from the UK’s telecommunications regulator, the Office of Communications (Ofcom). For each consumer profile, the ONS then tracks the price for the cheapest available tariff from the main service providers. These are then weighted together using expenditure shares which are also supplied by Ofcom. This approach has problems, particularly when quality change needs to be considered. The cheapest tariff is often based on old technology while the price of the new technology declines and the old technology is phased out. In this case, significant price movements in tariffs using new technologies are missed, even if most people are using the new technology.”<sup>65</sup>

In addition, “With the exception of Smartphones, none of the item level indices in the (consumer price index) CPI: Telecommunications Equipment and Services are hedonically adjusted to control for quality change within the twelve-month life of the ‘basket of goods’ before new products are selected. In a fast-moving sector where contract design can change significantly and quickly this is a key weakness.”<sup>66</sup>

In short, there is a lot to be done to improve the measurement of a fast-changing, dynamic services economy. The creation of the Economic Statistics Centre of Excellence (ESCoE) in November last year – an investment by the Office for National Statistics in response to the findings of the independent review of UK economic statistics<sup>67</sup> – is a very positive step: “ESCoE’s focus will be to provide analysis of emerging and future issues in measuring the modern economy. The centre will offer the capacity for fundamental methodological and conceptual work, which will include best ways to address the challenge of measuring new forms of economic activity in a globalised world, meeting the needs for local area statistics and the productivity puzzle.”<sup>68</sup>

Despite these efforts, statisticians will continue to struggle to fully capture the effects of new technology on the economy. In many ways, this underlines the limits to central banks’ sole focus on price stability: inflation statistics are not that reliable. Accurate productivity statistics will also prove elusive if the deflators are incorrect. This suggests that the Bank of England needs to work closely with the Office for National Statistics to get a better sense of these dynamics. It also shows that more

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<sup>65</sup> See “A Comparison of Approaches to Deflating Telecoms Services Output”, Mo Abdirahman, Diane Coyle, Richard Heys & Will Stewart, Economic Statistics Centre of Excellence and Office for National Statistics, December 2017, p. 15, <https://www.escoe.ac.uk/wp-content/uploads/2017/02/ESCoE-DP-2017-04.pdf>.

<sup>66</sup> Ibid.

<sup>67</sup> See “Independent Review of UK Economic Statistics”, Professor Sir Charles Bean, March 2016, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/507081/2904936\\_Bean\\_Review\\_Web\\_Accessible.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507081/2904936_Bean_Review_Web_Accessible.pdf).

<sup>68</sup> See “About ESCoE”, <https://www.escoe.ac.uk/about-escoe/>.

emphasis needs to be placed on statistics that can be measured with greater accuracy, such as employment, wages, investment and credit.

#### [The Bank of England Asset Purchase Programme – corporate bond purchases](#)

The Corporate Bond Purchase Scheme (CBPS) commenced on September 27<sup>th</sup> 2016.<sup>69</sup> Regarded by some as a belated aspect of the Bank of England’s quantitative easing, this was launched over seven years after gilt purchases.

When outlining this scheme, the Bank of England noted that: “to maximise the effectiveness and efficiency of the economic stimulus”, it would purchase “investment-grade bonds issued by companies that make a material contribution to economic activity in the UK.”<sup>70</sup>

Eligibility decisions as to which corporates were to be considered for the Corporate Bond Purchase Scheme were made by risk management staff, “taking into account a number of different factors. Companies with significant employment in the UK or with their headquarters in the UK will normally be regarded as meeting this requirement”.<sup>71,72</sup> The Bank of England staff also considered “whether the company generates significant revenues in the UK, serves a large number of customers in the UK or has a number of operating sites in the UK”.<sup>73</sup>

A wide range of companies issue sterling corporate bonds. At the time of its Corporate Bond Purchase Scheme (CBPS) launch, the Bank of England commented that “some of those companies are UK incorporated and have substantial business in the UK. Bonds issued by those companies will be eligible for purchase in the CBPS. Other companies are incorporated overseas, but have a genuine business interest in the UK. For example, a company headquartered outside of the UK but employing hundreds of people in the UK and generating sales of £20m in the UK would be considered to make a material contribution to the UK economy. As a result, investment-grade bonds issued by such a company would normally be considered eligible for purchase”.<sup>74</sup> Companies that issued sterling bonds, but did not have material business activities in the UK, were not eligible for purchase in the CBPS.

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<sup>69</sup> The Bank of England purchased the eligible securities in the secondary market by holding reverse auctions. See also “Quantitative easing and the Asset Purchase Facility”, Bank of England, <http://www.bankofengland.co.uk/markets/Pages/apf/corporatebondpurchases/default.aspx>.

<sup>70</sup> See “Corporate bond purchase scheme: eligibility and sectors”, Bank of England, September 12<sup>th</sup> 2016, <https://www.bankofengland.co.uk/news/2016/september/corporate-bond-purchase-scheme-eligibility-and-sectors>.

<sup>71</sup> See “Corporate bond purchase scheme: eligibility and sectors”, Bank of England, September 12<sup>th</sup> 2016, <https://www.bankofengland.co.uk/news/2016/september/corporate-bond-purchase-scheme-eligibility-and-sectors>.

<sup>72</sup> It can be argued that in determining the original eligibility list a more strategic and investment-led approach could have been taken. The Bank of England Governor, the Financial Policy Committee and the Monetary Policy Committee could have played a major role in deciding which sectors of the economy were to benefit from this direct corporate debt purchase scheme.

<sup>73</sup> Ibid.

<sup>74</sup> Ibid.

Table I.B

**Allocation of CBPS scheme, as of  
May 3 2017**

Sector	% of eligible list
Electricity	19
Consumer, non-cyclical	15
Industrial & transport	13
Communications	12
Water	12
Consumer, cyclical	11
Gas	8
Property & finance	6
Energy	3
<b>Total</b>	<b>100*</b>

\* = figures may not sum to 100% due to rounding

Source: Bank of England

The Corporate Bond Purchase Scheme (CBPS) was short-lived: “On 27 April 2017, the Bank announced that it had completed the operations necessary to achieve the current target for corporate bond purchases totalling £10 billion”.<sup>75</sup> In the same statement, the Bank of England made it clear that there would be no additional CBPS operations until further notice.

Table I.B shows the list of sectors and the share that each sector accounts for in the list of bonds that were eligible, as of May 3<sup>rd</sup> 2017.<sup>76</sup>

#### The Bank of England’s implementation of the Corporate Bond Purchase Scheme

The asset purchases under the Corporate Bond Purchase Scheme replicated the existing distribution of bonds outstanding. As the Bank of England itself noted, it acquired “a representative portion of the market”.<sup>77</sup> However, by de facto entrenching the existing yields on corporate bonds outstanding on the secondary market, the Bank of England missed a chance to influence the cost of borrowing for companies that will contribute more to raising the potential growth path of the economy.

The Corporate Bond Purchase Scheme (CBPS) did not seek to shape or influence the distribution of corporate bonds. It made no attempt to directly influence the issuance of bonds in sectors critical to raising the potential growth path of the economy. It is hard to justify this deliberate passivity on the

<sup>75</sup> See “Quantitative easing and the Asset Purchase Facility”, Bank of England, <http://www.bankofengland.co.uk/markets/Pages/apf/corporatebondpurchases/default.aspx>.

<sup>76</sup> Ibid.

<sup>77</sup> See “Corporate bond purchase scheme: eligibility and sectors”, Bank of England, September 12<sup>th</sup> 2016, <https://www.bankofengland.co.uk/news/2016/september/corporate-bond-purchase-scheme-eligibility-and-sectors>.

part of the Bank of England in its implementation of the CBPS. Indeed, it is precisely the unorthodox nature of the CBPS that makes it suitable for the incorporation of wider, macroeconomic considerations.

A total of 48% of the bonds outstanding are for 'infrastructure' companies.<sup>78</sup> Improving the country's infrastructure is a key objective of the National Transformation Fund set out by the Labour Party. Using the Corporate Bond Purchase Scheme to reduce the cost of funding for 'infrastructure' companies may have benefits, although this could have been achieved through alternative, more direct avenues.

In essence, the Corporate Bond Purchase Scheme was entirely focussed on stimulating demand in the economy, not raising the potential growth path of the UK. This policy is merely about trying to hit the inflation target. As noted, policies that simply aim to hit a target for the consumer price index are sub-optimal.

It is also debateable whether the Bank of England, under its current mandate and relying on its current analytical capabilities, should be conducting asset purchases for *riskier* assets. The theoretical argument in favour of quantitative easing is predicated on shaping the *risk-free* interest rate.<sup>79</sup> Markets should ordinarily be left to decide the risk premium on corporate bonds. This should not be the realm of central banks. Instead, the Strategic Investment Board, an analytical and strategic 'hub', must be instrumental in outlining the sectors that should be targeted. It will be in a better position to understand the risk-reward profiles of companies. This would also ensure that any future purchases of corporate bonds by the Bank of England are consistent with the strategic investment required.

#### Asset Purchase Facility results<sup>80</sup>

Table I.C shows the Bank of England's outstanding stock of holdings from gilt purchases and from the Corporate Bond Purchase Scheme. It also shows the loans made through the Term Funding Scheme. The creation of central bank reserves has financed all transactions. Data are, as at close of Wednesday March 21<sup>st</sup> 2018, on a settlement date basis net of any redemption.<sup>81</sup>

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<sup>78</sup> Defined by the authors as 'industrial & transport', 'communications', 'water', 'gas' and 'energy'.

<sup>79</sup> As John Maynard Keynes noted in *The General Theory of Employment, Interest and Money*, Macmillan Cambridge University Press, 1936, p. 235, the 'money rate of interest' (the risk-free rate or pure rate) is responsible for "setting the pace for all other commodity-rates of interest." See also *The US Economic Recovery*, Graham Turner, 2QT Limited (Publishing), 2014, p. 191.

<sup>80</sup> See "Quantitative easing and the Asset Purchase Facility", Bank of England, <http://www.bankofengland.co.uk/markets/Pages/apf/corporatebondpurchases/default.aspx>.

<sup>81</sup> Ibid.

Table I.C

<b>Bank of England Asset Purchase Facility</b>	
<b>Scheme</b>	<b>Current amount purchased, as of March 21 2018 (£ millions)</b>
Gilt purchases	421,559
Corporate bond purchases	9,883
Term Funding Scheme	127,016

Source: Bank of England

### Funding for Lending Scheme

The Funding for Lending Scheme allows participants to borrow UK Treasury Bills in exchange for eligible collateral, which consists of all collateral eligible in the Bank's Discount Window Facility.

"The Bank and HM Treasury launched the Funding for Lending Scheme (FLS) on 13<sup>th</sup> July 2012. The FLS is designed to incentivise banks and building societies to boost their lending to the UK real economy. It does this by providing funding to banks and building societies for an extended period, with both the price and quantity of funding provided linked to their lending performance".<sup>82</sup>

The Funding for Lending Scheme (FLS) was extended on April 24<sup>th</sup> 2013 and amended on November 28<sup>th</sup> 2013, on December 2<sup>nd</sup> 2014 and on November 30<sup>th</sup> 2015. Participants were able to borrow from the FLS until January 2018, "with incentives to boost lending skewed towards small and medium sized enterprises (SMEs)".<sup>83</sup>

The Bank of England and the Treasury claim that the Funding for Lending Scheme has been beneficial for small & medium-sized enterprises and the wider economy. As the Bank of England stated on November 30<sup>th</sup> 2015, "the extension announced today will continue the tapering of the scheme, while ensuring a continuation of the temporary support provided so as not to risk hindering the recovery in SME credit conditions. This extension will also complement other initiatives undertaken by the Treasury and the Bank of England that tackle longer term structural constraints on SME lending."<sup>84</sup>

<sup>82</sup> See "The Funding for Lending Scheme", Bank of England, Quarterly Bulletin Q4 2012, p. 306, <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2012/the-funding-for-lending-scheme.pdf?la=en&hash=57B13A5C9E94B5D02A451670C8B013DD22CF16EA>.

<sup>83</sup> See "Further Amendment to the Funding for Lending Scheme Extension – Market Notice", Bank of England, November 30<sup>th</sup> 2015, <https://www.bankofengland.co.uk/markets/market-notices/2015/further-amendment-to-the-funding-for-lending-scheme-extension-market-notice>.

<sup>84</sup> See "Bank of England and HM Treasury announce extension to the Funding for Lending Scheme", Bank of England, November 30<sup>th</sup> 2015, <https://www.bankofengland.co.uk/news/2015/november/boe-and-hmt-announce-extension-to-the-fls>.



Commenting on these changes to the scheme, Mark Carney, Governor of the Bank of England said: “Since its launch in 2012, the Funding for Lending Scheme (FLS) has provided an important source of funding support to banks, which has flowed through to improved credit conditions across the economy. As conditions have normalised for particular sectors over the life of the FLS, we have consistently reduced the scope of this temporary scheme and focussed support where it is needed most. The announcement today continues that tapering, supporting continued improvement in small, & medium sized enterprises credit conditions as the economic recovery takes hold, while gradually withdrawing that support over the next two years.”<sup>85</sup>

George Osborne, then Chancellor of the Exchequer noted: “The Funding for Lending Scheme, which we launched with the Bank of England in 2012, has been a vital part of supporting the recovery, ensuring lending to households and businesses. It was due to expire in January but I am pleased to say that we are extending the scheme until 2018, supporting more loans. Given the improvement we’ve seen in credit conditions for households and large businesses, as our long-term economic plan moves from rescue to rebuild it is right that we continue to focus the scheme’s firepower on the small businesses that are the lifeblood of the economy. The Funding for Lending Scheme will be gradually wound down as the recovery strengthens, delivering a managed exit from the scheme.”<sup>86</sup>

#### Term Funding Scheme

The Term Funding Scheme was announced by the Bank of England on August 4<sup>th</sup> 2016 as a separate aspect of the Asset Purchase Facility: “The Term Funding Scheme (TFS) is designed to reinforce the transmission of Bank Rate cuts to those interest rates actually faced by households and businesses by providing term funding to banks at rates close to Bank Rate... It is a monetary policy tool of the Monetary Policy Committee and will be operated as part of the Asset Purchase Facility”.<sup>87</sup>

As the Monetary Policy Committee noted:

“The cut in Bank Rate will lower borrowing costs for households and businesses. However, as interest rates are close to zero, it is likely to be difficult for some banks and building societies to reduce deposit rates much further, which in turn might limit their ability to cut their lending rates. In order to mitigate this, the Monetary Policy Committee (MPC) is launching a Term Funding Scheme (TFS) that will provide funding for banks at interest rates close to Bank Rate. This monetary policy action should help reinforce the transmission of the reduction in Bank Rate to the real economy to ensure that households and firms benefit from the MPC’s actions. In addition, the TFS provides participants with

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<sup>85</sup> Ibid.

<sup>86</sup> Ibid.

<sup>87</sup> See “Asset Purchase Facility: Term Funding Scheme – Market Notice”, Bank of England, <https://www.bankofengland.co.uk/markets/market-notice/2016/asset-purchase-facility-term-funding-scheme-market-notice>.

a cost-effective source of funding to support additional lending to the real economy, providing insurance against the risk that conditions tighten in bank funding markets”.<sup>88</sup>

The Term Funding Scheme closed on February 28<sup>th</sup> 2018: banks borrowed a total of £127bn.<sup>89</sup> Nevertheless, the Term Funding Scheme has failed to meaningfully address the insufficiency of productive lending in the UK economy (see Chapter 3). Channelling funding, albeit at ‘close to Bank Rates’, to ‘rentier’ and/or unproductive sectors offers no solution to the falling levels of productivity and weak growth path of the UK economy. Furthermore, now that the scheme has been withdrawn, bank margins are coming under renewed downward pressure.

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<sup>88</sup> See “Monetary Policy Summary and minutes of the Monetary Policy Committee meeting ending on 3 August 2016”, Bank of England, August 4<sup>th</sup> 2016, <https://www.bankofengland.co.uk/-/media/boe/files/monetary-policy-summary-and-minutes/2016/august-2016.pdf?la=en&hash=E33AF6A4125E5A009CD2B766F119B90A2AB1A707>.

<sup>89</sup> See “Quantitative easing and the Asset Purchase Facility”, Bank of England, <https://www.bankofengland.co.uk/markets/quantitative-easing-and-the-asset-purchase-facility>.

### Risk weightings<sup>90</sup>

The Prudential Regulation Authority (PRA) issued a consultation paper (CP12/17) in July 2017, setting out a new Pillar 2A that will give the PRA more scope to increase risk weighting requirements.<sup>91</sup> This, along with the PRA buffer (also known as Pillar 2B), could incentivise banks to promote lending to small & medium-sized enterprises.

In 2017, the Bank of England and the Prudential Regulation Authority (PRA) proposed amendments in the Consultation Paper CP12/17 'Pillar 2A capital requirements and disclosure'. This contained proposed draft amendments to the Supervisory Statement 31/15 'The Internal Capital Adequacy Assessment Process (ICAAP) and the Supervisory Review and Evaluation Process (SREP)':

*"2.8 To reflect the change from guidance to requirement of Pillar 2A, the PRA proposes to update its Capital Buffers and Pillar 2 Model Requirements by adding a requirement that firms should maintain Pillar 2A capital and meet that requirement with at least 56% of CET1 capital and not more than 44% additional Tier 1 (AT1) capital or 25% Tier 2 capital. A firm would then be invited to apply for the imposition of such a requirement at the same time as it is informed about the outcome of the SREP."*

Powers of PRA to set the 'PRA buffer':

*"5.21 In setting a PRA buffer for a firm the PRA will not just consider whether the firm would meet its CET1 capital requirements under the CRR and its ICG Pillar 2A capital requirement in the stress scenario. Other factors informing the size of the PRA buffer include but are not limited to: the maximum change in capital resources and requirements under the stress; the firm's leverage ratio; the extent to which the firm has used up its CRD IV buffers (eg the systemically important financial institution (SIFI) and capital conservation buffers); Tier 1 and total capital ratios; and the extent to which potentially significant risks are not captured fully as part of the stress."*

*"5.22 Where the PRA assesses a firm's risk management and governance (RM&G) to be significantly weak, it may set the PRA buffer to include an amount of capital to cover the risks posed by those weaknesses until they are addressed. This will generally be calibrated in the form of a scalar applied to the amount of CET1 required to meet the firm's Pillar 1 plus Pillar 2ATCR. Depending on the severity of the weaknesses identified, the scalar could range from 10% to 40%. If the PRA sets the PRA buffer to cover the risk posed by significant weaknesses in risk management or governance it will identify those weaknesses to the firm and expect the firm to address those weaknesses within an appropriate timeframe."*

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<sup>90</sup> This section has been adapted from *Financing Investment: Interim Report*.

<sup>91</sup> See "Pillar 2A capital requirements and disclosure", Consultation Paper CP12/17, Prudential Regulation Authority, July 2017, <http://www.bankofengland.co.uk/pr/Documents/publications/cp/2017/cp1217.pdf>.

## **Box 2: Productive investment**

“Investment is defined as spending that has the potential to expand the capacity of the economy, by adding to capital, knowledge and technology.”<sup>92</sup>

The opportunities across different areas of technology need to be examined more closely. Working with the Strategic Investment Board, the Bank of England will be expected to talk to industry experts across a range of sectors. A more detailed analysis of capital goods, new inventions, and the pace of change and development of new technologies will allow the Bank of England to estimate the potential growth path of the economy more accurately. Notable examples include semiconductor chips, sensors, 3-D printing machines, robotics, renewables, quantum computers and machine learning. This data can be corralled into partial price indicators to provide a more accurate assessment of opportunities for companies to 1) reduce costs, 2) develop/expand into new markets and 3) disrupt existing markets.

Investment can be tangible (e.g. machinery) or intangible (e.g. software). According to the Office for National Statistics (ONS), business investment is net investment by private and public corporations in “transport, information & communication technology (ICT) equipment, other machinery & equipment, cultivated assets (such as livestock and vineyards), intellectual property products (IPP, which includes investment in software, research and development, artistic originals and mineral exploration), and other buildings and structures.”<sup>93</sup>

A broader definition of investment is gross fixed capital formation, which includes investment in dwellings.<sup>94</sup> Productive investment should exclude this.

There are pressing issues around the accurate measurement of investment in many areas related to technology.<sup>95</sup> These problems have been exacerbated by the growing importance of intangible investment (e.g. software and R&D) over time. This is a feature of the knowledge economy: the intensity of intangible capital has grown alongside the shift from capital-intensive to knowledge-intensive sectors.

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<sup>92</sup> See “Understanding and measuring finance for productive investment”, Bank of England, April 2016, p. 8, <https://www.bankofengland.co.uk/-/media/boe/files/paper/2016/understanding-and-measuring-finance-for-productive-investment.pdf?la=en&hash=BI B704C63D3E3D59179A583619C05F1FCECB4CEE>.

<sup>93</sup> See “Business investment in the UK: October to December 2017 revised results”, Office for National Statistics, March 29<sup>th</sup> 2018, p. 3, <https://www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/businessinvestment/octobertodecember2017revisedresults>.

<sup>94</sup> See “A short guide to gross fixed capital formation and business investment”, Office for National Statistics, May 25<sup>th</sup> 2017, <https://www.ons.gov.uk/economy/grossdomesticproductgdp/articles/ashortguidetogrossfixedcapitalformationandbusinessinvestment/2017-05-25>.

<sup>95</sup> For more on this issue, see *AI: American Innovation and the Economic Recovery*, Graham Turner and Demetris Pachnis, 2QT Limited (Publishing), 2016, pp. 113-132.

Not all intangible assets are included in the national accounts. The ONS has begun to publish experimental estimates of investment in intangible assets in the UK.<sup>96</sup> This includes spending on ‘economic competencies’ such as branding, organisational capital and firm-specific training, which are currently not capitalised in the national accounts.

For the record, intangible investment (broad definition) overtook tangible investment in the UK in 2001 and has exceeded tangible investment in every year barring 2015 (latest available data).<sup>97</sup> In 2015, tangible investment totalled £141.7 billion compared to £134.2 billion on intangible investment.<sup>98</sup>

The definition of ‘productive’ investment is more difficult to pin down. For some, a positive marginal product of capital is sufficient. For others, the productivity of investment is tied to its profitability (i.e. if the net present value of investment is positive).

The Bank of England adopts a wider definition:

“Investment is productive as long as the expected social return to investment is greater than or equal to the social cost of capital.”<sup>99</sup>

Critically, private and social returns (and costs) can differ. For example, “a bridge without tolls may yield no private return to its owners. However, the increased mobility of goods and people that result from a bridge being built can yield substantial returns to society as a whole.”<sup>100</sup>

In practice, the social returns from investment are very difficult to measure. Central banks need to develop a deeper understanding of the opportunities that are emerging from efficiency gains within different categories of investment. It cannot be enough to rely on historic data, which may not (due to question marks over deflators) be accurate.

Finally, it is worth distinguishing between productive *investment* and productive *sectors* of the economy. ‘Productive’ sectors of the economy can still be engaged in speculative activity.<sup>101</sup>

<sup>96</sup> See “Experimental estimates of investment in intangible assets in the UK: 2015”, Office for National Statistics, February 7<sup>th</sup> 2018,

<https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/experimentalestimatesofinvestmentinintangibleassetsintheuk2015/2018-02-07>.

<sup>97</sup> Ibid.

<sup>98</sup> Ibid.

<sup>99</sup> See “Understanding and measuring finance for productive investment”, Bank of England, April 2016, p. 3, <https://www.bankofengland.co.uk/-/media/boe/files/paper/2016/understanding-and-measuring-finance-for-productive-investment.pdf?la=en&hash=BI B704C63D3E3D59179A583619C05F1FCECB4CEE>.

<sup>100</sup> Ibid. p. 8.

<sup>101</sup> See *Solutions to a Liquidity Trap*, Graham Turner, June 2003, p. 2: “The trappings of Japan’s success story were evident for all. At the height of the property rush, Japanese investors were stampeding into the US property market. Mitsubishi Estate bought the New York Rockefeller Centre for US\$84.6bn in 1989. Mitsui Fudosan acquired the Exxon Building in New York for US\$61.0bn three years earlier. Shuwa Corporation had purchased the Arco Plaza in Los Angeles for US\$62.0bn in 1986. The world art market was dominated by cash-rich Japanese bidders too, snapping-up masterpieces at record prices. Between 40 and 50 per cent of impressionist and modern paintings on sale at Sotheby’s and Christie’s auction houses were being acquired by Japanese dealers. In one notable case, businessman Ryoei Saito had paid an eye-catching US\$82.5m for Van Gogh’s “Portrait of Dr Gachet” and a further US\$78.1m for Renoir’s “Au Moulin de la Galette”. Japanese

The Bureau of Economic Analysis (US) provides a more detailed breakdown of non-residential investment that is illustrative of the detail required for a comprehensive analysis of investment:

**Structures:**

- Commercial and healthcare
- Manufacturing
- Power and communication
- Mining exploration, shafts, and wells
- Other structures

**Equipment:**

- Information processing equipment
- Computers and peripheral equipment
- Industrial equipment
- Transportation equipment

**Intellectual property products:**

- Software
- Research and development
- Entertainment, literary, and artistic originals

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companies were among the largest in the world. Mitsui & Co, Sumitomo Corp, Marubeni Corp and C Itoh all had larger sales than America's biggest company, General Motors.”

## Coordinating fiscal and monetary policy

In 1997, a Labour Government gave the Bank of England full control over monetary policy.<sup>102</sup> To varying degrees, independent central banks have become ‘the norm’ across the industrialised world.<sup>103</sup> However, outside of the Eurozone, governments have continued to exercise autonomy over fiscal policy.

This division of responsibility creates problems. As seen in the US during recent months, it is possible for fiscal and monetary policy to come into conflict. A looser fiscal policy has contributed to a rise in US Treasury yields (Chart 1.2) and amplified volatility in financial markets (see Charts 1.3 and 1.4).<sup>104</sup>

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<sup>102</sup> See “How is the Bank of England independent of the Government?”, Bank of England, <http://edu.bankofengland.co.uk/knowledgebank/how-is-the-bank-of-england-independent-of-the-government/>.

<sup>103</sup> The Bank of Japan was given greater independence with the Bank of Japan Act in 1997. The “government’s authority is now limited to checking whether the Bank’s actions are pursuant to laws and regulations. The budget for expenses necessary to perform the Bank’s operations and organizational management requires approval by the Minister of Finance... the areas of business operations subject to approval by the Minister have been limited and transparency is secured in the process of such approval.” See “What does independence mean for the Bank?” Bank of Japan, <https://www.boj.or.jp/en/announcements/education/oshiete/outline/a03.htm/>.

The Federal Reserve is an independent government agency, but it is ultimately accountable to the public and Congress. Congress established maximum employment and stable prices as the key macroeconomic objectives for the Federal Reserve in its conduct of monetary policy.

See “What does it mean that the Federal Reserve is “independent within the government”?”, Federal Reserve, [https://www.federalreserve.gov/faqs/about\\_12799.htm](https://www.federalreserve.gov/faqs/about_12799.htm).

The European Central Bank’s (ECB) independence “is laid down in the institutional framework for the single monetary policy (in the Treaty and in the Statute). Neither the ECB nor the national central banks (NCBs), nor any member of their decision-making bodies, are allowed to seek or take instructions from EU institutions or bodies, from any government of an EU Member State or from any other body”.

See “Independence”, European Central Bank, <http://www.ecb.europa.eu/ecb/orga/independence/html/index.en.html>.

<sup>104</sup> See “The Budget and Economic Outlook: 2018 to 2028”, Congressional Budget Office, April 9<sup>th</sup> 2018, p. 1, <https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/53651-outlook.pdf>. According to the Congressional Budget Office (CBO):

“Federal debt is projected to be on a steadily rising trajectory throughout the coming decade. Debt held by the public, which has doubled in the past 10 years as a percentage of gross domestic product (GDP), approaches 100 percent of GDP by 2028 in CBO’s projections. That amount is far greater than the debt in any year since just after World War II. Moreover, if lawmakers changed current law to maintain certain current policies—preventing a significant increase in individual income taxes in 2026 and drops in funding for defense and nondefense discretionary programs in 2020, for example—the result would be even larger increases in debt.

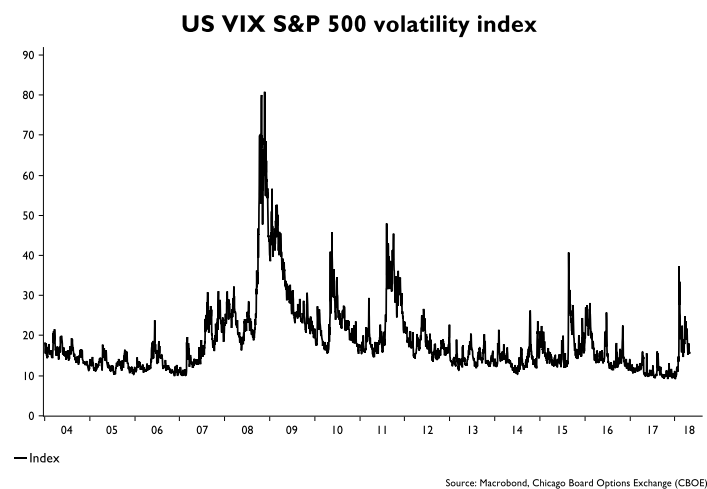
Projected deficits over the 2018–2027 period have increased markedly since June 2017, when CBO issued its previous projections. The increase stems primarily from tax and spending legislation enacted since then—especially Public Law 115-97 (originally called the Tax Cuts and Jobs Act and called the 2017 tax act in this report), the Bipartisan Budget Act of 2018 (P.L. 115-123), and the Consolidated Appropriations Act, 2018 (P.L. 115-141). The legislation has significantly reduced revenues and increased outlays anticipated under current law”.

The two-year Treasury yield has more than doubled since September 2017 (see Chart 1.2).<sup>105</sup> A lack of policy coordination can be destabilising.

Chart 1.2



Chart 1.3



<sup>105</sup> Source: Macrobond. The two-year Treasury yield was 1.27% on September 8<sup>th</sup> 2017. It had risen to 2.59% by June 13<sup>th</sup>. Of course, it could be argued that this simply reflected stronger US economic data and the Federal Open Market Committee’s determination to keep raising interest rates (to 3.4% by Q4 2020, based on the June 12-13<sup>th</sup> 2018 Economic Projection Materials, <https://www.federalreserve.gov/monetarypolicy/files/fomcprojt20180613.pdf>). However, the timing of the shift to a looser fiscal policy accelerated the rise in borrowing costs. See “Minutes of the Federal Open Market Committee January 30–31, 2018”, pp. 11-12, <https://www.federalreserve.gov/monetarypolicy/files/fomcminutes20180131.pdf>. “A strengthening outlook for economic growth in the United States and abroad, along with recently enacted tax legislation, appeared to boost investor sentiment. U.S. equity prices, Treasury yields, and market-based measures of inflation compensation rose”.



Chart I.4



This review sets out how the Government can and should contribute towards raising the productive potential of the economy. It also explains the Bank of England’s role in this endeavour. As already stated above, this report suggests that productivity should be a key target for the central bank.

However, if governments borrow excessively to fund current spending, this will undermine the Bank of England’s efforts to raise productivity and boost the potential growth path of the economy.

In the 2017 Election Manifesto, the Labour Party committed to “eliminating the government’s deficit on day-to-day spending within five years.”<sup>106</sup> This “Fiscal Credibility Rule is based on the simple principle that government should not be borrowing for day-to-day spending, but that future growth depends on investment.”<sup>107</sup> This is a clear positive but more concrete, structural steps are required.

This review proposes, therefore, that the Bank of England and the Government sign a fiscal policy accord. This agreement would mandate the Bank of England to formally comment on Government fiscal policy. Using input from the Office for Budget Responsibility, the Bank of England will be tasked with providing a detailed critique of the spending and taxation decisions of the Government, and how these impact on productivity and the potential growth path of the UK economy.

Specifically, the Bank of England would issue a detailed analysis of the tax and spending proposals outlined in every Autumn Budget. The Bank of England could comment on the level of spending and taxation, as well as the distribution (i.e. to fund current spending versus capital expenditures, or between different government departments).

<sup>106</sup> See “For the many, not the few”, The Labour Party Manifesto 2017, p. 10, <https://labour.org.uk/wp-content/uploads/2017/10/labour-manifesto-2017.pdf>.

<sup>107</sup> Ibid.

Nevertheless, as part of the accord, the Bank of England must pledge to respect the Government's manifesto commitments, and the democratic vote. In other words, the Bank of England must consider the Government's wider economic objectives and social objectives upon which it was elected. The Government will ultimately decide on the level of spending between departments and on the level of taxation.

### Mechanisms

This review proposes that legislation is passed mandating the Bank of England to comment and critique a Government's budget proposals set forth in every Autumn Budget. This additional level of scrutiny will exert discipline on the Government to prioritise investment, not current spending.

This legislation will allow the Bank of England to monitor and review the evolution of the Government's spending and taxation plans. The Office for Budget Responsibility will be given an expanded role to oversee these new budget rules.<sup>108</sup>

The Office for Budget Responsibility (OBR) will be required to produce more frequent reports on the long-term projections for the public finances.<sup>109</sup> The OBR produces fiscal risk statements "at least once every two years".<sup>110</sup> Both of these exercises need to be completed more frequently – every six months – to ensure an absolute focus on the sustainability of public sector finances.

The Office for Budget Responsibility (OBR) currently has access to information as set out by the Memorandum of Understanding between the OBR, the Treasury and other government departments.<sup>111</sup> This Memorandum of Understanding needs to be extended to include UK Research and Innovation, the Strategic Investment Board, the National Investment Bank, and other

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<sup>108</sup> See "Memorandum of understanding between the Office for Budget Responsibility, HM Treasury, the Department for Work & Pensions and HM Revenue & Customs", Office for Budget Responsibility, March 8<sup>th</sup> 2017, [http://obr.uk/docs/dlm\\_uploads/MoU\\_2017\\_updateWebPDF.pdf](http://obr.uk/docs/dlm_uploads/MoU_2017_updateWebPDF.pdf). "The Memorandum of Understanding sets out the agreed working relationship between the OBR, HM Revenue and Customs, the Department for Work and Pensions, and HM Treasury. It sets out the arrangements needed for effective working, covering each institution's key responsibilities, coordination of the forecast process, and the process for information sharing."

<sup>109</sup> See "Charter for Budget Responsibility: autumn 2016 update", Presented to Parliament pursuant to Section 1 of the Budget Responsibility and National Audit Act 2011, HM Treasury, January 2017, p. 13, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/583547/charter\\_for\\_budget\\_responsibility\\_autumn\\_2016\\_update\\_final\\_for\\_laying\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/583547/charter_for_budget_responsibility_autumn_2016_update_final_for_laying_web.pdf). The Office for Budget Responsibility produces an annual sustainability report. This report includes long-term projections for the public finances and an assessment of the public sector balance sheet "at least once every 2 years".

<sup>110</sup> Ibid.

<sup>111</sup> See "Memorandum of understanding between the Office for Budget Responsibility, HM Treasury, the Department for Work & Pensions and HM Revenue & Customs", Office for Budget Responsibility, March 8<sup>th</sup> 2017, [http://obr.uk/docs/dlm\\_uploads/MoU\\_2017\\_updateWebPDF.pdf](http://obr.uk/docs/dlm_uploads/MoU_2017_updateWebPDF.pdf).

institutions.<sup>112</sup> This will allow the Office for Budget Responsibility to delve more closely into the determinants of productivity.

#### Deficit targets

The Bank of England will be expected to demonstrate how its policies have contributed to the productivity target (of 3% per annum).

The Government could decide to allocate spending and taxation in a way that still meets its deficit (or surplus) target, but damages the potential growth path of the economy. This may also increase the risks of higher inflation. The Bank of England would be expected to articulate its position to the broader public. This will act as a strong deterrent to the Government introducing fiscal policy measures that damage the productive potential of the economy.

To reiterate, the Bank of England will not be able to dictate spending allocations between departments or on specific tax rates. These will be matters for the Government, working with the Treasury. The Bank of England will, nevertheless, be expected to engage in a rigorous debate with the Treasury in regard to budgets that do not ‘credibly’ contribute to the productivity target, or breach Labour’s own Fiscal Credibility Rule.

Specifically, the Labour Party commits<sup>113</sup> to:

- Closing the deficit on day-to-day spending over five years;<sup>114</sup>
- Ensuring government debt is falling (as a share of GDP) at the end of five years; and
- Borrowing only to invest.

This framework will provide an extra incentive for the Government to reduce the tax gap.<sup>115</sup> This is the difference between the amount of tax that should, in theory, be collected, and the money received from taxpayers.<sup>116</sup> According to HM Revenue & Customs, the tax gap was £34bn in 2015/16.<sup>117</sup> In sterling terms, this figure has barely changed over the past eleven years.<sup>118</sup> As a share of tax liabilities,

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<sup>112</sup> UK Research and Innovation, its core councils and other research institutes, universities and collaborating companies will provide valuable data on the impact of funding, science and technology. See Chapter 5 – Industrial Strategy.

<sup>113</sup> See “Labour’s Fiscal Credibility Rule”, UK Labour Party, <http://labour.org.uk/wp-content/uploads/2017/10/Fiscal-Credibility-Rule.pdf>.

<sup>114</sup> For the record, the UK ran a current budget surplus of £1.3bn in the financial year April 2017 to March 2018. See “Public sector finances, UK: April 2018”, Office for National Statistics, May 22<sup>nd</sup> 2018, <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/publicsectorfinance/bulletins/publicsectorfinances/april2018>.

<sup>115</sup> See “Measuring tax gaps 2017 edition: Tax gap estimates for 2015-16”, HM Revenue & Customs, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/655097/HMR\\_C-measuring-tax-gaps-2017.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/655097/HMR_C-measuring-tax-gaps-2017.pdf).

<sup>116</sup> Ibid. p. 5.

<sup>117</sup> Ibid. p. 3.

<sup>118</sup> Ibid. p. 4.

the tax gap has dropped from 7.9% to 6.0%.<sup>119</sup> Nevertheless, HM Revenue & Customs has failed to collect £360bn during this period.<sup>120</sup> Furthermore, this is very likely to be an underestimate.<sup>121</sup>

Investment in big data should allow HM Revenue & Customs to bring this tax gap down significantly, and quickly. This will provide room, under the proposed policy framework, for the Government to increase current spending. Indeed, there is a very clear incentive for the Government to provide more resources to HM Revenue & Customs to eliminate the tax gap.

### Debt sustainability

Outlays through the National Transformation Fund will fall outside the current government budget, but will nevertheless increase public sector debt. The sustainability of public sector debt will not only depend on the current budget. Ultimately, expanding public sector investment is only desirable if it leads to faster productivity growth, which in turn leads to an improvement in the current government budget (i.e. through higher tax revenues, lower welfare spending).

The Bank of England will need to assess the long-term impact of spending through the National Transformation Fund on productivity. It will be required to consider the impact of credit guidance (and other policies) on productivity, to calibrate the necessary borrowing targets for the Government's current budget, and ensure total public sector debt remains on a sustainable path.

Economic growth propelled by faster consumer spending will, *ceteris paribus*, require more restrictive targets for current government borrowing, compared to an equivalent growth rate driven by faster non-residential investment. However, in the latter case, it will be important for the Bank of England and the Office for Budget Responsibility to dissect any expansion in non-residential investment to estimate how quickly this is feeding through into higher productivity.

By scrutinising the multiplier effects and the impact on productivity from investment through the National Transformation Fund (and other policy changes<sup>122</sup>), the Bank of England and the Office for Budget Responsibility will be able to adjust their assessment of how government policies will contribute to meeting or missing government borrowing targets. This will need to be done to ensure that total public sector debt falls as a share of GDP over the course of a Parliament, consistent with Labour's Fiscal Credibility Rule.<sup>123</sup>

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<sup>119</sup> Ibid.

<sup>120</sup> Ibid.

<sup>121</sup> It should be stressed: the Office for National Statistics estimate of the tax gap may be an underestimate. See "Measuring the tax gap in the European economy", Konrad Raczkowski, *Journal of Economics and Management*, Vol. 21(3), 2015, pp. 58-72. This paper estimates the UK tax gap to stand between £58.6 billion and £122.0 billion a year.

<sup>122</sup> For example, credit guidance.

<sup>123</sup> See "Labour's Fiscal Credibility Rule", UK Labour Party, <http://labour.org.uk/wp-content/uploads/2017/10/Fiscal-Credibility-Rule.pdf>.

## Multipliers, R&D spending and capacity constraints

In its simplest terms, the ‘multiplier’ is defined as the effect of a £1 change in spending (or tax revenue) on the level of GDP.<sup>124</sup> Mathematically, this can be represented as follows:

$$\text{Impact multiplier} = \frac{\Delta Y(t)}{\Delta G(t)}$$

where  $\Delta Y$  is the change in output,  $\Delta G$  is the change in government spending, and  $t$  denotes the time period. The short-run multipliers used by the Office for Budget Responsibility are presented below, taken from a March 2014 Briefing Paper<sup>125</sup>:

Table I.E: Estimates of fiscal multipliers<sup>126</sup>

Measure	Impact multipliers
Change in VAT rate	0.35
Changes in the personal tax allowance and National Insurance Contributions	0.3
AME welfare measures	0.6
Implied resource departmental expenditure limits	0.6
Implied capital departmental expenditure limits	1.0

Source: Office for Budget Responsibility

Capital spending is generally associated with the highest multipliers. These multiplier estimates have remained unchanged since June 2010.<sup>127</sup> The Office for Budget Responsibility estimates were informed by the academic literature of the time. However, there has been some debate regarding the validity of these estimates.<sup>128</sup>

The size of the multiplier will also depend on the degree of spare capacity in the economy. Monetary policymakers may act to offset a fiscal stimulus, if it is believed that the economy is close to full employment. In the UK, “The MPC (Monetary Policy Committee) continues to judge that the UK economy has a very limited degree of slack.”<sup>129</sup> Short-term interest rates could rise by more if current public sector spending was allowed to climb too quickly. In this case, the multipliers would be lower.

<sup>124</sup> See “Fiscal Multipliers: Size, Determinants, and Use in Macroeconomic Projections”, Nicoletta Batini, Luc Eyraud, Lorenzo Forni, and Anke Weber, IMF Technical Notes and Manuals, September 2014, <https://www.imf.org/external/pubs/ft/tnm/2014/tnm1404.pdf>.

<sup>125</sup> See “Policy costings and our forecast”, Briefing paper No. 6, Office for Budget Responsibility, March 2014, p. 35, [http://cdn.obr.uk/27814-BriefingPaperNo\\_6.pdf](http://cdn.obr.uk/27814-BriefingPaperNo_6.pdf).

<sup>126</sup> Ibid.

<sup>127</sup> See “Budget forecast: June 2010”, Office for Budget Responsibility, p. 95, [http://obr.uk/docs/junebudget\\_annexc.pdf](http://obr.uk/docs/junebudget_annexc.pdf).

<sup>128</sup> See, for example, “Why multipliers matter”, Geoff Tily, June 24<sup>th</sup> 2017, <https://touchstoneblog.org.uk/2017/07/why-multipliers-matter/>.

<sup>129</sup> See “Inflation Report: May 2018”, Bank of England, p. i, <https://www.bankofengland.co.uk/-/media/boe/files/inflation-report/2018/may/inflation-report-may-2018.pdf?la=en&hash=50C30B6F32DE7CB3232EA2F0A025D849EECE1EBAA>.

However, a tighter monetary policy in the face of greater investment may be misguided. Rather than ‘crowding out’ private sector activity, entrepreneurs may be ‘crowded in’ by government investment projects, which create investment opportunities.

The multiplier effects will depend on the ‘buy-in’ from the private sector. The coordination of fiscal and monetary policy, the explicit use of credit guidance, and reforms to encourage more long-term equity investment, can all raise the multiplier effects. As noted in Chapter 5, ‘smart’ investment by the public sector can act as a powerful signalling mechanism to the private sector, raising the potential buy-in from investors.

The evidence suggests that the multiplier effects from research & development spending, for example, tend to be very large.<sup>130,131</sup>

A higher potential growth path for the economy would imply more spare capacity: both public and private investment could increase without stoking inflation. For this reason, policy coordination is imperative. There is no guarantee that the ‘correct’ policy mix will be achieved. Nevertheless, a debate at top policymaking institutions will arguably minimise the scope for policy mistakes.

The focus on productivity and multipliers will concentrate minds on whether a Labour Government will want to make full use of the pledged lending by the National Investment Bank and spending through the National Transformation Fund. Value for money is important. A smaller increase in spending may have a larger impact – leading to a faster reduction in the public sector debt ratio – if it is concentrated in areas with higher multiplier effects (i.e. research & development).

#### How does the Office for Budget Responsibility estimate productivity?

Productivity is the key variable in any forecast, as the Office for Budget Responsibility notes:

“Productivity growth is the single biggest source of potential output growth – and therefore GDP

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<sup>130</sup> See, for example, “The taxpayer tech dividend: R&D grants provide £43 billion economic boost, study finds”, Economic and Social Research Council, September 7<sup>th</sup> 2017, <https://esrc.ukri.org/news-events-and-publications/news/news-items/the-taxpayer-tech-dividend-r-d-grants-provide-43billion-economic-boost-study-finds/>. A study by the Enterprise Research Centre found that “Over a 13-year period, research and development grants spurred growth worth £43 billion to the British economy - more than five times the £8 billion invested - and created around 150,000 jobs.”

<sup>131</sup> See “Getting the most from public R&D spending in times of austerity: some insights from simpatico analysis”, Reinhilde Veugelers, Bruegel working paper 2016/01, January 2016, p. 15, [http://bruegel.org/wp-content/uploads/2016/02/WP-2016\\_01-1.pdf](http://bruegel.org/wp-content/uploads/2016/02/WP-2016_01-1.pdf). “Using the NEMESIS model to study the impact of more public R&D investment on GDP growth and jobs in Europe shows that there is potential for a considerable impact, which could reach a multiplier of around 10. But these positive effects will be realised over the long term, with initially the stimulus effects being absorbed in higher wages for researchers and resulting in job destruction from increased labour productivity. The endogenous [sic] growth power of the additional private investments in R&D will only be leveraged into positive competitiveness, growth and job effects in the longer term.”

growth too – so this is the key judgement in our economy forecast and the most important source of uncertainty around medium-term growth prospects.”<sup>132</sup>

According to the Office for Budget Responsibility, “Our potential productivity growth forecast is informed by considering historical averages of growth rates, as well as judgements about factors that may prevent trend productivity from growing in line with previous trends, including the functioning of the financial system (which is important for allocating resources to their most productive use) or the outlook for business investment (which influences the amount of capital available to each worker).”<sup>133</sup>

Similarly, in the Office for Budget Responsibility (OBR) Briefing Paper No. 3, the OBR states that: “the projection for trend productivity growth is informed by an assessment of the latest evidence, together with a degree of judgement on factors relevant to the outlook for productivity over the projection period (e.g. changes to the rate of capital deepening)”.<sup>134</sup>

The outlook for productivity growth is essentially an extrapolation of past trends. However, productivity is **the** critical variable in any economic model or forecast for the public sector finances. A more transparent and engaged debate is required, involving many of the institutions outlined in Chapter 5 – Industrial Strategy.

#### Stylised example 1 – public sector net borrowing

The following stylised examples are used to show how additional capital expenditures by the government may impact on public sector finances. The forecasts below are based on the following simplifying assumptions.

Spending through the National Transformation Fund is assumed to take the following path, slowly building up to an additional £25 billion a year. It is assumed that most of the spending takes the form of research & development.

Table 1.F

<b>Stylised National Transformation Fund expenditures (£ bn)</b>						
<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>	<b>2021-22</b>	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>
2.5	5	10	17.5	25	25	25

<sup>132</sup> See “Potential output and the output gap”, Office for Budget Responsibility, <http://obr.uk/forecasts-in-depth/the-economy-forecast/potential-output-and-the-output-gap/#potential>.

<sup>133</sup> Ibid.

<sup>134</sup> See “Forecasting the economy”, Briefing paper No. 3, Office for Budget Responsibility, October 2011, [http://obr.uk/docs/dlm\\_uploads/Forecasting-the-economy.pdf](http://obr.uk/docs/dlm_uploads/Forecasting-the-economy.pdf).

A range of multipliers are used, from 1 to 3. These are clearly greater than the estimates used by the Office for Budget Responsibility. However, as argued above, the evidence shows that the returns from public sector R&D are very high.

For the sake of simplicity, it has been assumed that the full effects of the multiplier are felt in the year following the increase in spending.<sup>135</sup> For example, the £2.5 billion spent in FY2018/19 will impact on GDP (and therefore tax receipts) in FY2019/20.

Estimates for nominal GDP are based on the Office for Budget Responsibility’s forecasts from the March 2018 Economic and Fiscal Outlook.<sup>136</sup> The annual GDP growth rate between 2021/22 and 2022/23 is extrapolated into 2023/24 and 2024/25. Public sector current receipts and total managed expenditures are extrapolated into 2023/24 and 2024/25 on a similar basis.

The new figures for total managed expenditures (used in GFC Economics’ alternative projections) now include the additional spending through the National Transformation Fund. This is simply added on to total managed expenditures in the same fiscal year that the investment is undertaken. The estimates for depreciation remain unchanged.

The path of expenditures is also altered to account for higher interest payments arising from additional government spending. The Office for Budget Responsibility (OBR) produces a table showing the forecast effect of a *permanent* £5 billion increase in the central government net cash requirement (CGNCR) on debt interest payments.<sup>137</sup>

Table I.G

Projected debt interest payments based on a multiplier of 1 (£ billions)							
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
£5bn increase in CGNCR*	0.04	0.12	0.20	0.28	0.38	0.46	0.55
£25bn increase in CGNCR**	0.02	0.07	0.17	0.34	0.61	0.89	1.17

\*Increase is assumed to take effect at the beginning of 2018-19 and continue throughout the forecast.

\*\*Increase is built up over time, starting from £2.5bn in FY2018/19 and eventually hitting £25.0bn in FY2022/23 (see Table I.F).

Source: Office for Budget Responsibility and GFC Economics calculations

According to the Office for Budget Responsibility, “a £5 billion increase in the central government net cash requirement in the base year has a relatively small impact on the forecast, pushing debt interest

<sup>135</sup> Of course, in reality, additional government spending contributes to nominal GDP in the year it is spent, while the multiplier effects may accrue over a longer period of time.

<sup>136</sup> See “Office for Budget Responsibility: Economic and fiscal outlook”, March 2018, [http://cdn.obr.uk/EFO-MaRch\\_2018.pdf](http://cdn.obr.uk/EFO-MaRch_2018.pdf).

<sup>137</sup> See “March 2018 Economic and fiscal outlook fiscal supplementary tables: expenditure”, Office for Budget Responsibility, March 13<sup>th</sup> 2018, table 2.36, <http://obr.uk/efo/economic-fiscal-outlook-march-2018/>. The £5bn increase in the central government net cash requirement (CGNCR) is assumed to take effect at the beginning of 2018-19 and continue throughout the forecast.



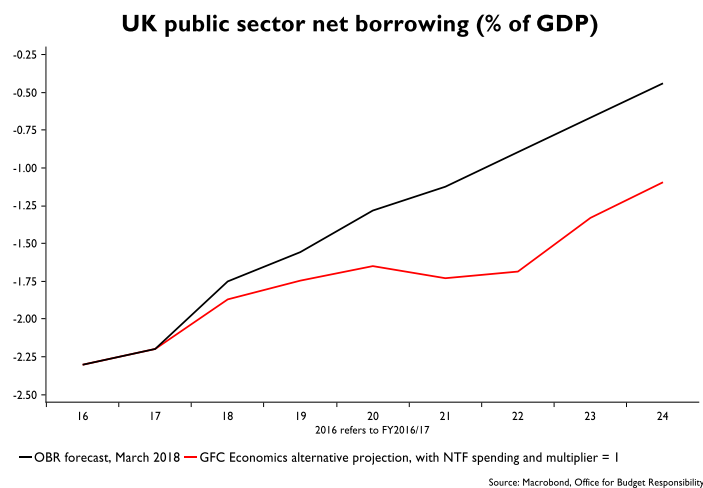
spending up by only £0.4 billion by the final year of the forecast. This small impact is due to low interest rates.”<sup>138</sup>

*Note: we have maintained the profile for average gilt yields despite the rise in public sector borrowing. Critics will claim this is not tenable: higher borrowing will put some upward pressure on yields. We should stress that investment-led growth need not put upward pressure on government bond yields. Indeed, this is one of the defining lessons of recent years: strong investment in (productive) information technology in the US has coincided with a marked flattening of the yield curve.*

For public sector current receipts, the original tax-to-GDP ratios provided by the Office for Budget Responsibility are used to estimate the additional receipts expected from increased GDP as a result of the multiplier effects.

Charts 1.5, 1.6 and 1.7 plot the Office for Budget Responsibility projections for public sector borrowing (the deficit), against an alternative series that includes additional spending through the National Transformation Fund. Three different multipliers are considered, ranging from 1 to 3.

Chart 1.5



<sup>138</sup> See “Debt interest (central government, net of APF)”, Office for Budget Responsibility, <http://obr.uk/forecasts-in-depth/tax-by-tax-spend-by-spend/debt-interest-central-government-net/>.

Chart I.6

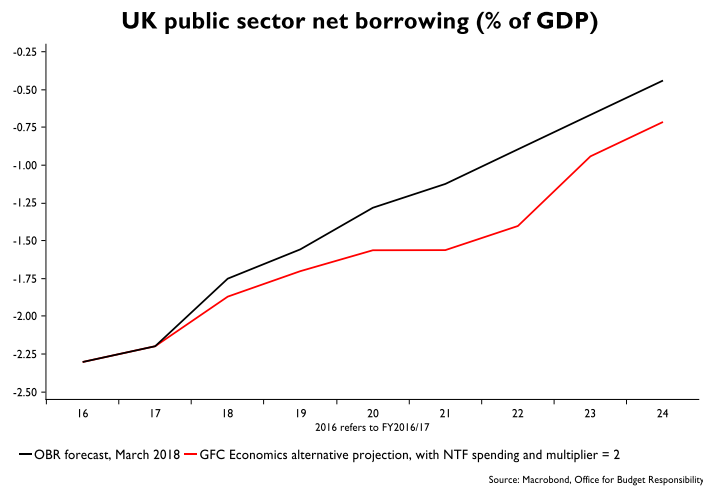
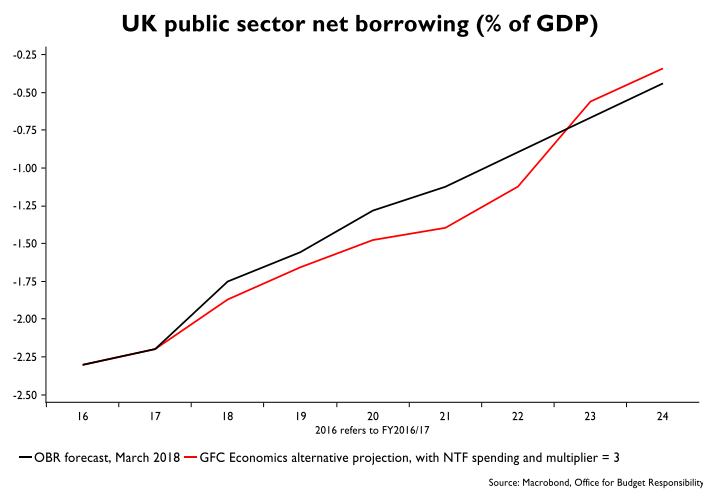


Chart I.7



**Stylised example 2 – public sector net borrowing (with productivity boost)**

As stressed earlier, the potential effects on productivity are critical. The returns to investment in research & development can be long and variable. However, it is important to show how even modest improvements to productivity growth can have significant effects.

Table I.H: Potential output growth forecast<sup>139</sup>

	Percentage change on a year earlier, unless otherwise stated					
	Potential population <sup>1</sup>	Equilibrium employment rate <sup>1</sup>	Equilibrium average hours	Potential productivity <sup>2</sup>	Potential output <sup>3</sup>	memo: NAIRU (per cent)
2017	0.6	0.0	0.0	0.9	1.6	4.5
2018	0.5	0.0	0.0	0.8	1.4	4.5
2019	0.5	0.0	0.0	0.9	1.4	4.6
2020	0.5	-0.1	0.0	1.0	1.4	4.6
2021	0.5	-0.2	0.0	1.1	1.5	4.6
2022	0.6	-0.3	0.0	1.2	1.5	4.6

<sup>1</sup> Corresponding to those aged 16 and over.

<sup>2</sup> Output per hour.

<sup>3</sup> Components may not sum to total due to rounding.

Source: Office for Budget Responsibility

The Office for Budget Responsibility (OBR) projects that the rise in productivity (output per hour) will average 1% between 2018 and 2022.<sup>140</sup> On a year-by-year basis, annual productivity growth will accelerate by around 0.1 percentage points per annum between 2018 and 2022, rising from 0.8% in 2018 to 1.2% per annum in 2022. Note: the figures in Table I.H represent *potential* output and *potential* productivity. However, the OBR also assumes that the output gap closes to zero by 2020, so that the difference between actual output and potential is zero.

In any case, it is useful to consider an alternative path for productivity. Table I.I presents a path for nominal GDP based on (marginally) faster productivity growth (+0.7 percentage points) in FY2023/24 and FY2024/25. In other words, nominal GDP grows 4.0% per annum through 2023/24 and 2024/25, instead of the 3.3% per annum originally assumed.

Table I.I

Forecast	Nominal GDP growth								
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24*	2024/25*
OBR	4.4%	3.4%	3.0%	2.9%	3.0%	3.2%	3.3%	3.3%	3.3%
GFC	4.4%	3.4%	3.0%	2.9%	3.0%	3.2%	3.3%	4.0%	4.0%

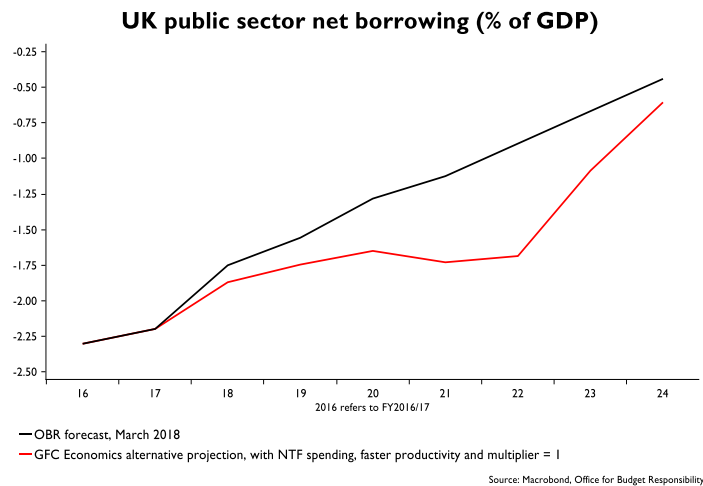
\* Extrapolated from the forecasts for 2022/23.

Source: Office for Budget Responsibility and GFC Economics calculations

<sup>139</sup> Ibid.

<sup>140</sup> See “Office for Budget Responsibility: Economic and fiscal outlook”, March 2018, p. 42, table 3.1, [http://cdn.obr.uk/EFO-MarCh\\_2018.pdf](http://cdn.obr.uk/EFO-MarCh_2018.pdf).

Chart 1.8



Incremental gains in productivity growth generate significant reductions in the deficit (as a share of GDP). Chart 1.8 uses a multiplier of just 1. The improvements to public sector borrowing are, of course, greater if a multiplier of 2 is assumed.

#### Stylised example 3 – public sector net debt

It is also possible to construct a profile of the stock of outstanding debt (public sector net debt). Again, a series of simplifying assumptions are required.

Firstly, the difference between public sector borrowing as forecast by the Office for Budget Responsibility, and public sector borrowing based on the increase in National Transformation Fund spending, is added to the stock of public sector net debt in that fiscal year.

Secondly, for years in which the Office for Budget Responsibility does not provide forecasts, it is assumed that it is only public sector net borrowing that adds to the stock of debt.

Thirdly, nominal GDP is calculated in the same way as above. Note, however, that to facilitate comparison, the nominal GDP centred around March is *not* used here. Again, three different multipliers are considered (see Charts 1.9, 1.10 and 1.11).

The public sector debt-to-GDP ratio may be slower to fall if the multiplier is low. On more realistic estimates of the multiplier, where investment is targeted in areas with a high potential rate of return, it is very plausible that the public sector debt-to-GDP ratio will fall more quickly. Furthermore, the economy will be bigger. Alongside debt sustainability, this is surely another important aim of policy.

Chart I.9

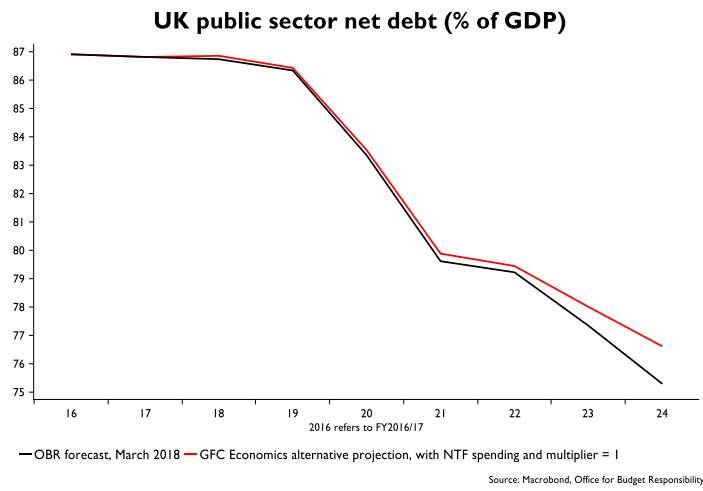


Chart I.10

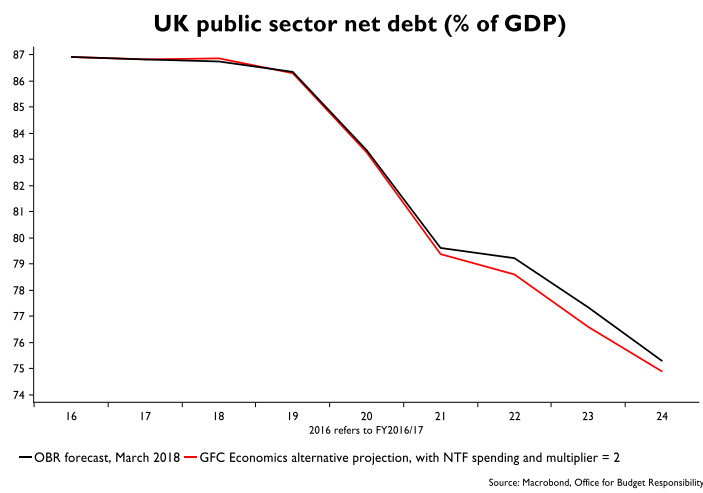
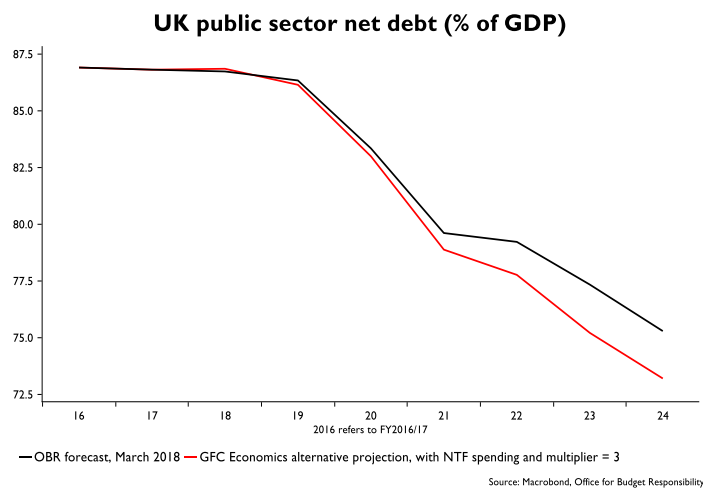


Chart I.11



## Appendix

The Office for Budget Responsibility (OBR) was created in 2010 to “provide independent and authoritative analysis of the UK’s public finances”.<sup>141</sup> The OBR produces detailed five-year forecasts for the economy and public finances twice a year.

Functions and purpose of the Office for Budget Responsibility:

- Use “public finance forecasts to judge the Government’s performance against its fiscal targets and target for welfare spending”.<sup>142</sup>
- “Assess the long-term sustainability of the public finances”.<sup>143</sup>
- “Every two years we produce a comprehensive review of risks from the economy and financial system in the Fiscal risks report (FRR)”.<sup>144</sup>
- “Scrutinise the Government’s costing of individual tax and welfare spending measures at each Budget”.<sup>145</sup>
- “The Office for Budget Responsibility (OBR) is an independent body, which takes full responsibility for the content of all its publications and other pronouncements. To fulfil our remit of analysing and reporting on the sustainability of the public finances, we need to work closely with the many government departments that are responsible for forecasting the different revenues, spending streams and financial transactions that affect the public finances. We also have an executive responsibility to the Chancellor of the Exchequer to deliver the fiscal and economic forecasts he needs to take tax and spending decisions.”<sup>146</sup>
- “To ensure that our independence is not called into question, we believe that it is important to be transparent about the way in which we interact with government. The Memorandum of Understanding sets out the agreed working relationship between the Office for Budget Responsibility, HM Revenue and Customs, the Department for Work and Pensions, and HM Treasury. It sets out the arrangements needed for effective working, covering each institution’s key responsibilities, coordination of the forecast process, and the process for information sharing”.<sup>147</sup>

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<sup>141</sup> See “What we do”, Office for Budget Responsibility, <http://obr.uk/about-the-obr/what-we-do/>.

<sup>142</sup> Ibid.

<sup>143</sup> Ibid.

<sup>144</sup> Ibid.

<sup>145</sup> Ibid.

<sup>146</sup> See “Working with Government”, Office for Budget Responsibility, <http://obr.uk/about-the-obr/working-with-government/>.

<sup>147</sup> Ibid.

# Chapter 2: Financial stability risks

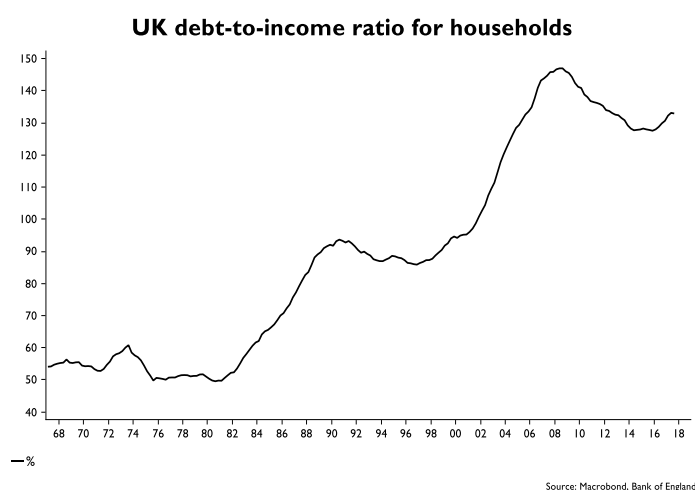
## Financial stability risks

### The rise of unproductive lending

The Bank of England is still learning from 2007/08. Household debt has been rising again, but the Financial Policy Committee has been slow to intervene. The underlying problem of leverage in the UK economy has not been resolved.

The household debt-to-disposable income ratio remains lower than the all-time high of 147.0%.<sup>148</sup> However, the deleveraging ended in Q4 2015 (Chart 2.1). Household debt has subsequently climbed back up to 132.92% (Q3 2017).<sup>149</sup> The debt ratio is well above the average of 103.3% recorded between 1987 and 2006. It is not that far below the 139.2% level witnessed in 2006, the last full year before the financial crisis of 2007/08. It is worth adding: debt ratios tend to rise during the early stages of a financial crisis. A global recession could easily push the household debt-to-disposable income ratio up to new secular highs.

Chart 2.1



The outstanding balance for mortgages in the UK has climbed to 98.2% of disposable income.<sup>150</sup> The Financial Policy Committee has blamed the rise in mortgage debt on the “relatively limited growth in the stock of housing”, which, it claims, has pushed up house prices and forced borrowers to take on

<sup>148</sup> See Financial Stability Report November 2017, Bank of England, p. 69, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>. The household debt-to-disposable income ratio is defined as: “Gross debt as a percentage of a four-quarter moving sum of gross disposable income of the UK household and non-profit sector. Includes all liabilities of the household sector except for the unfunded pension liabilities and financial derivatives of the non-profit sector. Disposable income is adjusted for financial intermediation services indirectly measured (FISIM) and changes in pension entitlements.”

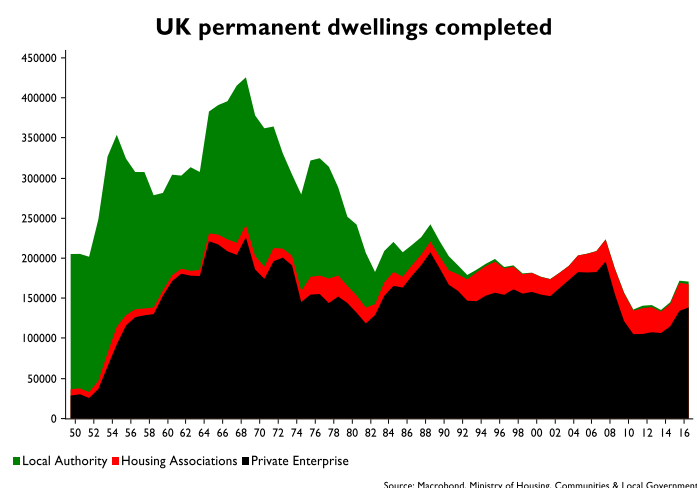
<sup>149</sup> Source: Macrobond, FPC Housing tools core indicators, Bank of England, <https://www.bankofengland.co.uk/-/media/boe/files/core-indicators/housing-tools>.

<sup>150</sup> Ibid.



bigger loans.<sup>151</sup> The total number of newly built homes in the UK declined from a peak of 426,000 in 1968 to 224,000 in 2007, before falling further to 171,000 in 2016 (Chart 2.2).<sup>152</sup> Local authorities have accounted for much of this decline (housebuilding has dropped from 184k to just 3k between 1968 and 2016).<sup>153</sup> Relative to household incomes, house prices are close to the highs reached in 2007 (Chart 2.3).<sup>154,155</sup>

Chart 2.2



<sup>151</sup> See Financial Stability Report June 2017, Bank of England, p. 2. <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>. “Over the past 50 years, the number of new houses built each year in the United Kingdom has more than halved, from a peak of 426,000 in 1968. Since 1982, this number has averaged less than 190,000, while the UK population has increased by around 265,000 per year.”

<sup>152</sup> Source: Macrobond, Ministry of Housing, Communities & Local Government, Live tables on house building: new build dwellings, Table 241: permanent dwellings completed, by tenure, United Kingdom, historical calendar year series, <https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building>. An alternative data series suggests that these official figures miss about 20% of new construction (see “England is undercounting its new homes”, Financial Times, September 18<sup>th</sup> 2016, <https://www.ft.com/content/ce2a28e0-7b59-11e6-b837-eb4b4333ee43>). Nevertheless, even this would not be sufficient to overcome the housing shortage. The latest data from the Ministry of Housing, Communities & Local Government for the first three quarters of 2017 point to a moderate increase, with dwellings completed up 11.7% y/y compared to the first three quarters of 2016.

<sup>153</sup> Source: Macrobond, Ministry of Housing, Communities & Local Government, Live tables on house building: new build dwellings, Table 241: permanent dwellings completed, by tenure, United Kingdom, historical calendar year series, <https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building>.

<sup>154</sup> Source: Macrobond, FPC Housing tools core indicators, Bank of England, <https://www.bankofengland.co.uk/-/media/boe/files/core-indicators/housing-tools>. The latest estimate of the house price-to-household income ratio (as of Q3 2017) is 4.43%. This is almost on par with the pre-crisis peak of 4.66% reached in Q3 2007. Over the period Q4 2008 to Q4 2013, this ratio averaged 3.76%. There was a big jump in 2014 to 3.95%. This was followed by annual increases in 2015 and 2016 to 4.12% and 4.30%, respectively.

<sup>155</sup> The house price-to-disposable income ratio is calculated as the average UK house price divided by the four-quarter moving sum of gross disposable income of the UK household and non-profit sector per household. Aggregate household disposable income is adjusted for ‘financial intermediation services indirectly measured’ (FISIM) and changes in pension entitlements. House prices are an average of the Halifax and Nationwide indices.

The Bank of England argues that house prices are ‘largely beyond its control’.<sup>156</sup> Low long-term real interest rates, for example, have contributed to the rise in house prices relative to incomes: “Long-term real interest rates have been declining across advanced economies for several decades. Global structural factors – such as demographics – are likely to have been the primary driver of these falls, which have contributed to a rise in the level of house prices.”<sup>157</sup>

Chart 2.3

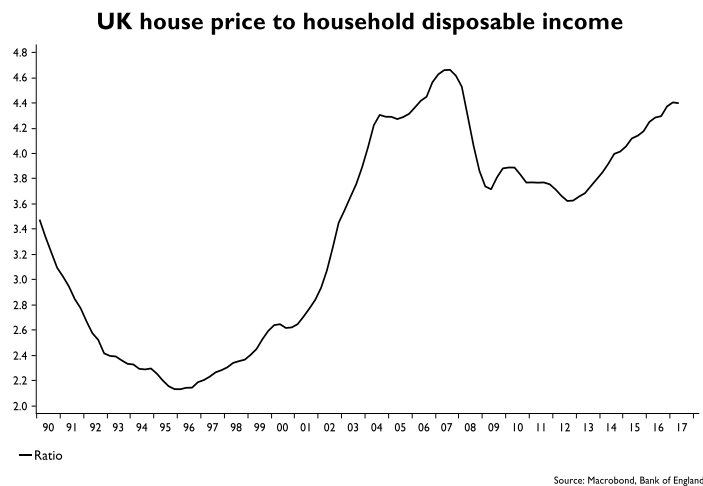
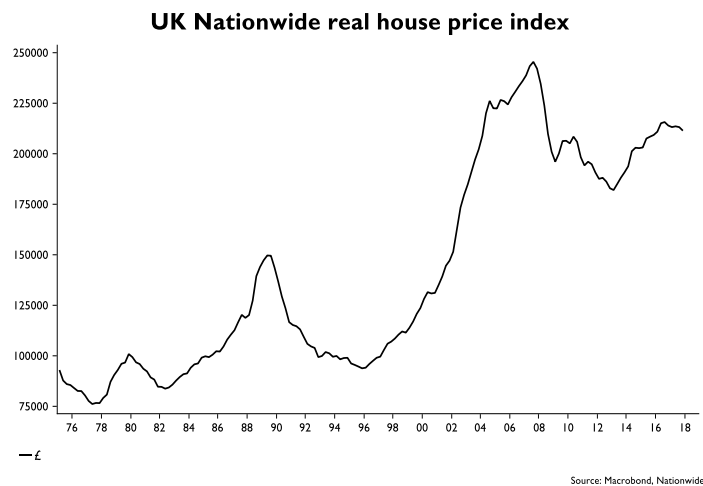


Chart 2.4



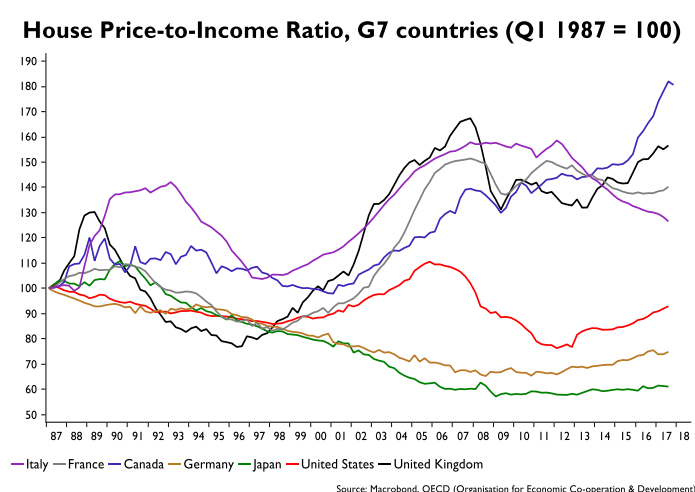
<sup>156</sup> See Financial Stability Report June 2017, Bank of England, p. 1, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>. “While a significant factor contributing to high levels of house prices relative to incomes in the United Kingdom has been the relatively limited growth in the stock of housing, the main drivers of housing supply are not under the control of the Bank of England or the FPC.”

Critics of the Bank of England argue that quantitative easing depressed deposit rates, forcing savers to seek alternatives, which helped inflate the housing market. However, quantitative easing was a necessary policy response to the financial crisis of 2007/08. Without it, the decline in real economic activity would have been deeper.

<sup>157</sup> See Financial Stability Report June 2017, Bank of England, p. 2, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

The focus on global interest rates ignores the important institutional variation that exists between countries.<sup>158</sup> Chart 2.5 uses cross-country OECD data to show house price-to-income ratios across the G7 economies since 1987.<sup>159</sup> Most of these countries have experienced similar interest rates over this period (except for Japan, which for decades struggled with debt deflation and the fallout from its real estate bubble, leading to even lower interest rates). Nevertheless, house prices have varied significantly at times. France’s house price-to-income ratio, for example, has risen by 40.3% since Q1 1987 (latest data are for Q3 2017). Germany, by contrast, has experienced a 25.2% decline in this ratio. According to OECD data, the UK has seen a 56.6% jump in its house price-to-income ratio over the past thirty years, the second-biggest behind Canada.

Chart 2.5



Furthermore, low real interest rates are not unusual: from a longer perspective, the period of high real interest rates from the late-1970s onward may be the anomaly.<sup>160</sup> Indeed, high real interest rates

<sup>158</sup> See *Rethinking the Economics of Land and Housing*, Josh Ryan-Collins, Toby Lloyd and Laurie Macfarlane, Zed Books, 2017, pp. 156-157.

<sup>159</sup> Source: Macrobond, OECD Economic Outlook House Prices.

<sup>160</sup> See “The Rate of Return on Everything, 1870-2015”, Óscar Jordà, Katharina Knoll, Dmitry Kuvshinov, Moritz Schularick and Alan M. Taylor, Federal Reserve Bank of San Francisco, December 2017, p. 4, <https://www.frbsf.org/economic-research/files/wp2017-25.pdf>. “We find that the real safe asset return has been very volatile over the long-run, more so than one might expect, and oftentimes even more volatile than real risky returns. Each of the world wars was (unsurprisingly) a moment of very low safe rates, well below zero. So was the 1970s inflation and growth crisis. The peaks in the real safe rate took place at the start of our sample, in the interwar period, and during the mid-1980s fight against inflation. In fact, the long decline observed in the past few decades is reminiscent of the decline that took place from 1870 to WWI. Viewed from a long-run perspective, it may be fair to characterize the real safe rate as normally fluctuating around the levels that we see today, so that today’s level is not so unusual. Consequently, we think the puzzle may well be why was [sic] the safe rate so high in the mid-1980s rather than why has it declined ever since. Safe returns have been low on average, falling in the 1%–3% range for most countries and peacetime periods. While this combination of low returns and high volatility has offered a relatively poor risk-return trade-off to investors, the low returns have also eased the pressure on government finances, in particular allowing for a rapid debt reduction in the aftermath of WW2.”

– coupled with light touch regulation – have been a major cause of the boom and bust tendency of the economy in recent decades.<sup>161</sup>

There is now a growing body of empirical evidence that disputes the “loanable funds” framework of interest rate determination. As a recent Bank for International Settlements working paper notes: “Prevailing explanations of the decline in real interest rates since the early 1980s are premised on the notion that real interest rates are driven by variations in desired saving and investment. But based on data stretching back to 1870 for 19 countries, our systematic analysis casts doubt on this view. The link between real interest rates and saving-investment determinants appears tenuous. While it is possible to find some relationships consistent with the theory in some periods, particularly over the last 30 years, they do not survive over the extended sample. This holds both at the national and global level.”<sup>162</sup>

### Macroprudential policies

Focussing on the supply side constraints for house building – and other ‘exogenous’ factors such as demographics – allows the Bank of England to ignore its contribution to higher house prices and the build-up of debt. It is important to ask whether the Bank of England could have acted more decisively to curb household re-leveraging. The Financial Policy Committee has acquired significant regulatory powers since the 2007/08 crisis.<sup>163</sup> These are divided into *powers of direction* and *powers of recommendation*.<sup>164</sup> The Financial Policy Committee has so far been granted powers of direction to:<sup>165</sup>

- set the countercyclical capital buffer (CCyB) rate for the UK
- set sectoral capital requirements for UK firms
- set a leverage ratio requirement for UK firms
- set loan-to-value and debt-to-income limits for UK mortgages on owner-occupied properties
- set loan-to-value and interest cover ratio limits for UK mortgages on buy-to-let properties<sup>166</sup>

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<sup>161</sup> See Keynes’s *General Theory, The Rate of Interest and ‘Keynesian’ Economics*, Geoff Tily, Palgrave Macmillan, 2007.

<sup>162</sup> See “Why so low for so long? A long-term view of real interest rates”, Claudio Borio, Piti Disyatat, Mikael Juselius and Phurichai Rungcharoenkitkul, Bank for International Settlements, December 2<sup>nd</sup> 2017, p. iii, <https://www.bis.org/publ/work685.htm>.

<sup>163</sup> See “The Financial Policy Committee’s powers over housing policy instruments”, Bank of England, November 2016, <https://www.bankofengland.co.uk/-/media/boe/files/statement/2016/the-financial-policy-committee-powers-over-housing-policy-instruments.pdf?la=en&hash=9449FF251302F5529C4EFAF0E821828FC43A1488>.

<sup>164</sup> Ibid. p. 8. “The FPC has two main powers under the Bank of England Act 1998 (as amended). It can make Recommendations to anybody, including to the PRA and FCA. It can also give Directions to those regulators to implement a specific measure to further the FPC’s objectives.”

<sup>165</sup> See “Financial Policy Committee powers”, Bank of England, <https://www.bankofengland.co.uk/financial-stability>.

<sup>166</sup> See “The Financial Policy Committee’s powers over housing policy instruments”, Bank of England, November 2016, p. 11, <https://www.bankofengland.co.uk/-/media/boe/files/statement/2016/the-financial-policy-committee-powers-over-housing-policy-instruments.pdf?la=en&hash=9449FF251302F5529C4EFAF0E821828FC43A1488>.

Legislation granting the Financial Policy Committee powers of direction over loan-to-value and debt-to-income (DTI) limits in respect of mortgages on owner-occupied properties came into force in April 2015.<sup>167</sup> In addition, from early 2017, the Financial Policy Committee has been able to direct the Prudential Regulation Authority and the Financial Conduct Authority to require regulated lenders to place limits on buy-to-let mortgage lending in relation to loan-to-value (LTV) ratios and interest coverage ratios (ICRs).<sup>168</sup> However, the Financial Policy Committee has yet to use these specific powers of direction (over LTV limits, DTI ratios and ICRs).<sup>169</sup> The Financial Policy Committee has judged that the measures in place are “proportionate” to the risks.<sup>170</sup>

These measures include a combination of stress testing and bank capital requirements, together with recommendations in the mortgage market, including a mortgage affordability test designed to prevent a marked loosening of underwriting standards.<sup>171</sup>

In addition, “The FPC’s loan to income (LTI) flow limit Recommendation limits the number of mortgages extended at LTI ratios of 4.5 or higher to 15% of a lender’s new mortgage lending. The 4.5 multiple was calibrated to ensure that, at a stressed mortgage rate of 7% and a typical mortgage term of around 25 years, mortgagors’ stressed DSRs [debt service ratios] would not exceed 35%–40%.”<sup>172</sup> This recommendation was first made in June 2014.<sup>173</sup> By October 2014, the Prudential Regulation

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[instruments.pdf?la=en&hash=9449FF251302F5529C4EFAF0E821828FC43A1488](https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017?la=en&hash=9449FF251302F5529C4EFAF0E821828FC43A1488). The Financial Policy Committee (FPC) recommended in September 2014 that “HM Treasury exercise its statutory power to enable the FPC to direct, if necessary to protect and enhance financial stability, the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA) to require regulated lenders to place limits on residential mortgage lending, both owner-occupied and buy-to-let by reference to:

- a) Loan to value (LTV) ratios: the ratio of the value of a mortgage to the value of the property against which it is secured;
- b) Debt to income (DTI) ratios, including interest coverage ratios (ICRs) in respect of buy-to-let lending. The DTI ratio is the ratio of a borrower’s outstanding debt to his or her annual income, and the ICR is the ratio of expected rental income from a buy-to-let property to the estimated mortgage interest payments over a given period of time.”

<sup>167</sup> See Financial Stability Report June 2017, Bank of England, p. 42, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>168</sup> See “New buy-to-let powers to help Bank of England enhance financial stability”, GOV.UK, November 16<sup>th</sup> 2016, <https://www.gov.uk/government/news/new-buy-to-let-powers-to-help-bank-of-england-enhance-financial-stability>.

<sup>169</sup> See Financial Stability Report June 2017, Bank of England, p. 12, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>170</sup> Ibid. p. 12. “The FPC will keep under review the risks to lenders stemming from high LTV mortgage lending. It could in future consider employing LTV limits to insure against risks on owner-occupier or buy-to-let mortgages, as other macroprudential authorities have done in a number of countries.”

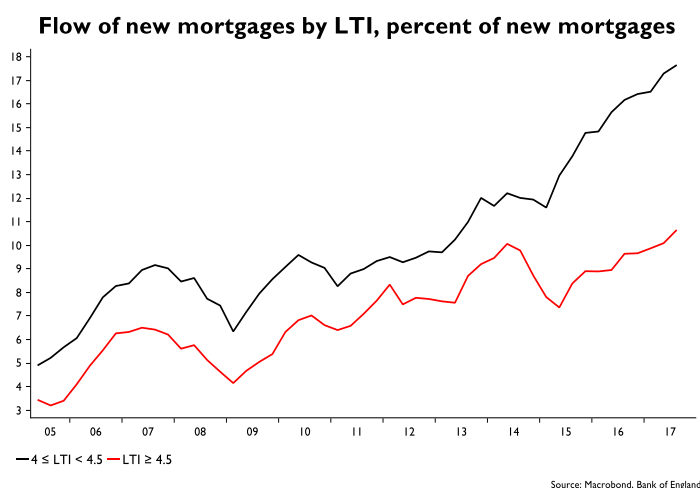
<sup>171</sup> Ibid. p. 1, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>. “When assessing affordability, mortgage lenders should apply an interest rate stress test that assesses whether borrowers could still afford their mortgages if, at any point over the first five years of the loan, Bank Rate were to be 3 percentage points higher than the prevailing rate at origination.”

<sup>172</sup> See Financial Stability Report November 2017, Bank of England, p. 15, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>.

<sup>173</sup> See “Record of the Financial Policy Committee Meetings on 22 and 27 November 2017”, Bank of England, December 5<sup>th</sup> 2017, <https://www.bankofengland.co.uk/-/media/boe/files/record/2017/financial-policy-committee-meeting-november-2017.pdf?la=en&hash=6C31A91A3BC722BDF0FBAA814430710A564B24BF>. The Financial Policy Committee recommended in June 2014 that: “The Prudential Regulation Authority (PRA)

Authority had issued a policy statement, including rules,<sup>174</sup> and the Financial Conduct Authority had issued general guidance.<sup>175</sup> After a consultation period, the fixed quarterly limit on the LTI ratio was converted into a four-quarter rolling limit in both cases.<sup>176,177</sup>

Chart 2.6



The result of this recommendation has been a significant rise in the share of the loans just below the 4.5 threshold ( $4 \leq \text{LTI} < 4.5$ ).<sup>178</sup> It is instructive to compare the present share of ‘high’ loan-to-income (LTI) loans (Q3 2017) with the pre-credit crisis peak reached in Q2 2007. The proportion of loans with LTI ratios between 4.0 and 4.5 has almost *doubled* (from 8.95% to 17.65%), while the share of  $\text{LTI} \geq 4.5$  has also risen from 6.50% to 10.65% (Chart 2.6).<sup>179</sup> This is still some way below the 15%

and the Financial Conduct Authority (FCA) should ensure that mortgage lenders do not extend more than 15% of their total number of new residential mortgages at loan to income ratios at or greater than 4.5. This Recommendation applies to all lenders which extend residential mortgage lending in excess of £100 million per annum. The Recommendation should be implemented as soon as is practicable.” See “Implementing the Financial Policy Committee’s recommendation on loan to income ratios in mortgage lending”, Bank of England, June 2014, p. 2, <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/consultation-paper/2014/cpl114>.

<sup>174</sup> See “Implementing the Financial Policy Committee’s recommendation on loan to income ratios in mortgage lending”, Prudential Regulation Authority, October 2014, <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/policy-statement/2014/ps914.pdf?la=en&hash=C5582AFB6BDED994F8B5160CACA7C181491F5DF4>.

<sup>175</sup> See “Guidance on the Financial Policy Committee’s recommendation on loan to income ratios in mortgage lending”, Financial Conduct Authority, October 2014, <https://www.fca.org.uk/publications/finalised-guidance/fg14-8-guidance-financial-policy-committee%E2%80%99s-recommendation-loan>.

<sup>176</sup> See “Amendments to the PRA’s rules on loan to income ratios in mortgage lending”, Bank of England Prudential Regulation Authority, February 2017, <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/policy-statement/2017/ps517.pdf?la=en&hash=ECD121A3B6E6BEE0D6824817099B05B6F84B0839>.

<sup>177</sup> See “The Financial Policy Committee’s recommendation on loan to income ratios in mortgage lending: General Guidance”, Financial Conduct Authority, February 2017, <https://www.fca.org.uk/publication/finalised-guidance/fg17-02.pdf>.

<sup>178</sup> See Financial Stability Report November 2017, Bank of England, p. 15, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>. “...one feature of recent lending has been a ‘bunching’ of loans just below the FPC’s 4.5 LTI limit.”

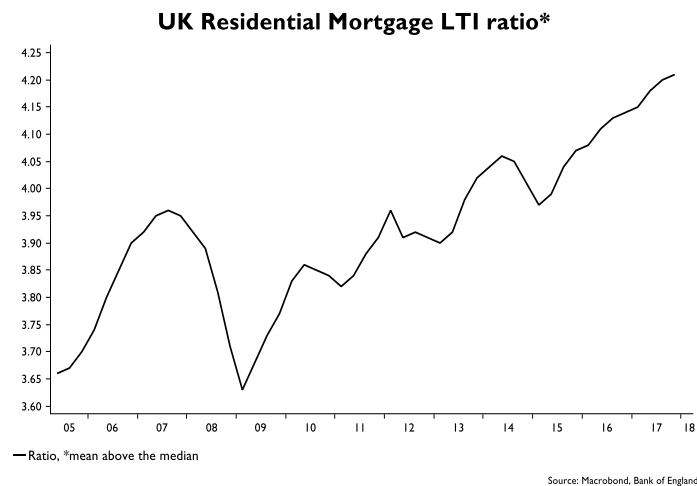
<sup>179</sup> See Financial Stability Report June 2017, Bank of England, p. 9, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>. Sources: FCA Product Sales Database and Bank of England calculations.

a) The Product Sales Database includes regulated mortgages only.

threshold: as noted by the Bank of England, “There remains headroom for further high LTI lending in aggregate”.<sup>180</sup>

The Bank of England has conceded that the impact of this LTI recommendation has been modest, reducing mortgage lending by just 1.0% on some estimates.<sup>181</sup> The ‘mean above the median’ LTI ratio for owner-occupier mortgages has continued to rise sharply, hitting a record 4.21 in Q4 2017 (Chart 2.7).<sup>182,183</sup> At least on this metric, the housing market looks particularly vulnerable vis-à-vis 2007. Nevertheless, following a review of the recommendation in June 2017, it was decided that the ‘calibration’ should not be amended.

Chart 2.7



- b) LTI ratio calculated as loan value divided by the total reported gross income for all named borrowers. Chart excludes lifetime mortgages, advances for business purposes and remortgages with no change in the amount borrowed.

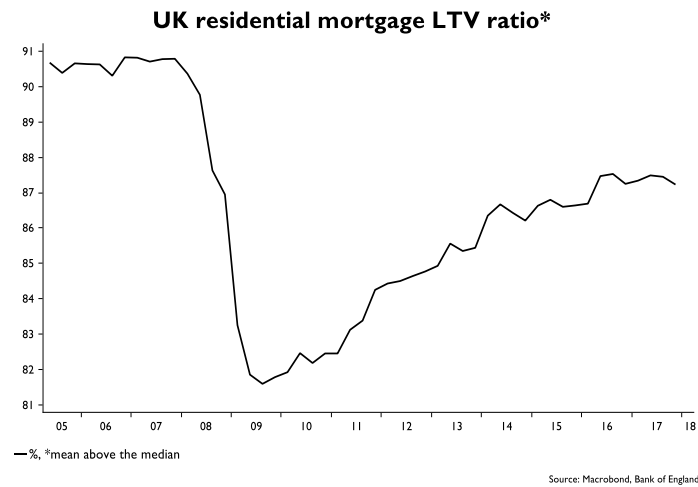
<sup>180</sup> Ibid.

<sup>181</sup> Ibid. p. 8. “if the share of borrowers with an LTI between 4 and 4.5 were to be returned to its level before the FPC Recommendations were made, and the remaining borrowers in that category were to obtain an LTI of 5 instead, the value of total mortgage lending would increase by less than 1%.”

<sup>182</sup> Source: Macrobond, FPC Housing tools core indicators, Bank of England, <https://www.bankofengland.co.uk/-/media/boe/files/core-indicators/housing-tools>.

<sup>183</sup> See “The Financial Policy Committee’s powers over housing policy instruments”, Bank of England, November 2016, p. 37, <https://www.bankofengland.co.uk/-/media/boe/files/statement/2016/the-financial-policy-committee-powers-over-housing-policy-instruments.pdf?la=en&hash=9449FF251302F5529C4EFAF0E821828FC43A1488>. “The mean above the median is defined as the average LTV (or LTI) ratio of new mortgages that are in the upper half of newly issued mortgages ordered by their LTV (or LTI) ratio. These are the mean above the median on owner-occupier mortgages only.” The Bank of England explains why it focusses on the mean above the median measure, as opposed to a simple average: “Since it is the upper end of the distribution of LTV or LTI ratios that tend to create financial stability risks, the indicators selected are based on the average of the top half of the distribution.”

Chart 2.8



The mean-above-the-median LTV ratio for Q4 2017 (87.23%) remained below the peak of 90.8% prior to the housing crisis of 2007/08 (Chart 2.8).<sup>184</sup> However, considered in tandem, the rising house price-to-disposable income and LTI ratios reflect years of weak income growth.<sup>185</sup> Real wages remain rooted below their 2007 levels, according to the OECD (Chart 2.9).<sup>186</sup> Real average weekly earnings (regular pay) declined y/y throughout most of 2017 (Chart 2.10).<sup>187</sup>

There are signs that the Bank of England is beginning to wake up to the risks. The Financial Policy Committee statement from the March 12<sup>th</sup> meeting flagged “some signs of rising domestic risk appetite in recent quarters.”<sup>188</sup> In the mortgage market, “the proportion of new owner-occupier mortgages at high loan-to-income ratios, including just below 4.5 (the level at which the FPC’s limit on the flow of new mortgages applies), has increased, and spreads between mortgage rates and risk-free rates have tightened.”<sup>189</sup>

<sup>184</sup> Source: Macrobond, FPC Housing tools core indicators, Bank of England, <https://www.bankofengland.co.uk/-/media/boe/files/core-indicators/housing-tools>.

<sup>185</sup> Of course, loan-to-income (LTI) and loan-to-value (LTV) ratios are linked. For a given house price-to-income ratio, an LTI ratio limit will effectively cap LTV ratios. However, as noted above, the LTI ratio could well have further room to increase, which could also push up LTV ratios.

<sup>186</sup> Source: OECD, [http://www.oecd.org/els/emp/AVERAGE\\_WAGES.pdf](http://www.oecd.org/els/emp/AVERAGE_WAGES.pdf). “The averages are obtained by dividing the total wage bill (“wages and salaries”, in the terminology of National Accounts) by the average number of employees in the total economy, also multiplying by the ratio of average usual weekly hours worked for full-time dependent employee in their main job to average usual weekly hours worked for all dependent employee in their main job.”

<sup>187</sup> Source: Macrobond, Office for National Statistics UK labour market, <https://www.ons.gov.uk/employmentandlabourmarket>.

<sup>188</sup> See “Financial Policy Committee Statement from its policy meeting”, Bank of England, March 16<sup>th</sup> 2018, p. 1, <https://www.bankofengland.co.uk/-/media/boe/files/statement/fpc/2018/financial-policy-committee-statement-march-2018.pdf?la=en&hash=61059A79F4453B2EFA6BA88A598739DD67FC0CD7>.

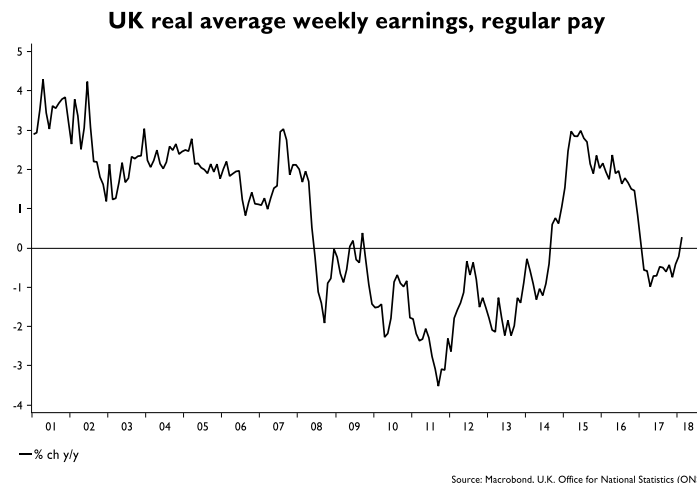
<sup>189</sup> Ibid. The Committee also noted: “Gross issuance of leveraged loans and high-yield bonds by UK companies increased in 2017. Valuations in some segments of the UK commercial real estate sector appear stretched.”



Chart 2.9



Chart 2.10



### Low nominal interest rates and money illusion

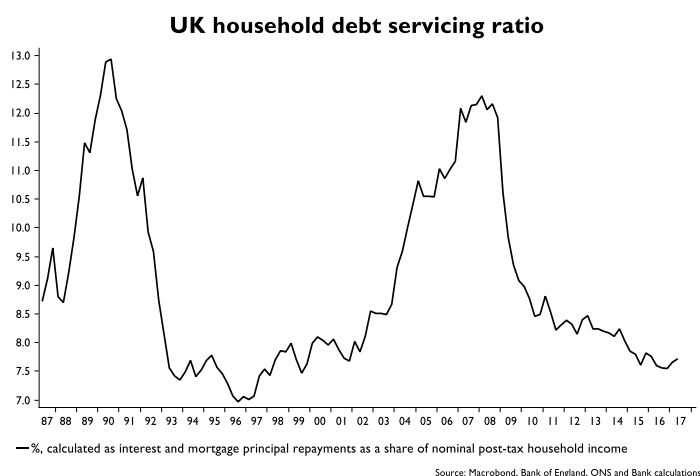
Low interest rates have supported the ability of households to service their debt.<sup>190</sup> The debt service ratio for households fell to a cyclical low of 7.55% in Q4 2016 (Chart 2.11).<sup>191</sup> By Q2 2017, it had edged up to 7.72%. This is well down from the debt service ratio in 2006 (11.02%) – one full year before the crisis – and more in-line with 1999 levels (7.70%).

<sup>190</sup> See Financial Stability Report November 2016, Bank of England, p. 17, <https://www.bankofengland.co.uk/financial-stability-report/2016/november-2016>. “The ability of households to service their debts has been supported in recent years by the low level of interest rates, contributing to reduced borrowing costs. Reflecting this, as set out in the Bank’s 2016 Q3 *Credit Conditions Review*, mortgage arrears rates have been falling since 2009 and write-off rates on consumer credit are at historically low levels”. The estimated average household debt servicing ratio has been falling since 2009, from 9.08% in Q4 2009 to 7.72% in Q2 2017. See Financial Stability Report November 2017, Bank of England, p. 3, Chart A. 4, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>.

<sup>191</sup> See Financial Stability Report November 2017, Bank of England, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>.

The proportion of households with mortgage debt servicing ratios of 40% or more has risen over the past two years, but remains low (Chart 2.12).<sup>192</sup> Nevertheless, this moderate increase is troubling given the low level of interest rates (and indeed, the cut in Bank rate on August 4<sup>th</sup> 2016 from 0.50% to 0.25%) that prevailed over this period. A hawkish turn by the Monetary Policy Committee may hit many indebted households. The Bank of England has acknowledged this point: “Given the prevalence of short-term fixed-rate mortgage contracts, UK households are also particularly exposed to the risk of unexpected changes in interest rates.”<sup>193</sup> Almost 80% of new mortgage lending in 2016 was either on a fixed rate for a period of less than five years or on a floating rate.<sup>194</sup>

Chart 2.11



It is also well known that individuals often underestimate outstanding loan amounts in surveys. Highly indebted borrowers also tend to be under-represented.<sup>195</sup> The Bank of England’s research department has published a paper that utilises a series of novel techniques and algorithms from computer science and applied statistics to highlight the vulnerabilities in the UK mortgage market. The authors find “a larger tail of vulnerable borrowers than household surveys suggest. While survey data suggest that the share of high DSR loans has decreased in recent years, our estimations indicate that it remained almost flat. Similarly, our estimate of high LTI shares over time are steadily higher than surveys. All these

<sup>192</sup> Ibid. p. 15, Chart A. 11. Data provided by the Bank of England – based on the submissions of a limited cohort of survey participants – suggests that the share of households with debt servicing ratios at or higher than 40% has fallen from 2.60% in 1991 and 2.35% in 2006 to 1.41% in 2017. All figures are annual, and all are estimates based on *self-assessment* surveys. The series used by the Bank of England to construct the chart is, therefore, a collation of two different data providers (it switched from British Household Panel Survey (BHPS) to NMG Consulting in 2014).

<sup>193</sup> See Financial Stability Report June 2017, Bank of England, p. 4, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

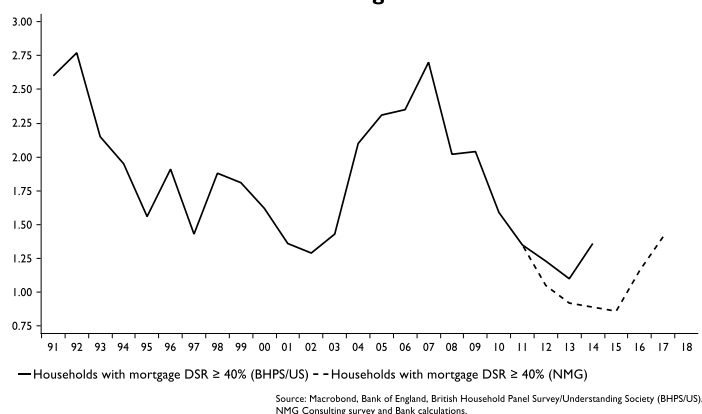
<sup>194</sup> Ibid.

<sup>195</sup> See “A tiger by the tail: estimating the UK mortgage market vulnerabilities from loan-level data”, Bank of England, December 2017, p. 15, <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2017/a-tiger-by-the-tail.pdf>.

results suggest that policy makers should be less sanguine about the developments in the UK mortgage market in recent years”.<sup>196</sup>

Chart 2.12

**Percentage of households with mortgage debt-servicing ratios of 40% or greater**



Debt service ratios have also been kept low by the shift towards longer mortgages.<sup>197</sup> Countrywide estimates that 38% of the mortgages it arranged in 2017 will not be repaid until after the borrower turns 65, up from 24% in 2007.<sup>198</sup> Nationwide, Halifax and Leeds Building Society have set their maximum term length at 40 years.

Rising house prices and falling real wages have forced borrowers to take longer mortgages.<sup>199</sup> Extra-long mortgages have also helped borrowers pass the mortgage affordability test.<sup>200</sup> Monthly payments are smaller, but lengthier loans incur higher total interest charges over a borrower’s lifetime.

There may of course be sound reasons for taking out a longer mortgage. UK citizens are living and working longer. However, there is also an increased risk of a change in financial circumstance, that may hinder repayments. More and more people will be repaying their mortgage into retirement. Sam Woods of the Prudential Regulation Authority flagged this as a concern in July 2017, noting that “if

<sup>196</sup> Ibid. p. 22.

<sup>197</sup> See Financial Stability Report November 2017, Bank of England, p. 16, Chart A. 13, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>. Between Q1 2006 and Q3 2017, the share of new mortgages with a ‘typical’ term profile (between 25 and 30 years) has declined from 36.4% to 24.1%. Over the same period, new mortgages with terms ranging between 30 and 35 years have risen from 8.8% to 19.72%. The most significant growth, albeit from a low base (3.8% in Q1 2006), was posted by the *ultra-long* mortgages (exceeding 35 years). These, as a share of new mortgage issuance, have jumped from 3.8% to 16.5%.

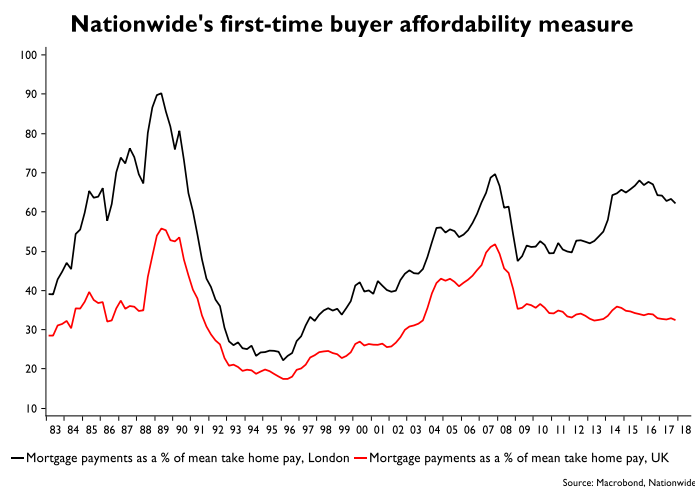
<sup>198</sup> See “Extra-long mortgages push up the age of borrowers”, Financial Times, July 28<sup>th</sup> 2017, <https://www.ft.com/content/7711f8c8-7205-11e7-93ff-99f383b09ff9>.

<sup>199</sup> Ibid.

<sup>200</sup> See Financial Stability Report June 2017, Bank of England, p. 9, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>. The Bank of England maintains that “...while there has been a long-run trend towards longer mortgage terms since the crisis, there has been no acceleration in that trend since the introduction of the affordability test.”

lenders become too narrowly pre-occupied with the profile of the loan in the first 5 years (in line with MMR affordability rules), this could store up a problem for the future.”<sup>201</sup>

Chart 2.13



The total debt servicing burden should be adjusted to reflect the longer duration of mortgages. The lengthening of mortgage terms and the slower accumulation of equity exposes borrowers to significantly greater uncertainty and a higher default risk.

Interest-only mortgages pose another risk. The Financial Conduct Authority warned at the end of January that “hundreds of thousands” of homeowners were at risk of losing their properties because they lack the capital to pay off their loans.<sup>202</sup> According to the Council for Mortgage Lenders, around a fifth of all residential mortgages in the UK are interest-only.<sup>203</sup> This is corroborated by figures from the Financial Conduct Authority, which show that there are 1.67 million full interest-only and part capital repayment mortgage accounts outstanding in the UK, representing 17.6% of all outstanding mortgage accounts.<sup>204</sup>

The Financial Conduct Authority has identified three interest-only mortgage maturity peaks. The current peak (happening now) is likely to be contained. However, the next two (2027/28 and 2032) may exert a greater impact, as they will affect less affluent borrowers with “higher income multiples

<sup>201</sup> See “Looking both ways”, Sam Woods, Bank of England, July 10<sup>th</sup>, 2017, p. 18,

<https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/looking-both-ways.pdf?la=en&hash=2937652C00CD056E3632841A7078723CF8C12E9F>.

<sup>202</sup> See “Borrowers ignoring mortgage timebomb, says FCA”, BBC News, January 30<sup>th</sup> 2018,

<http://www.bbc.co.uk/news/business-42872432>.

<sup>203</sup> See “Interest-only: coaxing the cat out of the bag”, Council of Mortgage Lenders, May 15<sup>th</sup> 2017, <https://www.cml.org.uk/news/news-and-views/interest-only-coaxing-the-cat-out-of-the-bag/>. The figures from the Council of Mortgage Lenders showed that there were around 1.9m interest-only mortgages outstanding in 2017.

<sup>204</sup> See “FCA urges action on interest-only mortgages”, Financial Conduct Authority, January 30<sup>th</sup>, 2018, <https://www.fca.org.uk/news/press-releases/fca-urges-action-on-interest-only-mortgages>.

at the point of application, greater rates of mortgages converted from repayment to interest-only and lower forecast equity levels”.<sup>205</sup>

## Buy-to-let

Total outstanding residential loans (regulated and non-regulated) totalled £1,395.5 billion in Q4 2017, according to the Mortgage Lenders and Administrators Statistics.<sup>206</sup> Unsecuritised loans amounted to £1,304.0 billion.<sup>207</sup> For all unsecuritised loans (regulated & non-regulated), the share of outstanding non-regulated (i.e. buy-to-let) loans rose from a low of 8.55% in Q2 2007 to a peak of 15.64% in Q1 2017 (Chart 2.14).<sup>208</sup> The share has since slipped to 15.52% in Q4 2017, but remains well above the levels witnessed at the onset of the 2007/08 financial crisis. Indeed, the June 2017 Financial Stability Report suggests the buy-to-let share was as little as 1% in 2000.<sup>209</sup>

In flow terms, buy-to-let advances peaked at 21.44% of new loans extended in Q1 2016, just before the introduction of a higher rate of stamp duty land tax effective from April 1<sup>st</sup> 2016.<sup>210</sup> This share has since dropped back to 12.70% as of Q4 2017 (Chart 2.15).<sup>211</sup>

Rental yields have been flat for over a decade and held at a record low of 4.78% in September 2017, according to Bank of England data (Chart 2.16).<sup>212</sup> Your Move also produces rental yields, with a regional breakdown, which paint a similar picture in London (Chart 2.17).<sup>213</sup>

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<sup>205</sup> Ibid.

<sup>206</sup> Source: Macrobond, Mortgage Lenders and Administrators Statistics, <https://www.bankofengland.co.uk/statistics/mortgage-lenders-and-administrators/2017/2017-q4>.

<sup>207</sup> Ibid.

<sup>208</sup> Estimates suggest that around 87% of the non-regulated sample is buy-to-let lending. See “Financial Policy Committee powers of direction in the buy-to-let market”, HM Treasury, November 16<sup>th</sup> 2016, footnote 24, <https://www.gov.uk/government/consultations/consultation-on-financial-policy-committee-powers-of-direction-in-the-buy-to-let-market/financial-policy-committee-powers-of-direction-in-the-buy-to-let-market#fn:24>.

<sup>209</sup> See Financial Stability Report November 2017, Bank of England, p. 16, Chart A. 13, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>.

<sup>210</sup> See “Stamp duty land tax: Higher rates for purchases of additional residential properties”, GOV.UK, November 29<sup>th</sup> 2016, p. 3, <http://webarchive.nationalarchives.gov.uk/20170203173904/https://www.gov.uk/government/publications/stamp-duty-land-tax-higher-rates-for-purchases-of-additional-residential-properties>: “At Autumn Statement on 25 November 2015, the Chancellor of the Exchequer announced that higher rates of stamp duty land tax (SDLT) would apply from 1 April 2016 to purchases of additional residential properties, such as second homes and buy-to-let properties.”

<sup>211</sup> Source: Macrobond, Mortgage Lenders and Administrators Statistics, <https://www.bankofengland.co.uk/statistics/mortgage-lenders-and-administrators/2017/2017-q4>.

<sup>212</sup> Source: Macrobond, FPC Housing tools core indicators, Bank of England, <https://www.bankofengland.co.uk/-/media/boe/files/core-indicators/housing-tools>.

<sup>213</sup> Source: Macrobond, Your Move Buy to Let Index, <https://www.your-move.co.uk/buy-to-let-index>.

Chart 2.14

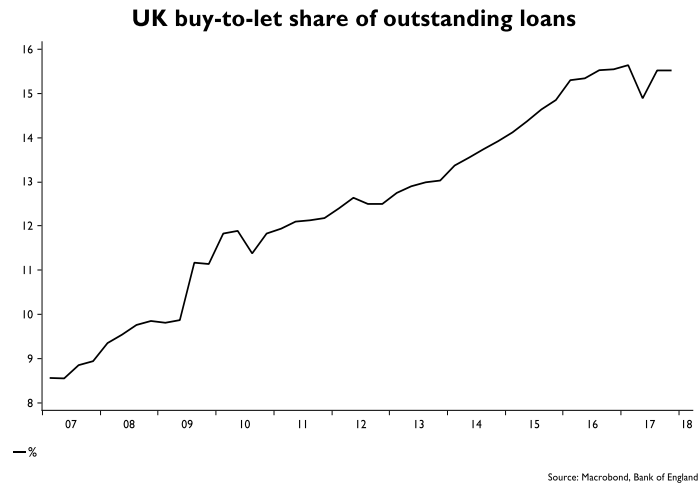


Chart 2.15

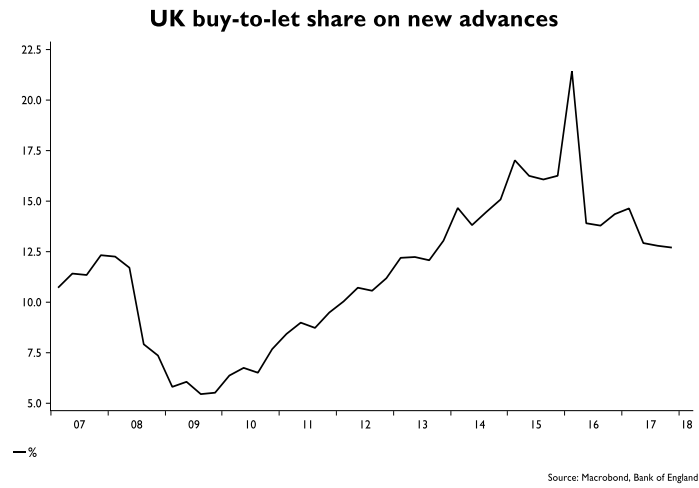


Chart 2.16

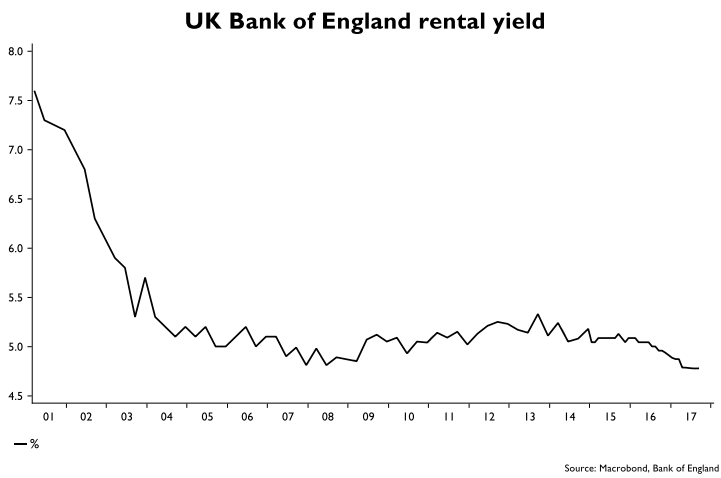
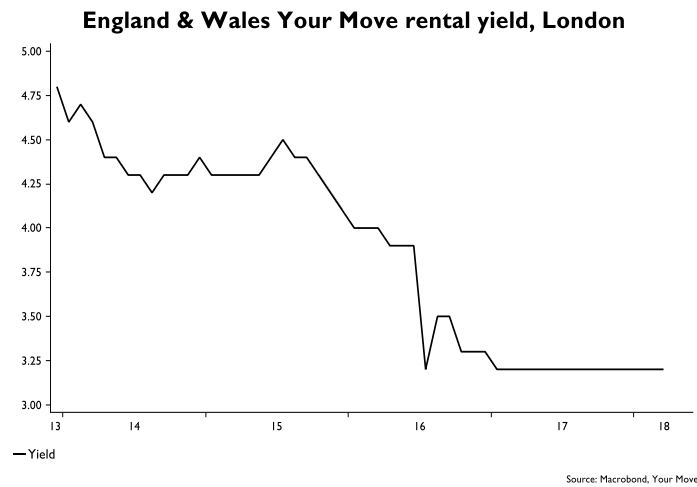


Chart 2.17



The Bank of England is not oblivious to the risks posed by the buy-to-let sector. In the June 2017 Financial Stability Report, the Bank of England warned:

“The size of the buy-to-let segment of the mortgage market has almost doubled since the period before the crisis. So the impact of a growing share of leveraged investors on the dynamics of the broader market in a stress [sic] has yet to be tested. But there is evidence of this channel operating in the United States in the financial crisis. In those US states that experienced the largest housing booms and busts, at the peak of the market almost half of mortgage originations were associated with investors.”<sup>214</sup>

The Financial Stability Report also noted:

“Growth in the private rental sector in recent years may have led to growing risks of amplified house price cycles from leveraged buy-to-let investors. The share of households in the private rental sector rose from around 10% in 2002 to 20% in 2016. Buy-to-let investors do not live in the house that they rent out and their behaviour is more likely to be driven by their expected returns on their housing investment than that of owner-occupiers. But if either house prices or the income received from rental payments were to fall materially, there is a risk that some leveraged investors may look to sell their properties quickly, reinforcing house price falls in a downturn.”<sup>215</sup>

According to Savills, landlords now “face being hit by a ‘double whammy’ of higher mortgage payments and losing higher rate tax relief on mortgage interest payments, which is scheduled to be phased out by 2020. As a result, landlords will see their mortgage payments go up proportionately more than

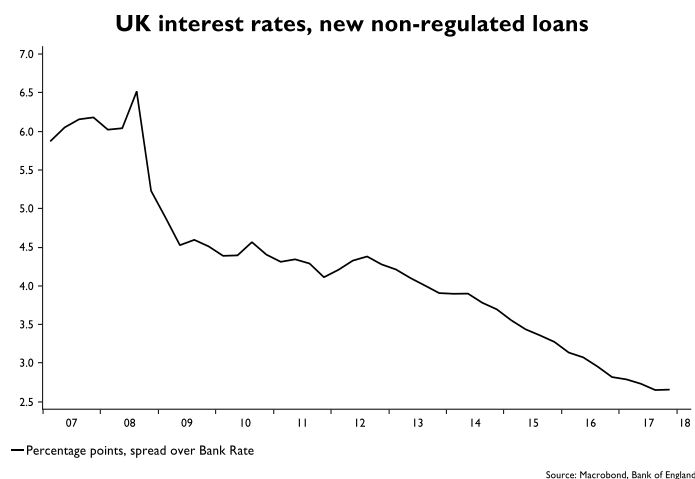
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<sup>214</sup> See Financial Stability Report June 2017, Bank of England, pp. 6-7, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>215</sup> Ibid.

those with capital repayment deals... It's why we're beginning to see signs of some people exiting the sector or reducing their portfolios to make it more viable."<sup>216</sup>

Chart 2.18



The differential between mortgage rates and Bank Rate for all outstanding non-regulated (i.e. buy-to-let) loans dropped to 295 basis points in Q3 2017.<sup>217</sup> This was the lowest since Mortgage Lenders and Administrators began collecting the statistics in 2007.<sup>218</sup> The spread for *new* non-regulated loans has also continued to decline, slipping to 266 basis points by the end of last year (Chart 2.18).<sup>219</sup> If rents start to fall, these rate differentials could widen.

### Risks

Indeed, the Bank of England will need to tread carefully. London house prices dropped 0.8% y/y in March, according to the Land Registry (Chart 2.19).<sup>220</sup> The y/y rate for the ONS private rental price index has also turned down sharply in recent months (Chart 2.20).<sup>221</sup> In April, rents in London fell y/y (0.05%) for the first time since September 2010. A significant slowdown in London's housing market<sup>222</sup> put a big dent in Foxton's profits for the year ending December 2017.<sup>223</sup>

<sup>216</sup> See "Buy-to-let landlords biggest winners from low interest rates", Financial Times, February 26<sup>th</sup> 2018, <https://www.ft.com/content/3d7f8c78-18b9-11e8-9e9c-25c814761640>.

<sup>217</sup> Source: Macrobond, Mortgage Lenders and Administrators Statistics, <https://www.bankofengland.co.uk/statistics/mortgage-lenders-and-administrators/2017/2017-q4>.

<sup>218</sup> The spread subsequently rose to 301 bps in Q4 2017.

<sup>219</sup> Source: Macrobond, Mortgage Lenders and Administrators Statistics, <https://www.bankofengland.co.uk/statistics/mortgage-lenders-and-administrators/2017/2017-q4>.

<sup>220</sup> Source: Macrobond, Land Registry HPI.

<sup>221</sup> Source: Macrobond, Office for National Statistics Private Housing Rental Index.

<sup>222</sup> See "Housing market woes trigger tough start to 2018 for Countrywide", Financial Times, April 25<sup>th</sup> 2018, <https://www.ft.com/content/01ae193a-4857-11e8-8ee8-cae73aab7ccb>. Estate Agency Countrywide warned that revenues had fallen 10% from a year ago in Q1 2018 as a result of "significantly lower entry pipeline in UK and London sales."

<sup>223</sup> See "Foxtons profits slump as London home sales 'near historic lows', Financial Times, February 28<sup>th</sup> 2018, <https://www.ft.com/content/3c0e01ce-1c76-11e8-aaca-4574d7dabfb6>.



Chart 2.19

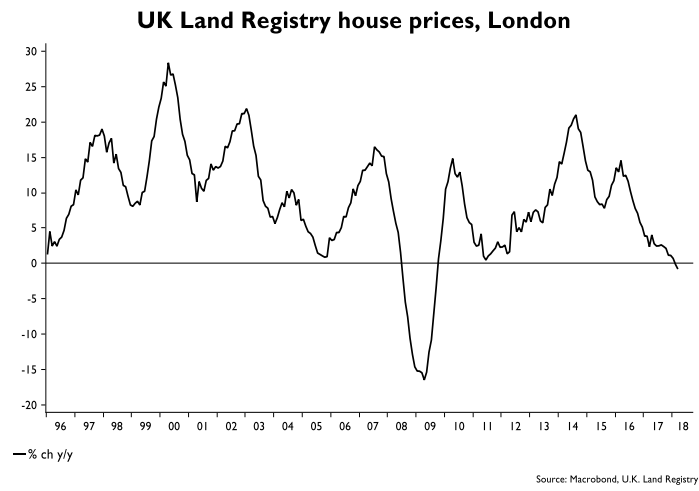


Chart 2.20

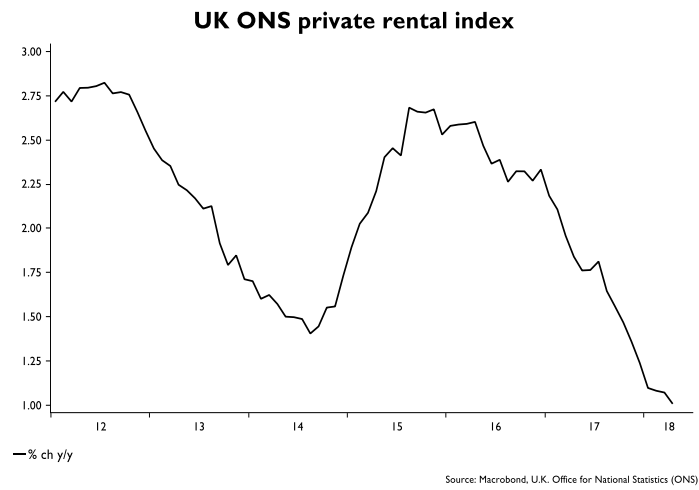


Chart 2.21

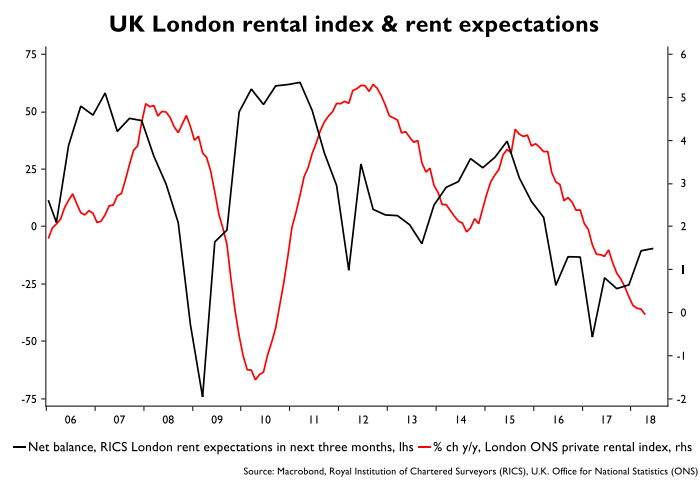
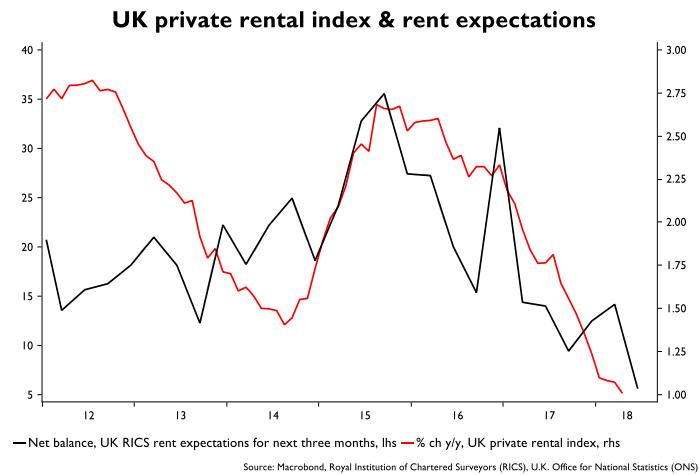


Chart 2.22



According to the Royal Institution of Chartered Surveyors, the net balance for rent expectations in London remains negative, but suggests rents may stabilise (Chart 2.21).<sup>224</sup> However, rent expectations across the UK continue to fall (Chart 2.22).<sup>225</sup> A sustained decline in net migration could accelerate the decline in rents (Chart 2.23).<sup>226</sup> The strong correlation between net migration and the Office for National Statistics private rental price index suggests that faster rate hikes could tip the housing market over. Margins have been squeezed for buy-to-let investors.

It is perhaps worth noting: the headlines are (overly) focussed on the decline in net migration from EU countries (Chart 2.24).<sup>227</sup> The latest data for Q3 2017 saw a modest rise in overall net migration. Arrivals from non-EU countries rose to the highest level since Q3 2011 (Chart 2.25).<sup>228</sup>

Some investors will not need to rely on buy-to-let mortgages to purchase properties. The change to annuity rules has resulted in pension funds being diverted into the housing market.<sup>229</sup> This may continue to push the house price-to-income ratio higher, putting further upward pressure on loan-to-income (LTI) ratios. Given that high LTI ratios are a potential systemic risk, the Bank of England needs to pay attention to these dynamics.

It will also need to consider distortions in the housing market and the wider impact on the real economy. As the Bank of England itself notes, “around one third of respondents who lived in rented

<sup>224</sup> Source: Macrobond, Royal Institution of Chartered Surveyors (RICS), Office for National Statistics.

<sup>225</sup> Ibid.

<sup>226</sup> Source: Macrobond, Office for National Statistics.

<sup>227</sup> See “EU migration to Britain below 100,000 for first time in 5 years”, Financial Times, February 22<sup>nd</sup> 2018, <https://www.ft.com/content/9534df4a-17ba-11e8-9376-4a6390addb44>.

<sup>228</sup> Source: Macrobond, Office for National Statistics.

<sup>229</sup> See “Up to £50bn pulled from final salary pension plans since 2015”, Financial Times, June 23<sup>rd</sup> 2017, <https://www.ft.com/content/d020d408-5760-11e7-80b6-9bfa4c1f83d2>.

accommodation reported that their rental payments were 30% or more of their pre-tax incomes”.<sup>230</sup> It is too easy to dismiss this as “partly related to the planning system” and inadequate housing supply.<sup>231</sup>

A shakeout in the rental market would, of course, be helpful for first-time buyers. Furthermore, buy-to-let investors typically borrow on much lower loan-to-value ratios. The risk (to banks) of ‘forced’ selling by landlords is not a major concern for the Bank of England – yet.

Nevertheless, there is a potential ‘air pocket’ in the UK housing market. A modest slowdown, or outright decline, will improve affordability, but house prices have risen so far in relation to incomes that landlords may struggle to sell without offering significant discounts.

Chart 2.23

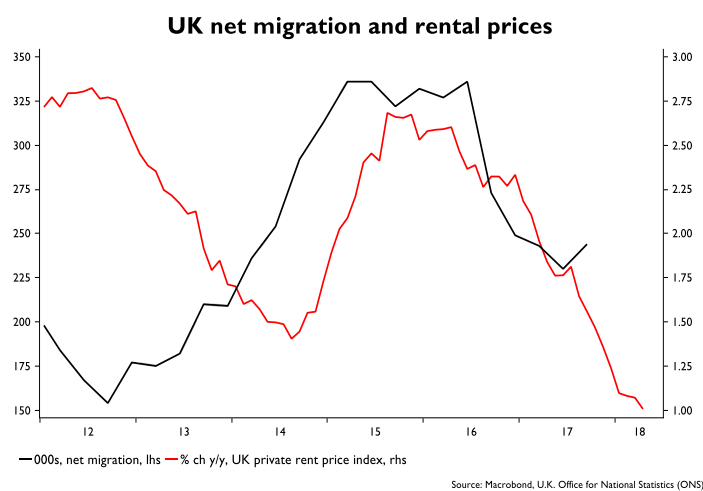
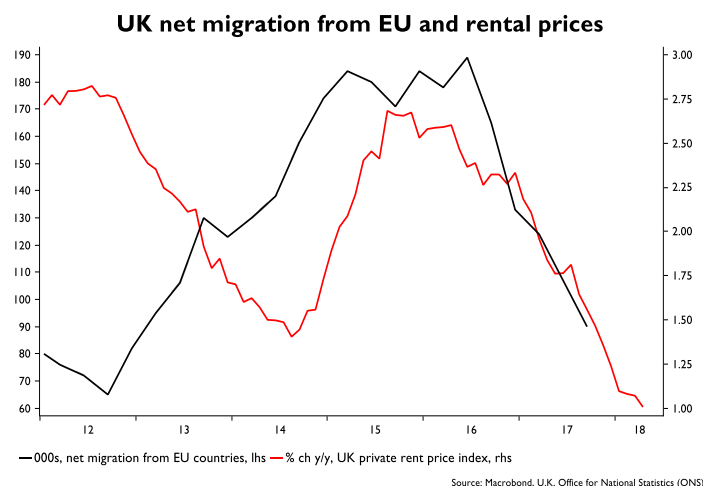


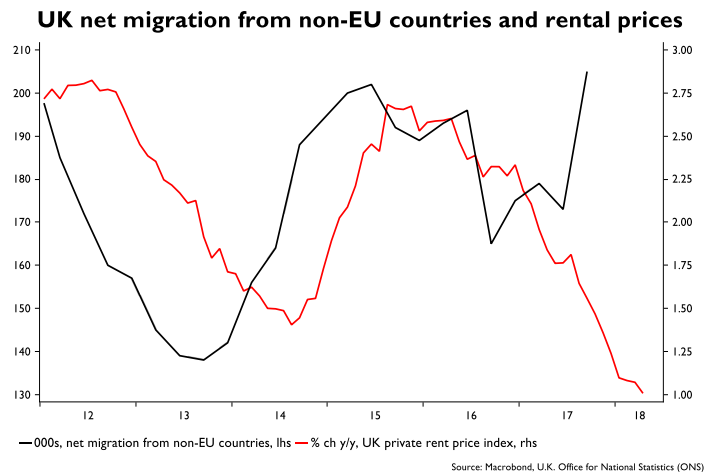
Chart 2.24



<sup>230</sup> See Financial Stability Report June 2017, p. 2, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>231</sup> Ibid.

Chart 2.25



According to the Royal Institution of Chartered Surveyors survey, inventories remain close to historic lows. This could, of course, limit any downside should rents fall. The Bank of England may also argue that the banks are much better capitalised vis-à-vis 2007, when Northern Rock ran into trouble.

However, the inventories picture could change quickly. Homeowners derive a utility from owning property: negative equity does not force homeowners to sell, so long as the mortgage is not in serious arrears. For landlords, it is different: a negative margin, with rents falling and interest rates rising, could persuade a sizeable proportion to sell.

### Consumer credit

Consumer credit has been allowed to grow rapidly during this economic cycle. The *y/y* rate had accelerated to a high of 10.9% in November 2016. Indeed, the Bank of England’s quarterly Credit Conditions Survey reported a “loosening of unsecured credit availability” in every quarter between the end of 2012 and the end of 2016.<sup>232</sup> Intense competition between lenders has driven interest rates lower relative to ‘risk-free rates’.<sup>233</sup> Credit card customers have been offered longer interest-free periods on balance transfers. Indeed, the average interest-free period has doubled since 2011.<sup>234</sup>

Overall consumer credit outstanding as a share of personal disposable income has risen from a trough of 12.6% in Q2 2014 to 14.7% in Q2 2017, but remains well down from the peak of 20.0% in 2005 (Chart 2.26).<sup>235</sup>

<sup>232</sup> Ibid. p. 15.

<sup>233</sup> Ibid. The spread between effective interest rates on new personal loans and the Bank Rate has dropped to 7.39% (as of April 2017). That contrasts with a post-crisis level of 9.27% (December 2013). For comparison, the credit crisis average (calculated for the period 2009 to 2013) was 11.64%.

<sup>234</sup> Ibid. p. 15, chart A. 21. The Bank of England has not granted permission to access the raw data.

<sup>235</sup> Source: Macrobond.

However, debt burdens are particularly onerous for some households. The Financial Conduct Authority has warned that customers in “persistent” debt pay on average around £2.50 in interest and charges for every £1 repaid.<sup>236</sup>

The Financial Conduct Authority introduced measures in February to ease the burden of debt.<sup>237</sup> Lenders will have to take a more active approach in helping customers to manage their repayments, in particular for those in “persistent debt”, defined as “consumers that have an average credit limit utilisation of 90% or more while also incurring interest charges”.<sup>238</sup> After a period of 36 months of persistent debt, credit providers must offer the borrower options to repay their balance in a reasonable period. Otherwise, they may have to waive or cancel credit card fees and interest payments.<sup>239</sup> In addition, customers in persistent debt for 12 months will not be offered credit limit increases.

The Bank of England expressed concern at the rapid rise in consumer credit in the June 2017 Financial Stability Report. Lenders were putting undue weight on the recent trend in arrears, which had fallen materially from their highs reached after the financial crisis of 2007/08.<sup>240</sup> The Financial Stability Report for June 2017 also showed that lenders were lowering the capital they held: “average risk weights for consumer credit have also fallen in recent years, reducing the loss-absorbing capital required to fund these exposures”.<sup>241</sup>

In September last year, the Financial Policy Committee again concluded that “lenders overall are placing too much weight on the recent performance of consumer lending in benign conditions as an indicator of underlying credit quality. As a result, they have been underestimating the losses they could incur in a downturn.”<sup>242</sup>

The Financial Policy Committee brought forward its analysis of consumer credit losses in the event of a deep recession. In the first three years of the 2017 stress test scenario, losses on UK consumer

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<sup>236</sup> See “New credit card rules introduced by the FCA”, Financial Conduct Authority, February 27<sup>th</sup> 2018, <https://www.fca.org.uk/news/press-releases/new-credit-card-rules-introduced-fca>.

<sup>237</sup> Ibid.

<sup>238</sup> See “Problem credit card debt”, Financial Conduct Authority, <https://www.fca.org.uk/credit-card-market-study-interim-report/problem-credit-card-debt#>.

<sup>239</sup> See “New credit card rules introduced by the FCA”, Financial Conduct Authority, February 27<sup>th</sup> 2018, <https://www.fca.org.uk/news/press-releases/new-credit-card-rules-introduced-fca>.

<sup>240</sup> See Financial Stability Report June 2017, p. 15, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>241</sup> Ibid. p. 16. The major UK banks’ average risk weights on consumer credit exposures have fallen for both credit card and non-credit card consumer credit. The former has dropped from an average 92% risk weighting in 2014 to 85% in 2016, whilst the latter has recorded an even sharper decrease, from 109% to 92%. Since the allocation of capital reserves depends on these internal risk weights, it is safe to assume that the banks’ loss absorption buffers have been reduced accordingly.

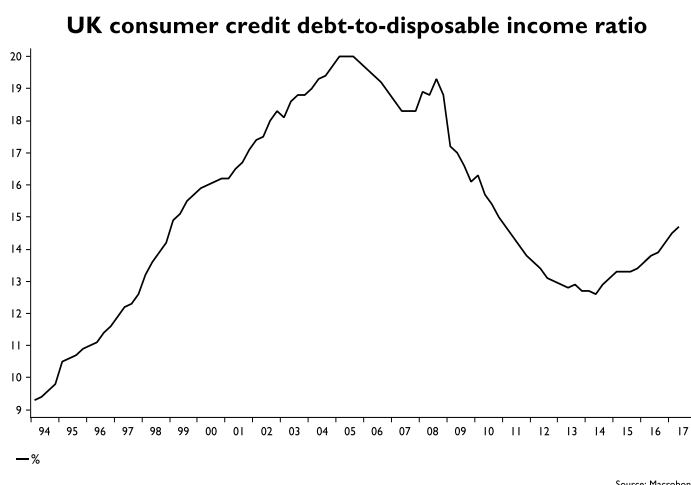
<sup>242</sup> See “Financial Policy Committee Statement from its policy meeting, 20 September 2017”, Bank of England, September 25<sup>th</sup> 2017, p. 5. <https://www.bankofengland.co.uk/-/media/boe/files/statement/fpc/2017/financial-policy-committee-statement-september-2017.pdf>.

loans totalled £30 billion (or 20% of UK consumer credit loans), £10 billion more than in the previous 2016 stress test. The Prudential Regulation Authority has also published a follow-up to its initial review of consumer credit, first conducted in July 2017.<sup>243</sup>

Banks subsequently reported a tightening in unsecured credit availability throughout 2017.<sup>244</sup> In the latest Credit Conditions Survey from the Bank of England, “credit scoring criteria for granting both credit card and other unsecured loan applications tightened significantly in Q1 [2018].”<sup>245</sup>

In response to Bank of England pressure, consumer credit growth is showing signs of a meaningful deceleration: the y/y rate for consumer credit outstanding dipped from 9.4% in February to 8.6% in March (Chart 2.27).<sup>246</sup> This was the smallest annual increase since November 2015. The growth in consumer credit cards outstanding eased from 9.5% to 8.8% (Chart 2.28), while other loans & advances slowed from 9.4% y/y to 8.8% y/y.<sup>247</sup> However, despite the tightening of unsecured credit in Q1, the Bank of England’s credit conditions survey suggest this is set to reverse in Q2 (Chart 2.29).<sup>248</sup>

Chart 2.26



<sup>243</sup> See “Follow-up to PRA Statement on consumer credit”, Prudential Regulation Authority, January 17<sup>th</sup> 2018, <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2017/follow-up-to-pra-statement-on-consumer-credit.pdf?la=en&hash=00023C625ADE4BDD307BD2CD71C965C77C789C47>.

<sup>244</sup> See “Credit Conditions Survey – 2017 Q4”, Bank of England, January 11<sup>th</sup> 2018, <https://www.bankofengland.co.uk/credit-conditions-survey/2017/2017-q4>.

<sup>245</sup> See “Credit Conditions Survey – 2018 Q1”, Bank of England, April 12<sup>th</sup> 2018, <https://www.bankofengland.co.uk/credit-conditions-survey/2018/2018-q1>.

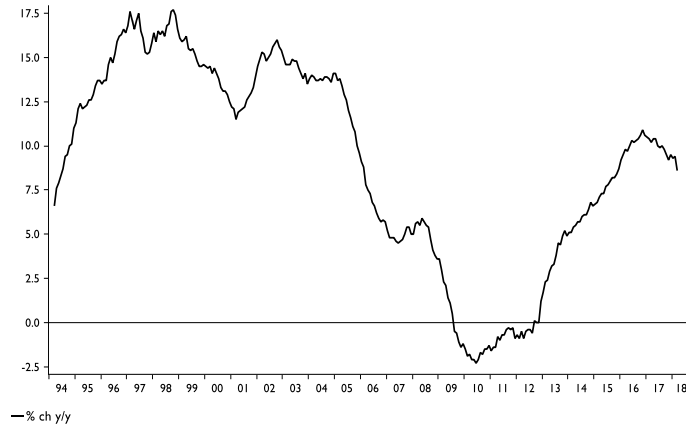
<sup>246</sup> Source: Macrobond.

<sup>247</sup> Source: Macrobond, Bank of England.

<sup>248</sup> Ibid.

Chart 2.27

**UK consumer credit**



Source: Macrobond, Bank of England

Chart 2.28

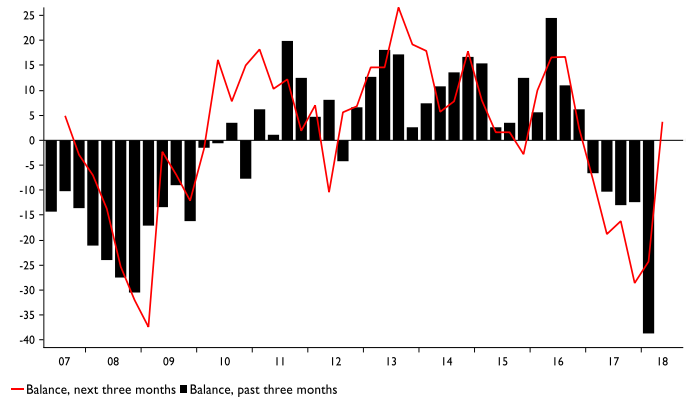
**UK consumer credit, credit cards**



Source: Macrobond, Bank of England

Chart 2.29

**UK BoE credit conditions survey, availability of unsecured credit to households**



Source: Macrobond, Bank of England

### Profiling consumer credit

Bank of England and the Financial Conduct Authority staff have published research suggesting that credit growth “has not been driven by subprime borrowers”.<sup>249</sup> Only a “small proportion of all consumer credit debt is held by subprime consumers.” As of November 2016, the majority of 0% credit card debt and motor finance was held by borrowers with high credit scores. Given that motor finance and 0% credit has accounted for most of the credit growth since 2012, the authors conclude that credit is flowing to those least likely to suffer financial distress.

The authors offer two caveats: firstly, they claim, growth in subprime borrowing has been less important to explaining the US mortgage crisis.<sup>250</sup> Furthermore, “renters with squeezed finances may be an increasingly important (and vulnerable) driver of growth in consumer credit.”

High rental payments increase the potential fallout from record levels of consumer credit borrowing. According to one of the country’s largest estate agencies, the rent paid to private landlords is now more than double the mortgage interest paid to banks by homeowners.<sup>251</sup> Rent payments totalled around £54bn over the 12 months to the end of June 2017. The interest paid by owner-occupier borrowers stood at £26.5bn, down by a total of £6.4bn from 2012.<sup>252</sup>

A report published by the Financial Conduct Authority in October 2017 showed that “47% of those who rent say they would struggle to pay their rent if payments went up by less than £100 per month”.<sup>253</sup> The Financial Conduct Authority’s Financial Lives Survey 2017 also classified 25.6m people in the UK as “financially vulnerable”. It is estimated that there are 4.1m people in “difficulty”, having already failed to pay domestic bills or meet credit commitments in three or more of the last six months.<sup>254</sup>

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<sup>249</sup> See “Who’s driving consumer credit growth?”, Bank Underground, January 8<sup>th</sup> 2018, <https://bankunderground.co.uk/2018/01/08/whos-driving-consumer-credit-growth/>.

<sup>250</sup> For a separate analysis of subprime borrowing in the 2007/08 crisis, see “Loan Originations and Defaults in the Mortgage Crisis: The Role of the Middle Class”, Manuel Adelino, Antoinette Schoar and Felipe Severino, *The Review of Financial Studies*, July 1<sup>st</sup> 2016, <https://academic.oup.com/rfs/article/29/7/1635/2607168>.

<sup>251</sup> See “Renters pay £54bn to private landlords in buy-to-let boom”, *Financial Times*, October 2<sup>nd</sup> 2017, <https://www.ft.com/content/58bb3090-a53d-11e7-9e4f-7f5e6a7c98a2>.

<sup>252</sup> *Ibid.*

<sup>253</sup> See “Understanding the financial lives of UK adults; Findings from the FCA’s Financial Lives Survey 2017”, Financial Conduct Authority, October 2017, p. 14, <https://www.fca.org.uk/publication/research/financial-lives-survey-2017.pdf>.

<sup>254</sup> *Ibid.* p. 15.



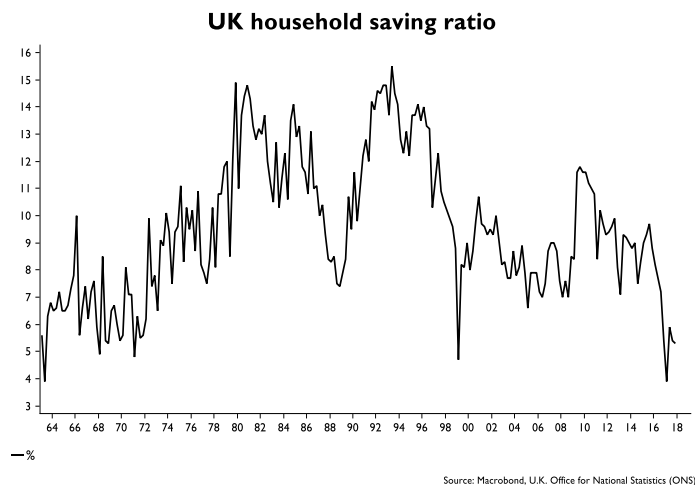
[Institute for Fiscal Studies paper on household debt burdens](#)

The Institute for Fiscal Studies has published a paper showing how poorer households are struggling with their debt burdens. According to the report, 25% of households in the lowest income decile were spending more than a quarter of their “current income servicing debts or servicing arrears.”<sup>255</sup> The comparable figure for the highest decile was just 6%. The report also showed that 16% of those on the lowest incomes were in arrears in 2012-2014.

Lower-income households also struggle with debt problems over a longer period of time. Over 40% of the households in the bottom two quintiles, who were in arrears or spending more than a quarter of their income on debt servicing in 2010-12, were faced with the same difficulties two years later.<sup>256</sup>

For the record, the household savings ratio tumbled to a joint post-war low of 3.9 in Q1 2017. The ratio has since rebounded to 5.3 by Q4 2017 (Chart 2.30), but remains below the average since 1997.<sup>257</sup> The alternative household savings ratio (cash basis) is more in line with the average since 1997, but is at the same time much lower too (Chart 2.31).<sup>258</sup>

Chart 2.30



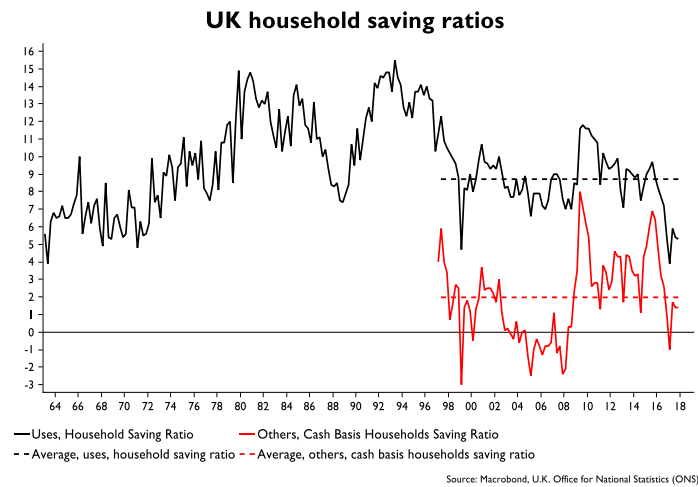
<sup>255</sup> See “Problem debt and low-income households”, Institute for Fiscal Studies, January 2018, p. 22, <https://www.ifs.org.uk/uploads/publications/comms/RI38%20-%20Problem%20debt.pdf>.

<sup>256</sup> Ibid. p. 39.

<sup>257</sup> Source: Macrobond, Office for National Statistics.

<sup>258</sup> Ibid.

Chart 2.31



### Further notes on consumer credit loans

Consumer credit loans can be divided into three categories:<sup>259</sup>

1. Credit cards (34% of total)
2. Dealership car finance (30% of total)
3. Other (36% of total)

#### Dealership car finance

These loans are typically hire purchase agreements: the customer normally pays a deposit, and then takes out a loan to cover the cost of buying the car. The loan is paid off with interest in regular monthly instalments, amortising fully.

The rapid growth in car loans has been concentrated in personal contract purchase (PCP) agreements. These are hire purchase agreements with lower monthly payments. At the end of the loan agreement, the customer can either make a pre-agreed ‘balloon payment’ or return the vehicle to the dealer. The balloon payment is set when the loan is arranged. It is based on the predicted value of the car in the used market at the end of the loan period. Recent data, however, suggests a substantial discrepancy between predicted and actual salvage value. Indeed, automotive analytics firm Sophus3 has reported car hire purchase deals with monthly payments lower than those under a smartphone contract.<sup>260</sup> In the words of one of the firm’s managing directors, “This new benchmark in car finance is fuelled by increasingly competitive monthly finance rates, from a growing list of rival finance providers, and the challenge to hit year-end sales targets.”<sup>261</sup>

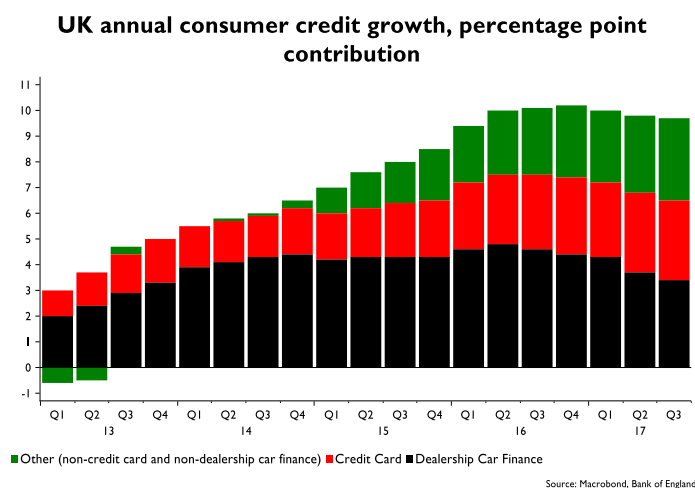
<sup>259</sup> See Financial Stability Report June 2017, Bank of England, p. 18, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>. Data are for March 2017.

<sup>260</sup> See “A new car is now cheaper than a smartphone”, MSN, September 28<sup>th</sup> 2017, <http://www.msn.com/en-gb/cars/news/a-new-car-is-now-cheaper-than-a-smartphone/ar-AAasyEQ2?li=AAAmiR2Z&ocid=spartanntp>.

<sup>261</sup> Ibid.

Car loans have risen sharply since 2009. According to the Bank of England, dealership car finance grew at an average annual rate of approximately 20% between 2012 and 2016. The stock of dealership car finance increased by over £30 billion during this period (accounting for around three quarters of total growth in consumer credit outstanding, Chart 2.32).<sup>262</sup>

Chart 2.32



The Bank of England takes a rather curious approach to this increase, claiming it was due to “a recovery in the car market: total new car registrations in 2016 were 30% higher than in 2012”.<sup>263</sup>

The rise in new car registrations surely would not have been possible without the rapid expansion in lending. As the Bank of England notes, “Around 85% of new car purchases used dealership car finance in 2016, compared with about half in 2009. In particular, use of PCP agreements has grown rapidly.”<sup>264</sup>

The Bank of England calls the growth in loans, weighted towards hire purchase agreements with lower monthly payments, “a structural shift in how cars are purchased”.<sup>265</sup>

There is nothing structural about this shift: it reflects looser credit conditions.

A significant share of these loans has been provided by the subsidiaries of global car manufacturers. According to the Bank of England, “Around half of the debt funding for these subsidiaries comes from their parent companies, around a quarter from securitisation, with the remainder from bank lending”.<sup>266</sup> This should cushion the banks were borrowers to default.<sup>267</sup>

<sup>262</sup> See Financial Stability Report June 2017, Bank of England, p. 19, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>263</sup> Ibid.

<sup>264</sup> Ibid.

<sup>265</sup> Ibid.

<sup>266</sup> Ibid.

<sup>267</sup> Ibid. Bank staff estimate major UK banks’ total exposures to UK car finance to be around £20 billion, or 9% of CET1, comprising:

The Bank of England also claims that arrears “tend to be lower than for other forms of consumer credit”.<sup>268</sup> Furthermore, this lending is secured, with the vehicle acting as collateral.

Of course, the value of this collateral will be particularly sensitive to recovery rates. The Bank of England has modelled the potential losses should car values at the end of contracts turn out to be 20% lower than expected by lenders at the origination of loans.<sup>269</sup> On this basis, the total losses would still only be “3%-6% of the total outstanding stock of car finance.”

If these losses were replicated across “the major UK banks’ dealership car finance portfolios, it would imply a reduction of 2-7 basis points in major UK banks’ aggregate CET1 ratio. That is, from a starting point of 13.92%, the ratio would fall to 13.85%-13.90%. Market-wide losses would rise to 7%-10% of the outstanding stock in a more severe scenario where car values at the end of contracts turn out to be 30% lower than originally expected. If these loss rates were applied to major UK banks’ portfolios, they would imply a reduction of 7-11 basis points in their aggregate CET1 ratio”.<sup>270</sup>

#### Other consumer credit

These include personal loans, overdrafts, peer-to-peer lending, store credit, lending from credit unions and small non-money bank lenders (pawnbrokers, payday lenders). These loans typically have a three to five-year maturity at a fixed interest rate. According to the Bank of England, just over a quarter of these loans are taken out for “the purposes of debt consolidation, with most of the remainder funding large purchases such as home improvements”.<sup>271</sup>

### Conclusion

The framework for financial stability has improved since the financial crisis of 2007/08. Consumer credit has been allowed to rise rapidly, but recent efforts suggest that the regulators are determined to mitigate potential financial stability risks.

This will be a litmus test of the post-crisis regulatory framework. Consumer credit should not have been allowed to rise this fast in the first place. In terms of mortgage lending, the framework has improved, but again, there has been a significant releveraging.

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- Direct exposures – around £17 billion, or 8% of CET1. This largely represents lending by banks’ asset finance subsidiaries, which make loans to car buyers, arranged through dealerships.
  - Indirect exposures via lending to UK finance subsidiaries of car manufacturers – around £2 billion, less than 1% of CET1.
  - Indirect exposures via holdings of asset-backed securities in banks’ liquid asset buffers – around £1 billion, less than 0.5% of CET1.

<sup>268</sup> See Financial Stability Report June 2017, Bank of England, p. 19, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>269</sup> The Bank of England also assumed that all PCP borrowers returned their vehicles.

<sup>270</sup> See Financial Stability Report June 2017, Bank of England, p. 19, <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>271</sup> Ibid. p. 18.

The financial system remains vulnerable because the underlying problems in the economy have not been tackled. The stagnation in real incomes, the sharp run-up in house prices and rising rents constitute significant risks to financial stability.

The Bank of England will need to work in tandem with other authorities (such as the Strategic Investment Board) to forge a coordinated policy that tackles many of these structural problems facing the UK economy.



# Chapter 3: Dissecting bank lending – a recap

## Dissecting bank lending: a recap

Sectors that are critical to the potential growth path of the UK economy are not being supported by the banks. These include manufacturing, 'professional, scientific & technical activities', 'information & communication' and 'administrative & support services'. Deposits from these four sectors – and many others – are effectively being recycled into lending that damages the long-run growth prospects of the UK economy.

Table 3.A shows all the sectors where deposits exceed lending (i.e. 'deposit surplus').<sup>272</sup> The combined deposit surplus of the first four 'productive' sectors in Table 3.A is £117.09 billion. This is greater than the deficit in deposits for the five sectors listed in Table 3.B (£116.38 billion).<sup>273</sup>

*[Note: unless otherwise stated, all the figures provided in this chapter are taken from the Bank of England's Bankstats database, which provides a detailed industrial analysis of monetary financial institutions' deposits from UK residents and lending to UK residents.]*

The most notable sector where lending exceeds deposits (i.e. 'deposit deficit') – buying, selling & renting of real estate – attracts the lion's share of funds (£83.43 billion). The pressure on banks to reduce their reliance on wholesale funding and increase liquidity ratios partly explains why, on an aggregate basis, deposits have risen relative to lending.

In total, there are 13 sectors (in Table 3.A) that are generating deposits over and above lending. In strict accounting terms, they all contributed to a deposit surplus. A significant proportion of this is effectively used to lend on to the sectors listed in Table 3.B.<sup>274</sup> Manufacturing, 'professional, scientific & technical activities', 'information & communication' and 'administrative & support services' are emphasised because, globally, these sectors have been at the forefront of rapid technological change.

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<sup>272</sup> Source: Bank of England, Industrial analysis of monetary financial institutions' deposits from UK residents and lending to UK residents, Bankstats tables C1.1 and C1.2, <https://www.bankofengland.co.uk/statistics/tables>. The lending numbers include all sterling and foreign currency loans. The Bank of England provides lending data extending back to 1987 for the majority of (but not all) industries. However, these 'long-run' lending numbers relate to sterling lending *only* (i.e. exclude foreign currency lending).

<sup>273</sup> For all non-financial corporations, there is a combined deposit surplus. In short, the banks take in more deposits than they lend: the gap is £78.52bn. This gap has widened in recent years. Overall, the gap between deposits and lending for all UK residents (financial & non-financial business and individuals & individual trusts) was £142.98bn in Q1 2018.

<sup>274</sup> Examining the gap between deposits and lending should not be confused with the concept of a 'funding gap'. For example, a report by the *Business, Energy and Industrial Strategy Committee* defined the funding gap for SMEs as "The difference between the funding required by SMEs and the funding available". See "House of Commons, Business Energy and Industrial Strategy Committee, Access to finance", Business, Energy and Industrial Strategy Committee, October 25<sup>th</sup> 2016, p. 5, <https://publications.parliament.uk/pa/cm201617/cmselect/cmbeis/84/84.pdf>.

The funding gap is difficult to calculate in practice. The funding needs of a business are subjective and can be endogenous. Surveys may be unreliable. For example, if a company realised that it could acquire more cost-effective funding, then it would alter its aspirations accordingly, which would in turn change the financing it requires.



Table 3.A

<b>Sectors with a deposit surplus / lending deficit</b>	
<b>Sector</b>	<b>£ bn, Q1 2018</b>
Total	194.90
Professional, scientific & technical activities	68.50
Information & communication	24.39
Manufacturing	15.43
Administrative & support services	8.77
Personal & community service activities	16.64
Public administration & defence	15.43
Mining & quarrying	11.54
Education	11.43
Recreational, cultural & sporting activities	9.87
Construction	8.93
Human health & social work	2.31
Transportation & storage	1.55
Fishing	0.12

Source: Bank of England. A positive number implies lending is lower than deposits in this sector.

Table 3.B

<b>Sectors with a deposit deficit / lending surplus</b>	
<b>Sector</b>	<b>£ bn, Q1 2018</b>
Total	-116.38
Buying, selling & renting of real estate	-83.43
Accommodation & food service activities	-16.76
Agriculture, hunting & forestry	-10.61
Electricity, gas & water supply	-5.10
Wholesale & retail trade	-0.48

Source: Bank of England. A negative number implies lending is higher than deposits in this sector.

Of course, companies that are growing quickly could experience a strong rise in deposits and may have less requirement for lending. Lending has fallen in manufacturing, 'professional, scientific & technical activities' and 'information & communication', while deposits have risen.

In administrative & support services, lending has risen, but this has been outstripped by faster growth in deposits. Furthermore, 'professional, scientific & technical activities', 'information & communication' and 'administrative & support services' have seen strong jobs growth since the crisis of 2007/08 (Table

3.C).<sup>275</sup> From this perspective, it appears that banks are not starving companies of the required funds to invest and expand.

Table 3.C

**UK employment by industry, Q4 2017**

Industry	% change since Q1 2009	Employment, millions (Q4 2017)	Share of total employment (%)
Total	9.94	35.11	100.00
Professional, scientific & technical activities	28.08	3.07	8.73
Administrative & support service activities	25.66	3.06	8.72
Information & communication	18.35	1.45	4.12

Source: Office for National Statistics

Table 3.D

**Manufacturing deposits and lending, Q1 2018**

Sector	Deposits (£ bn)	Lending (£ bn)	Deposits minus lending (£ bn)	Lending as a share of deposits (%)	% change in lending since Q1 2009
Manufacturing	58.35	42.93	15.43	73.6	-32.2
Chemicals, pharmaceuticals, rubber and plastics	11.67	8.50	3.17	72.9	21.7
Machinery, equipment and transport equipment	16.22	9.53	6.69	58.7	-13.8
Textiles, wearing apparel and leather	1.49	1.26	0.23	84.3	-23.8
Electrical, medical and optical equipment	8.46	2.64	5.82	31.2	-36.1
Food, beverages and tobacco	5.30	10.26	-4.96	193.5	-38.0
Non-metallic mineral products and metals	7.08	5.16	1.92	72.9	-42.3
Other manufacturing	6.11	3.43	2.68	56.1	-48.8
Pulp, paper, and printing	2.03	2.16	-0.14	106.7	-70.6

Source: Bank of England

However, productivity across these three industries remains weak by international standards. A dearth of lending to critical industries indicates that banks are failing to help UK businesses to invest. In a competitive global environment, it is imperative that small companies have sufficient access to finance

<sup>275</sup> Source: Office for National Statistics, Labour Market. Employment has risen strongly in professional, scientific & technical activities (28.1%), administrative & support services (25.7%) and information & communication (18.4%) since Q1 2009. Jobs growth in these sectors has outpaced the overall increase in workforce jobs over this period (9.9%). Together, these three sectors account for 21.6% of total workforce jobs in the UK (Table 3.C).

to enable them to scale up.<sup>276</sup> The outstanding stock of loans to small & medium-sized enterprises (SMEs) has dropped from £197.8 billion in April 2011 (start of data) to £166.1 billion in March 2018.<sup>277</sup> Even if company balance sheets appear healthy, a lack of investment in key technologies will compromise their performance and ability to compete over the long run. It will undermine the potential growth path of the economy, damage productivity and reduce the ability of companies to increase salaries. Indeed, real wages have fallen across the economy since 2007.<sup>278</sup> In this context, banks should be recycling deposits into areas that offer growth opportunities: instead, they are doing the opposite.

The reduction in lending to manufacturing companies is an indictment of the banks' skewed priorities (Table 3.D). One of the biggest declines has been in 'electrical, medical & optical equipment': lending has fallen from a high of £9.58 billion in Q2 1999 to £2.64 billion in Q1 2018. Deposits exceeded lending by £5.82 billion in this sector by Q1 2018. This sector includes industries that, globally, have seen big innovations in recent years. The failure of banks to support companies in this industry should be a major consideration for the Bank of England. The gap between lending and deposits for 'electrical, medical & optical equipment' companies is the second-largest in absolute terms within manufacturing (see Table 3.D).

The banks also have a deposit surplus of £6.69 billion with 'machinery, equipment & transport equipment'. This is the largest surplus within manufacturing in absolute terms. Along with 'electrical, medical & optical equipment', these two sectors account for well over half of the deposit surplus within manufacturing. One other sector with a surplus – 'non-metallic minerals & metals' (£1.92 billion) – is significant given the difficulties faced by this industry in recent years.

Loans outstanding to 'agriculture, hunting & forestry' have risen from £6.48 billion in Q4 1997 to £18.52 billion in Q1 2018. This has resulted in a big rise in the deposit deficit for this sector (£10.61 billion). The growth in lending could be viewed as a positive if it was being used for investment to raise productivity in agriculture.

However, it is possible that this increase in lending has simply been deployed for buying agricultural land. The deterioration in the trade deficit for 'food, beverages & tobacco' since 1997 – despite the increase in lending to agriculture over this period – is also striking.<sup>279</sup> Indeed, lending to the food, beverage & tobacco industry has dropped from a high of £21.35 billion to £10.26 billion. It is hard to

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<sup>276</sup> See "The Scale-Up Report", Sherry Coutu, November 2014, p. 32, <http://www.scaleupreport.org/scaleup-report.pdf>.

<sup>277</sup> See "Money and Credit – March 2018", Bank of England, May 1<sup>st</sup> 2018, <https://www.bankofengland.co.uk/statistics/money-and-credit/2018/march-2018>.

<sup>278</sup> See *Financing Investment: Interim Report*, GFC Economics Ltd and Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, p. 15.

<sup>279</sup> *Ibid.* p. 43.

avoid the conclusion that banks have been happy to help investors acquire agricultural land, but not to invest in food production.

The price of agricultural land in the UK has risen by over 270%, from approximately £2,000 per acre in Q4 2004 to £7,201 per acre in Q4 2017.<sup>280</sup> Over the past ten years, farmland has consistently outperformed major assets such as the FTSE100 Index and the Knight Frank UK House Price Index, which includes prime central London properties.<sup>281</sup>

The surplus of lending for ‘electricity, gas & water supply’ (£5.10 billion) is a concern too. This is not an optimal use of the banks’ lending capacity: loans for critical infrastructure in utilities can and should be provided through the government. Gilt issuance is cheaper than bank lending.

The last sector to enjoy a surplus of lending over deposits is ‘accommodation & food services’ (£16.76 billion). To emphasise, this relates to food services, not production. A further breakdown of lending in this sector is required. It is possible that the rise in lending has been skewed towards accommodation, which may be property-related. Alternatively, it could be tied to the expansion in student accommodation, which has helped the UK generate a surplus on tuition fees within the current account.<sup>282</sup>

### Bloated real estate sector?

Manufacturing, ‘professional, scientific & technical activities’, ‘information & communication’ and ‘administrative & support services’ account for 28.3% of real GDP. Loans outstanding to these four sectors total just £106.10 billion, or 5.2% of GDP (Table 3.E).

This is less than the total of loans outstanding to companies engaged in the buying, selling & renting of real estate (£135.83 billion or 6.7% of GDP). The priorities of the banks are inconsistent with securing a higher potential growth path for the UK economy.

Companies engaged in the ‘buying, selling & renting of real estate’ are separate from the £1,207.1 billion of lending secured on dwellings (i.e. mortgage loans, including bridging finance) on the books of UK banks. With ‘other loans’ included (£134.4 billion), UK banks have a total of £1,341.4 billion of loans outstanding to households. However, the deposits that banks take from UK individuals is

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<sup>280</sup> Source: See “Knight Frank Farmland Index”, Q4 2017, <http://content.knightfrank.com/research/157/documents/en/english-farmland-index-q4-2017-5295.pdf>. The latest figure marks a drop of 13.30% on the September 2015 peak of £8,306. The Knight Frank farmland market index is an opinion-based index, compiled quarterly by Knight Frank’s farms & estates and valuations offices in the UK. It tracks the price performance of bare agricultural land without dwellings or buildings.

<sup>281</sup> See “Knight Frank Farmland Index”, Q4 2017, <http://content.knightfrank.com/research/157/documents/en/english-farmland-index-q4-2017-5295.pdf>.

<sup>282</sup> See “UK Balance of Payments, The Pink Book: 2017”, Office for National Statistics, Table 3.3, October 31<sup>st</sup> 2017, <https://www.ons.gov.uk/releases/unitedkingdombalanceofpaymentsthepinkbook2017>. The education travel surplus more than doubled from £3.73 billion in 2005 to £8.91 billion in 2015, before falling back to £6.54 billion in 2016.

£1,270.1 billion. This deficit (£63.0 billion) is covered by the surplus generated from non-financial corporations. Again, it is hard not to conclude that banks are borrowing from sectors critical to UK economic growth to fund consumer spending or borrowing for house purchases.

Table 3.E

<b>Real GDP and lending</b>			
<b>Sector</b>	<b>Share of output in real GDP, 2017 (%)</b>	<b>Lending (£ bn, Q1 2018)</b>	<b>Share of total lending (%)</b>
Manufacturing	10.1	42.93	3.5
Professional, scientific & technical activities	7.6	19.26	1.6
Information & communication	4.6	12.75	1.0
Administrative & support services	6.0	31.17	2.5
Buying, selling & renting of real estate	3.8	135.83	11.0

Source: Bank of England, Office for National Statistics

Critics will argue that it is not within the Bank of England's remit to intervene in the direction of lending. This, they claim, would impede the smooth functioning of markets, and distort the 'efficient' allocation of capital.

However, financial stability risks will emerge if the economy becomes less competitive. Private finance cannot always be relied upon to guarantee the optimal allocation of capital. Bank lending is one channel through which the Bank of England can promote strategic industries that have a critical role to play in improving the long-run growth prospects of the UK economy.

### Recent uptick in manufacturing lending

It should be noted that lending to the manufacturing sector rose in the May to July period, from £38.2 billion to £49.7 billion. This was driven by loans in foreign currency, up from £13.3 billion to £22.9 billion. This jump in foreign currency lending is primarily found in two industries: 'chemicals, pharmaceuticals, rubber & plastic' and 'food, beverages & tobacco'. The Bank of England confirmed that the spike in the manufacturing lending in June/July was "because of a couple of large businesses driving the aggregates." This could be related to M&A deals.

Foreign currency loans to the manufacturing sector have since dropped back to £13.63 billion in March. Nevertheless, sterling loans to manufacturing are grinding higher, rising steadily from £24.92 billion in May 2017 to £28.52 billion in September 2017, before climbing to £29.30 billion in March. This was the highest since November 2009.

One sector – the ‘food, beverages & tobacco’ industry – has accounted for nearly two thirds (63.9%) of the rise in total sterling loans between May 2017 and March 2018. Some of the major food retailers have expressed concerns over food shortages that may follow once the UK leaves the EU, prompting a rise in stockpiling at warehouses.<sup>283</sup>

### Commercial real estate, collateral and intangibles

The UK current account deficit has been narrowing.<sup>284</sup> Nevertheless, the dependency on foreign direct investment inflows to fund the deficit remains a concern.<sup>285</sup> Overseas investors accounted for around 80% of total investment in the London commercial real estate market in 2017, up from 55% in 2007.<sup>286</sup> There has been an increased concentration, with Asian investors accounting for almost two-thirds of foreign purchases in London this year.<sup>287</sup>

Banks have reduced their direct exposure to the commercial real estate market. Commercial real estate lending by UK banks has fallen from around £160 billion at the end of 2008 to around £77 billion by the end of H1 2017.<sup>288</sup> Nevertheless, the importance of commercial real estate for collateral in bank lending leaves the UK economy vulnerable to a reversal of capital inflows. A 2015 review by the Bank of England of bank lending to small and medium-sized companies suggested that 75% of companies borrowing from banks use commercial real estate as collateral.<sup>289</sup> As the Financial Policy Committee warns, “an amplified downturn in the commercial real estate market could be transmitted to the real economy by reducing companies access to bank loans and their ability to undertake new loans”.<sup>290</sup> Every 10% fall in UK commercial real estate prices would lead to a 1% decline in investment.

The bias towards real estate lending stems in part from the security afforded by the property, used as collateral in the loan. This simplifies risk assessment for banks. By contrast, lending to non-financial,

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<sup>283</sup> See “Brexit fears spur businesses to stockpile goods”, Financial Times, November 23<sup>rd</sup> 2017, <https://www.ft.com/content/9492bd32-c959-11e7-aa33-c63fdc9b8c6c>.

<sup>284</sup> Source: Office for National Statistics, Balance of payments, <https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/timeseries/aa6h/ukea>. As a share of GDP, the current account deficit has narrowed from 6.4% in Q3 2016 to 4.1% in Q4 2017 (4-quarter moving average).

<sup>285</sup> In mitigation, a recent article by Bank of England staff argues that “Looking at *gross*, rather than *net* capital flows since 2012 suggests inflows have been extremely subdued relative to past levels. Instead, the UK has benefitted from increasing capital gains on past foreign investments and used these to fund its spending. We argue this carries lower financial stability risks than relying on gross inflows to cover the current account deficit.” See “A prince not a pauper: the truth behind the UK’s current account deficit”, Bank Underground, December 7<sup>th</sup> 2017, <https://bankunderground.co.uk/2017/12/07/a-prince-not-a-pauper-the-truth-behind-the-uks-current-account-deficit/>.

<sup>286</sup> See Financial Stability Report November 2017, p. 28, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>.

<sup>287</sup> Ibid.

<sup>288</sup> Ibid. p. 29.

<sup>289</sup> Ibid.

<sup>290</sup> See Financial Stability Report November 2017, pp. 28-29, <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-report/2017/november-2017.pdf?la=en&hash=F6D65F714A7DC28394BC4FCC9909CCD39E28AD10>.

non-real estate businesses involves a detailed assessment of the underlying business model. This requires expertise that many banks do not currently have and would be costly to acquire. This, in part, explains why challenger banks have been too focussed on real estate lending (see Chapter 8). The problem is amplified by the intangible economy.

Indeed, the reliance upon commercial real estate to collateralise lending is also a big constraint for companies in fast growing technology sectors. The importance of intangibles (e.g. software, research & development) in the creation of new products and services makes it hard for small companies to borrow.

In the UK, banks continue to favour real estate lending over and above loans to 'productive' sectors of the economy, including small & medium-sized enterprises. Lending against real estate can appear easy to manage and safer. Lending against real estate assets provides security for banks. However, it can impair financial stability and lower the potential growth path of the economy, ultimately putting the banks at risk.

Unproductive lending – for example, to fund increased consumption or to finance the purchase of an asset that already exists – does not raise the potential growth path of the economy. It diverts resources away from productive sectors. This can push up asset prices in the short run spurring further speculative inflows into real estate. Eventually, this 'virtuous' cycle will unravel.

By contrast, if credit is allocated to productive use – for example, investment in plant and equipment, research & development, or the implementation of innovative technologies and processes – then this will tend to drive faster economic growth. Productive investment generates the future income from which debts can be repaid.

Their role in allocating credit in the economy grants the banks enormous power. They are a key 'lever' in the economy, deciding which sectors can obtain finance, and which industries are starved of funds.

Nonetheless, bank lending decisions are often left unscrutinised. It is widely accepted in some circles that private individuals, left to their own devices, will allocate credit optimally for society.

The financial crisis of 07/08 cast severe doubt on this assumption. It focussed attention on the 'speculative' investments facilitated by bank credit, particularly in real estate. Nevertheless, the data show that little has been achieved to address the failure of the pre-crisis system. This underlines the need for a Strategic Investment Board to coordinate expertise and identify the potential technologies and new markets that are worth backing.





# Chapter 4: UK dividends and tech companies

## UK dividends and tech companies

Low interest rates were meant to encourage investment. However, UK gross fixed capital formation as a share of GDP was the lowest out of all G7 countries in 2016.<sup>291</sup> The lamentable track record of the UK, with investment lagging other countries, does not reflect a problem with monetary policy *per se*. Other countries with similar interest rates have seen much higher levels of investment.

It is important to look at the wider context. In an era of rapid technological change, global competitiveness requires a strategy for patient, long-term investment. US companies such as Amazon have employed this approach successfully. Chinese tech giants such as Alibaba are following suit.

Globally, investors are beginning to recognise the flaws with high dividend pay-outs. In the past, high dividends were often deemed to be a marker of a successful company. Now, investors are rewarding companies prepared to forgo dividends to focus on growth.

Government policies that stimulate long-term investment will reinforce this important shift by the private sector. Changes to corporate governance may be required. More importantly, the Bank of England, Strategic Investment Board, the National Investment Bank and the National Transformation Fund will have a critical role to play, creating the right incentives and opportunities for investors prepared to eschew high dividends.

### Dividend policies and low investment

The collapse of Carillion in January 2018 has focussed attention on company dividend policies and corporate governance. According to a House of Commons Library Briefing Paper, “In the eight years from 2009 to 2016, Carillion paid out £554 million in dividends, three quarters of the cash it made from operations. In the five-and-half-year period from January 2012 to June 2017, Carillion paid out £333 million more in dividends than it generated in cash from its operations.”<sup>292</sup> The company was borrowing to fund shareholders.

Carillion’s generous dividends were lauded by its group finance director in the 2016 annual report: “the board has increased the dividend in each of the 16 years since the formation of the company in 1999”.<sup>293</sup> In truth, it was a sign of poor management and a lack of vision. Investment in future growth opportunities was sacrificed for short-term gains.

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<sup>291</sup> See *Financing Investment: Interim Report*, GFC Economics Ltd and Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, pp. 13-14.

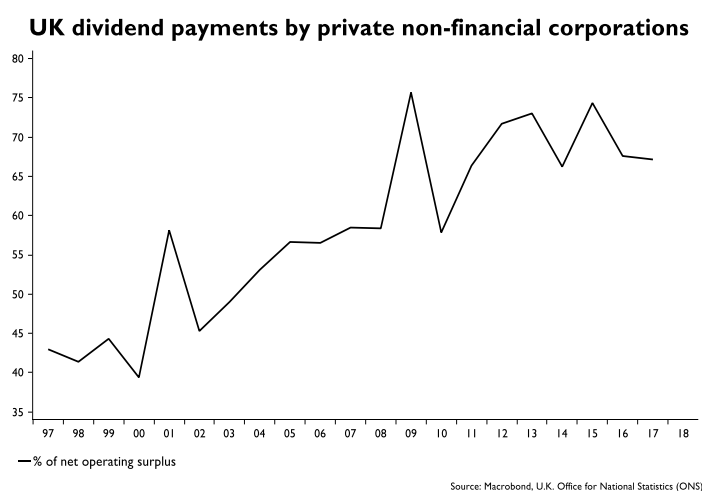
<sup>292</sup> See “The collapse of Carillion”, House of Commons Briefing Paper, March 14<sup>th</sup> 2018, p. 5, <https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-8206#fullreport>.

<sup>293</sup> See “Carillion collapse offers warning to dividend fetishists”, Financial Times, January 19<sup>th</sup> 2018, <https://www.ft.com/content/89576266-fd15-11e7-a492-2c9be7f3120a>.

This problem is widespread. According to AJ Bell, “26 current members of the FTSE 100 have grown their dividend every year for at least the past decade, with some stretching back over three decades.”<sup>294</sup> The dividend cover ratio (profits/dividends) for FTSE 100 companies in 2018 is forecast to be just 1.63.<sup>295</sup> The dividend coverage ratio for companies that pay the highest dividends is projected to be much lower (1.37). The flipside is languishing business investment.<sup>296</sup>

Data from the Office for National Statistics confirm that UK companies have prioritised shareholder returns over the past two decades. As a share of their net operating surplus (a national accounts measure of profits), dividend payments by UK private non-financial corporations grew from 43.0% in 1997 to 67.1% in 2017 (see Chart 4.1).<sup>297</sup> In other words, the dividend cover ratio declined from 2.3 to 1.5 over this period.

Chart 4.1



In May 2015, Andrew Haldane, Chief Economist of the Bank of England, echoed a growing concern with the “shareholder primacy” model that has dominated post-1980s.<sup>298</sup> He noted that “investment is consistently and significantly higher among private than public companies with otherwise identical characteristics, relative to profits or turnover. In other words, shareholder short-termism may have had material costs for the economy, as well as for individual companies, by constraining investment.”

<sup>294</sup> See “Dividend Dashboard Q4 2017”, AJ Bell, December 19<sup>th</sup> 2017, p. 3, [https://www.ajbell.co.uk/sites/ajbell/files/20171215\\_AJBYI\\_Dividend\\_dashboard%20Q42017%20FINAL.pdf](https://www.ajbell.co.uk/sites/ajbell/files/20171215_AJBYI_Dividend_dashboard%20Q42017%20FINAL.pdf).

<sup>295</sup> Ibid. p. 2.

<sup>296</sup> See *Financing Investment: Interim Report*, GFC Economics Ltd and Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, pp. 13-14, <http://www.gfceconomics.com/wp-content/uploads/2017/12/Financing-Investment-report-combined-PDF.pdf>.

<sup>297</sup> Source: Office for National Statistics, United Kingdom Economic Accounts and Profitability of UK Companies.

<sup>298</sup> See “Who owns a company?” Andrew Haldane, May 22<sup>nd</sup> 2015, p. 13, <https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/who-owns-a-company.pdf>.

## Bank dividends

The problem of high pay-out ratios in the UK is not confined to non-financial corporates. Banks have emphasised dividends too. This may place them at a competitive disadvantage vis-à-vis technology companies (see Chapter 9). According to the Bank of England, retained earnings averaged £6.2 billion per annum in the four years to 2016, but banks paid out an average of £10.9 billion per annum in dividends over this period (see Chart 4.2).<sup>299</sup> Dividends exceeded retained earnings by an average of £4.7 billion during these four years. In the four years to 2007, the gap was even bigger – £18.7 billion per annum (see Table 4.A). Retained earnings for all banks averaged £6.8 billion per annum in the four years to 2007, far below the £18.7 billion paid out in dividends. Post-tax profits averaged £17.4 billion in the four years to 2016. Dividend payments amounted to more than half of this. The same applies in the four years to 2007.

## UK dividends climb to a record in 2017

According to the UK Dividend Monitor, dividends totalled a record £94.4 billion in 2017, a jump of 10.5% y/y.<sup>300</sup> Underlying dividends – which exclude ‘special’ dividends (i.e. one-off payments) – rose 10.4% y/y to £87.7 billion, also a record.<sup>301</sup> The annual growth rate for underlying dividends was the fastest since 2012. Share buybacks have picked up over the past year too: repurchases hit £15 billion in the twelve months to January 2018, almost matching the £17 billion worth of new equity issuance over this period.<sup>302</sup>

Some asset managers have used the news of a spike in dividend payments as an opportunity to warn UK businesses not to neglect investment.<sup>303</sup> Companies are maintaining or increasing dividends at the expense of R&D and other projects.

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<sup>299</sup> Source: Bank of England, MFIs in the UK: Total Income & Expenditure.

<sup>300</sup> See “UK Dividend Monitor: Q4 2017”, LINK Asset Services, p. 3, <https://www.linkassetservices.com/our-thinking/uk-dividend-monitor-q4-2017>.

<sup>301</sup> Exchange rate effects (i.e. weaker sterling) boosted dividends by a relatively modest £2.1 billion last year: the total dividend payout would still have been a record.

<sup>302</sup> See “UK share buybacks accelerate as market lags behind”, Financial Times, March 16<sup>th</sup> 2018, <https://www.ft.com/content/df9bad78-2770-11e8-b27e-cc62a39d57a0>.

<sup>303</sup> See “Reel in ‘unsustainable’ dividends, UK companies warned”, Financial Times, December 17<sup>th</sup> 2017, <https://www.ft.com/content/02081042-d391-11e7-a303-9060cbl1e5f44>.

Chart 4.2

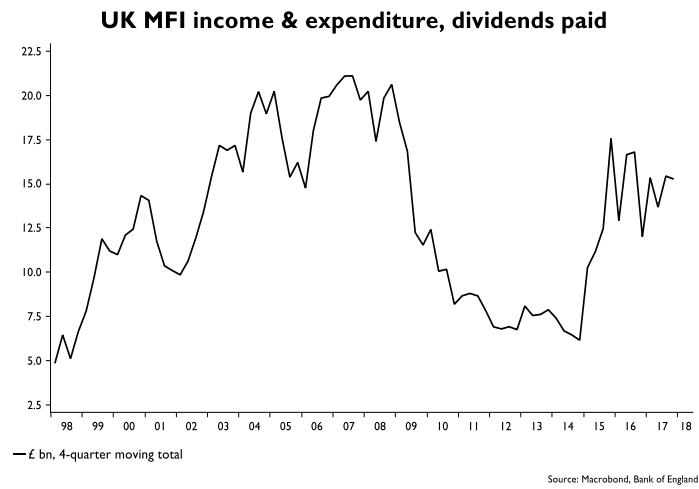


Table 4.A

<b>UK monetary financial institutions' profit &amp; loss (£ millions)</b>					
<b>Year</b>	<b>Pre-tax profit</b>	<b>Tax</b>	<b>Dividends paid</b>	<b>Other transfers</b>	<b>Retained profit</b>
2004	29,718	4,057	18,961	1,559	5,142
2005	29,765	5,302	16,212	1,772	6,478
2006	36,000	5,062	19,952	1,682	9,305
2007	32,116	3,978	19,745	2,277	6,116
2008	-20,943	-5,099	20,624	2,580	-39,047
2009	-10,559	-1,751	11,540	1,249	-21,597
2010	2,752	5,009	8,186	573	-11,012
2011	11,189	2,384	7,824	811	171
2012	4,183	2,369	6,751	2,675	-7,612
2013	18,296	3,543	7,874	163	6,717
2014	24,185	5,403	6,151	514	12,118
2015	25,338	5,472	17,565	379	1,922
2016	24,902	8,519	12,016	281	4,084

Source: Bank of England

## CFOs on the defensive

Companies in the UK are failing to invest and expand into new markets. According to the Q1 Deloitte CFO Survey, cost reduction was the top balance sheet priority over the next twelve months.<sup>304</sup> Uncertainty around Brexit may have been a significant factor. Nevertheless, the Deloitte CFO survey shows that ‘defensive’ strategies have dominated ‘expansionary’ strategies in 21 out of 31 quarters since the start of the survey in Q3 2010 (see Chart 4.3).<sup>305</sup> In this sense, the problem is nothing new.

The share of CFOs that regarded increasing capital expenditure as a strong priority over the next twelve months was just 12% in Q1, down from 17% in Q4 2017.<sup>306</sup> By contrast, the net percentage of CFOs who think cash return to shareholders (including dividends and share buybacks) is high relative to normal levels hit a cyclical record in the first quarter of the year (29.5%, see Chart 4.4).<sup>307</sup>

## Reward for companies that invest for the long run

In the US, equity investors are now rewarding companies for taking a longer-term perspective. Firms with the highest capex and R&D spending in the S&P 500 have seen their share prices rise ahead of companies in the S&P 500 buyback index since the beginning of 2016 (see Chart 4.5).<sup>308,309</sup>

Since November 24<sup>th</sup> 2017, the S&P 500 buyback index has made up some ground: corporates in the US are unveiling record buybacks on the back of recent tax cuts.<sup>310</sup> However, investment spending also rebounded in Q1 this year: capital expenditures by S&P 500 companies were on track to grow 25.9% y/y in the first quarter.<sup>311</sup> Capital spending by the IT sector was projected to surge by 59.8% y/y.

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<sup>304</sup> See “The Deloitte CFO Survey – Q1 2018”, Deloitte, April 2018,

<https://www2.deloitte.com/uk/en/pages/finance/articles/deloitte-cfo-survey.html>.

<sup>305</sup> Expansionary strategies include introducing new products/services or expanding into new markets, expanding by acquisition and increasing capital expenditure. Defensive strategies involve reducing costs, reducing leverage and increasing cash flow.

<sup>306</sup> Ibid.

<sup>307</sup> Ibid.

<sup>308</sup> Source: Bloomberg Anywhere, Macrobond. Accessed: May 31<sup>st</sup> 2018. The Capex and R&D basket (Bloomberg: <GSTHCAPX>) “consists of 50 [S&P 500] stocks with the highest ratio of trailing 12-month capex and R&D spending as a share of the company’s market cap at the beginning of this period. The median basket constituent has a capex and R&D-to-market cap ratio of 12% as compared to 3% for the median S&P 500 stock.”

<sup>309</sup> See “How Much Can Buybacks Rise on Tax Cuts? This Estimate Says 70%”, Bloomberg, January 3<sup>rd</sup> 2018, <https://www.bloomberg.com/news/articles/2018-01-03/how-much-can-buybacks-rise-on-tax-cuts-this-estimate-says-70>.

<sup>310</sup> See “Corporate America posed to unveil record buybacks”, Financial Times, April 15<sup>th</sup> 2018, <https://www.ft.com/content/5f062834-3f51-11e8-b9f9-de94fa33a81e>.

<sup>311</sup> See “Technology companies are driving a capital spending surge”, CNBC, May 2<sup>nd</sup> 2018, <https://www.cnbc.com/2018/05/02/technology-companies-are-driving-a-capital-spending-surge.html>.

Chart 4.3

**UK Deloitte CFO survey, expansionary vs defensive strategies**

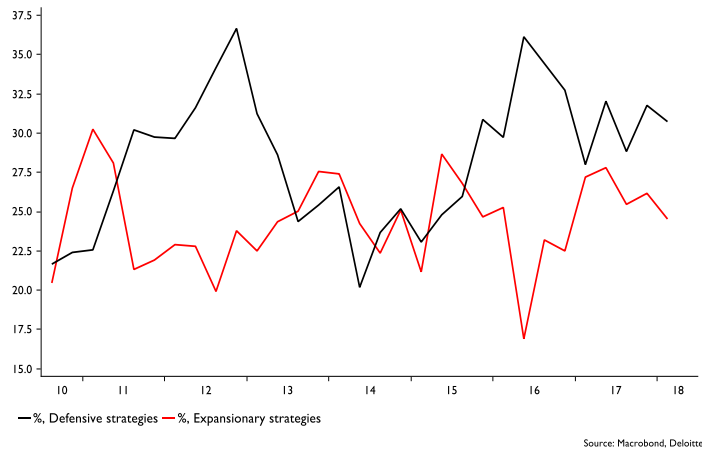


Chart 4.4

**UK cash return to shareholder ratios (including share buybacks)**

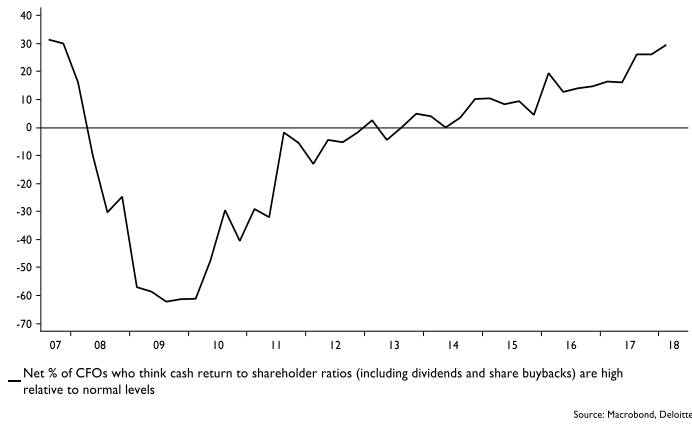
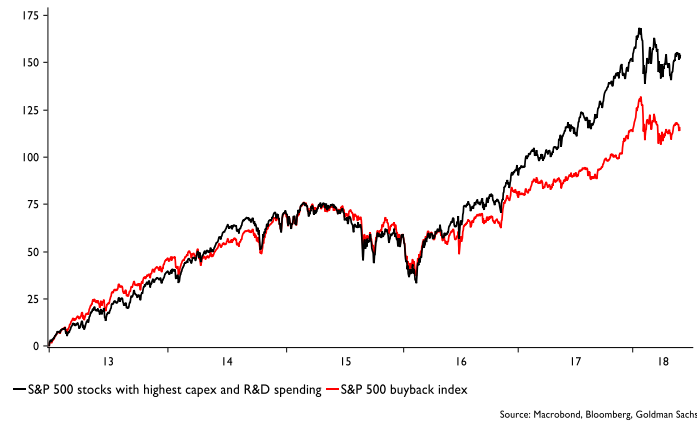


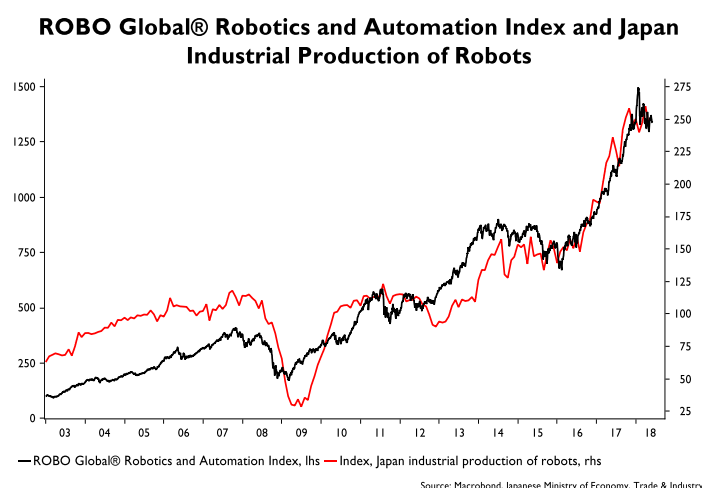
Chart 4.5

**High capex spending companies outperform those focussed on buybacks (percentage change since 2013)**



The ROBO Global Robotics and Automation Index – designed to represent the global value chain of robotics, automation, and enabling technologies – has surged over the past two-and-a-half years, mirroring the huge expansion in industrial robot production in Japan (see Chart 4.6).<sup>312</sup> The NYSE FANG+ Index<sup>313</sup> (an equal-weighted index of global tech giants) has outperformed the MSCI ACWI by 118% over the past three years.<sup>314</sup>

Chart 4.6



Companies in the NYSE FANG+ Index are some of the highest R&D spenders. Amazon and Alphabet were the top R&D spenders in the world according to the most recent PwC Global Innovation 1000 study.<sup>315</sup> In the latest annual company filings, Amazon’s spending on ‘technology and content’ totalled £22.62 billion in 2017, a jump of 41% y/y.<sup>316</sup> Alphabet’s R&D expenditures hit \$16.63 billion over the same period, a rise of 19% y/y.<sup>317</sup>

The US administration is pressing technology firms to remain focussed on investment. President Trump blocked Broadcom’s proposed takeover of Qualcomm on national security grounds. However, the Committee on Foreign Investment in the United States (CFIUS) was also concerned about Broadcom’s “private equity” style direction, which threatened long-term investment and instead

<sup>312</sup> See “ROBO Global Robotics & Automation Index”, ROBO Global, <http://www.roboglobal.com/us-index>.

<sup>313</sup> The NYSE FANG+ index is composed of 10 highly liquid stocks that represent the top innovators across today’s tech and internet/media companies. These are: Facebook, Apple, Amazon, Netflix, Google, Alibaba, Baidu, Nvidia, Tesla and Twitter. See “Index Composition: Benchmarking Today’s Tech Giants”, ICE, <https://www.theice.com/fangplus>.

<sup>314</sup> Source: Bloomberg Anywhere, Macrobond. Accessed: June 1<sup>st</sup> 2018. The MSCI ACWI Index is a global benchmark, measuring equity market performance in 23 developed and 24 emerging markets. See “MSCI ACWI Index”, MSCI, <https://www.msci.com/acwi>. The NYSE FANG+ Index plunged 14.8% between its peak on March 12<sup>th</sup> and April 2<sup>nd</sup> this year, but rebounded swiftly, hitting a new record high on June 1<sup>st</sup>.

<sup>315</sup> See “2017 Global Innovation Strategy”, PricewaterhouseCoopers, 2017, p. 26, <https://www.strategyand.pwc.com/innovation1000>.

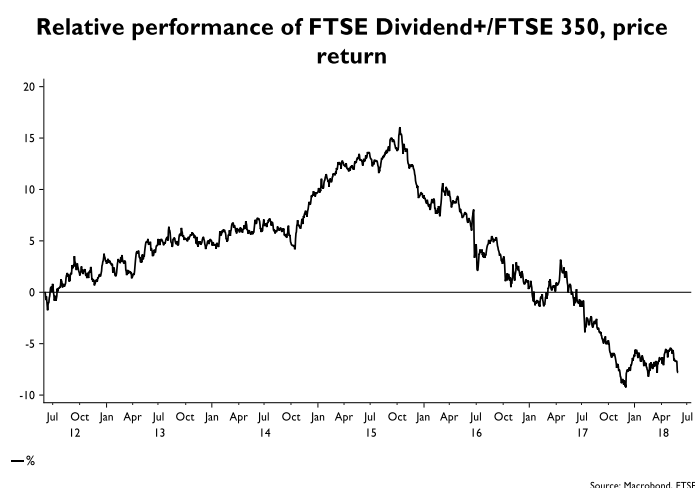
<sup>316</sup> See “Form 10-K”, Annual Filings, SEC Filings, Amazon.com, Inc., February 2<sup>nd</sup> 2018, [http://phx.corporate-ir.net/phoenix.zhtml?c=97664&p=irol-sec&control\\_selectgroup=Annual%20Filings](http://phx.corporate-ir.net/phoenix.zhtml?c=97664&p=irol-sec&control_selectgroup=Annual%20Filings).

<sup>317</sup> See “Form 10-K”, Annual Filings, SEC Filings, Alphabet Inc., February 1<sup>st</sup> 2018, <https://abc.xyz/investor/>.



focused on short-term profitability.<sup>318</sup> A weakened Qualcomm would allow China to expand its influence in the 5G standard-setting process: Huawei spent a record \$13.8 billion on R&D last year, and its R&D budget is already twice the size of Qualcomm’s.<sup>319</sup> Huawei is leading on all aspects of 5G development, across patents, phone chips, phones, routers and cell towers.<sup>320</sup> In short, a failure to invest for the long run will leave a company – or country – at a significant competitive disadvantage.

Chart 4.7



The UK economy requires investors to reward companies that are prepared to prioritise investment ahead of dividends. There are some signs that this is beginning to happen. Over the past three years, the FTSE UK dividend plus<sup>321</sup> – an index of the top 50 stocks with the highest forecast dividend yields

<sup>318</sup> See “Re: CFIUS Case 18-036: Broadcom Limited (Singapore)/Qualcomm Incorporated”, Letter to Mark Plotkin and Theodore Kassinger, Department of the Treasury, March 5<sup>th</sup> 2018, <http://online.wsj.com/public/resources/documents/cfiusletter.pdf>: “[A] Reduction in Qualcomm’s long-term technological competitiveness and influence in standard setting would significantly impact U.S. national security. This is in large part because a weakening of Qualcomm’s position would leave an opening for China to expand its influence on the 5G standard-setting process. Chinese companies, including Huawei, have increased their engagement in 5G standardization working groups as part of their efforts to build out a 5G technology. For example, Huawei has increased its R&D expenditures and owns about 10 percent of 5G essential patents. While the United States remains dominant in the standards-setting space currently, China would likely compete robustly to fill any void left by Qualcomm as a result of this hostile takeover. Given well-known U.S. national security concerns about Huawei and other Chinese telecommunications companies, a shift to Chinese dominance in 5G would have substantial negative national security consequences for the United States. CFIUS, during the investigation period, will continue to assess the likelihood that acquisition of Qualcomm by Broadcom could result in a weakening of Qualcomm’s position in maintaining its long-term technological competitiveness. Specifically, Broadcom’s statements indicate that it is looking to take a “private equity”-style direction if it acquires Qualcomm, which means reducing long-term investment, such as R&D, and focusing on short term profitability. Broadcom has lined up \$106 billion of debt financing to support the Qualcomm acquisition, which would be the largest corporate acquisition loan on record. This debt load could increase pressure for short-term profitability, potentially to the detriment of longer term investments.”

<sup>319</sup> See “Huawei’s R&D budget hits \$14bn as next-generation networks arrive”, Financial Times, March 30<sup>th</sup> 2018, <https://www.ft.com/content/7abddaca-33dc-11e8-a3ae-fd3fd4564aa6>.

<sup>320</sup> See “How Cellphone Chips Became a National-Security Concern”, Wall Street Journal, March 7<sup>th</sup> 2018, <https://www.wsj.com/articles/how-cellphone-chips-became-a-national-security-concern-1520450817>.

<sup>321</sup> See “FTSE UK Dividend+ Index Ground Rules”, FTSE Russell, May 2018, [http://www.ftse.com/products/downloads/FTSE\\_UK\\_Dividend\\_Plus\\_Index.pdf?42](http://www.ftse.com/products/downloads/FTSE_UK_Dividend_Plus_Index.pdf?42).

– has underperformed the broader FTSE 350 by 18.4% (see Chart 4.7).<sup>322</sup> On a total return basis, the FTSE dividend plus index has underperformed the broader FTSE 350 by 14.5% over the past 36 months.<sup>323</sup> Investors may be starting to recognise the flaws associated with high dividend pay-outs.

### The (small) size of the UK technology sector, and what it says about the economy

Recent stock market trends – with investors rewarding companies that focus on growth – might suggest little needs to be done to fix the UK’s productivity problem. In truth, the UK does not have enough successful technology companies capable of undertaking the required large-scale private sector investment.

The UK’s ‘most productive companies’ are now holding back the economy.<sup>324</sup> By failing to invest, they are undermining the productivity of the UK economy. The public sector may need to take a more active role, to bridge the gap with other major industrialised countries.

Breaking down the UK stock market by sector underlines the scale of the task.<sup>325</sup> By the end of 2017, financials had by far the largest weight in the MSCI UK (22.1%). By contrast, the information technology sector accounted for just 1.6% of the index, well behind ‘developed’ Europe (ex-UK)<sup>326</sup>, Japan, the US and a broad index of emerging markets<sup>327</sup> (see Table 4.B). The relative size of the information technology in the UK has continued to diminish, falling to 0.8% by the end of April 2018.<sup>328</sup>

The FTSE 100 has just two ‘technology’ companies – Micro Focus and Sage Group – accounting for 0.6% of the overall index.<sup>329</sup> Both companies experienced a difficult start to the year: Sage Group

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<sup>322</sup> Source: Macrobond, Bloomberg Anywhere. Accessed: May 31<sup>st</sup> 2018.

<sup>323</sup> Ibid.

<sup>324</sup> The UK has a ‘long tail’ of low productivity firms that hold back the growth in value-added per worker. However, the *productivity* slowdown in the 2010-15 period vis-à-vis 2004-07 has been largely due to weaker productivity growth among the UK’s most productive firms. For more, see “The UK’s productivity puzzle is in the top tail of the distribution”, Bank Underground, March 29<sup>th</sup> 2018,

<https://bankunderground.co.uk/2018/03/29/the-uks-productivity-puzzle-is-in-the-top-tail-of-the-distribution/>.

<sup>325</sup> Source: MSCI. The MSCI indices are weighted by market cap. They use the Global Industry Classification Standard (GICS), which breaks the equity market down into eleven sectors: Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Information Technology, Materials, Real Estate, Telecommunication Services and Utilities.

<sup>326</sup> Developed Markets (DM) countries in Europe (excluding the UK) include: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden and Switzerland.

<sup>327</sup> The MSCI Emerging Markets Index captures large and mid-cap representation across 24 Emerging Markets (EM) countries. EM countries include: Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Russia, Qatar, South Africa, Taiwan, Thailand, Turkey and United Arab Emirates.

<sup>328</sup> Source: MSCI United Kingdom Index, <https://www.msci.com/documents/10199/587e9bae-0a65-49e8-b1c6-bb84cf061441>.

<sup>329</sup> Source: Bloomberg Anywhere. Accessed: June 4<sup>th</sup> 2018. See also “Busy buyers leave only two UK tech giants standing”, Financial Times, January 14<sup>th</sup> 2018, <https://www.ft.com/content/39bc9b86-f464-11e7-88f7-5465a6ce1a00>.

(-16.7% year-to-date) lowered its full-year guidance for revenue growth in April.<sup>330</sup> Micro Focus (-47.1% year-to-date) lost almost half its value in one day in March.<sup>331</sup>

The PwC Innovation 1000 report for 2017 corroborates the view that the UK technology sector possesses neither the size nor scale to deliver the required levels of investment. There were no UK companies in the top 10 global innovators, nor the top 20 global R&D spenders: AstraZeneca (18<sup>th</sup> in 2016) dropped to 21<sup>st</sup> place last year. Just three of the top 100 global R&D spenders were headquartered in Britain (AstraZeneca, GlaxoSmithKline and Fiat Chrysler Automobiles N.V.).<sup>332</sup> Technology companies remain too small: the financial sector is too dominant.

Table 4.B

**Stock market weightings (%), as of December 29<sup>th</sup> 2017**

<b>GICS Sector</b>	<b>MSCI UK</b>	<b>MSCI Europe ex-UK</b>	<b>MSCI Japan</b>	<b>MSCI USA</b>	<b>MSCI EM</b>
Consumer Discretionary	8.0	11.5	20.2	12.7	10.2
Consumer Staples	17.8	12.1	7.6	8.0	6.6
Energy	15.8	4.1	1.1	6.0	6.8
Financials	22.1	20.5	12.8	14.7	23.5
Health Care	9.2	13.4	7.0	13.5	2.7
Industrials	7.6	15.3	21.6	10.0	5.2
<b>Information Technology</b>	<b>1.6</b>	<b>6.3</b>	<b>12.7</b>	<b>24.1</b>	<b>27.7</b>
Materials	9.2	8.0	6.7	3.1	7.4
Real Estate	1.2	1.4	3.9	3.0	2.8
Telecommunication Services	4.3	3.6	4.8	2.1	4.8
Utilities	3.1	3.8	1.6	2.9	2.4

Source: MSCI

<sup>330</sup> Source: Bloomberg Anywhere. Accessed: June 1<sup>st</sup> 2018. See also “Sage shares plunge on cut in revenue growth guidance”, Financial Times, April 13<sup>th</sup> 2018, <https://www.ft.com/content/82a644b2-3efd-11e8-b7e0-52972418fec4>.

<sup>331</sup> Source: Bloomberg Anywhere. Accessed: June 1<sup>st</sup> 2018. See also “Micro Focus shares plunge as chief quits after six months”, Financial Times, March 19<sup>th</sup> 2018, <https://www.ft.com/content/d1522cdc-2b5e-11e8-a34a-7e7563b0b0f4>.

<sup>332</sup> See “2017 Global Innovation Strategy”, PricewaterhouseCoopers, 2017, <https://www.strategyand.pwc.com/innovation1000#VisualTabs1>.

By the end of 2017, the IT sector had a weight of 12.7% in Japan (see Table 4.B).<sup>333</sup> Industrials are the largest sector (21.6%), but include major robotics manufacturers (such as Fanuc and Kawasaki Heavy Industries) that are at the forefront of automation and technological innovation.

The information technology sector commanded 24.1% of the MSCI USA index by the end of 2017, the largest weight of any other sector (see Table 4.B).<sup>334</sup> In truth, this understates the role of technology: Amazon (2.0% weight in the MSCI USA) is classified under consumer discretionary. By the end of May 2018, the weight of the information technology sector in the S&P 500 had climbed to 26.0%.<sup>335</sup>

China and emerging markets echo this trend. The MSCI Emerging Markets Index (which includes China) has seen its composition shift rapidly over the past decade: 28% of the MSCI index is composed of technology stocks, compared with 10% in 2007 and 20% in 2001.<sup>336</sup> The rest of the world is catching up – and overtaking – the UK.

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<sup>333</sup> Source: MSCI.

<sup>334</sup> Ibid.

<sup>335</sup> Source: Bloomberg Anywhere. Accessed: December 30<sup>th</sup> 2017.

<sup>336</sup> Source: Bloomberg Anywhere.

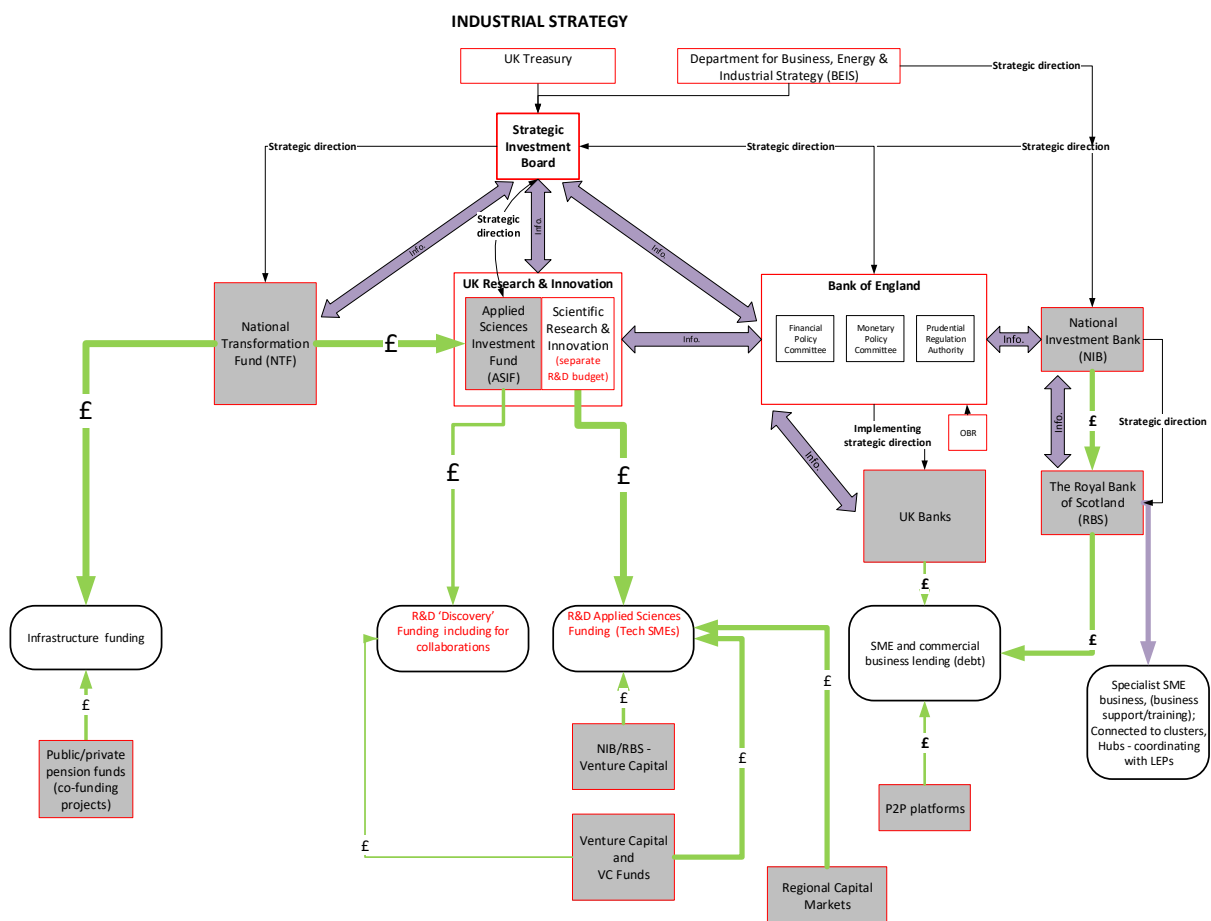
# Chapter 5: Industrial strategy

## Industrial Strategy

A successful industrial strategy requires ambition and imagination on the part of the government. It also needs well-designed institutions to provide confidence to financial markets and clarity to the general public. This chapter looks at the role of the Strategic Investment Board, considers necessary changes to the Bank of England, and provides an overview of the National Investment Bank and the National Transformation Fund (see Chart 5.1 and Appendix 3 for a more detailed diagram).

Birmingham will be the new location for the Strategic Investment Board, the National Investment Bank, the National Transformation Fund and key Bank of England functions.<sup>337</sup> They would preferably sit side-by-side, close to the main train station (Birmingham New Street), which has recently reopened after a major revamp.

Chart 5.1



<sup>337</sup> The rationale for this was given in *Financing Investment: Interim Report*, published in December 2017. For more on regional policies and clusters, see Chapter 7 of this report. UK Research and Innovation and its Applied Sciences Investment Fund (“ASIF”) is likely to operate from the UKRI Swindon offices.

## The Strategic Investment Board

A future Labour government should play a more active role in economic policy. The UK has fallen too far behind in research & development and its commercial applications.<sup>338</sup> Innovation is critical to wealth creation. Government support has been lacking.<sup>339</sup>

Working with the Bank of England, the Strategic Investment Board (SIB), the National Investment Bank (NIB) and the National Transformation Fund (NTF) will provide a lead on critical areas of investment. However, the structure and organisation of the newly created institutions must encourage an entrepreneurial spirit. Private sector involvement is critical and can only succeed if the Bank of England, SIB, NIB and NTF are flexible, nimble and responsive to the opportunities arising from technological change. Strong leadership is important, but decision making must be streamlined and reflect the views of scientists, researchers, engineers and technology experts.

Key Strategic Priorities (including artificial intelligence, robotics, clean energy, composites, intelligent mobility, accelerating patient access to drugs, and space & satellite technology) have been identified by the Council for Science and Technology and the Industrial Strategy Challenge Fund. The focus of investment coordinated by the Strategic Investment Board will be infrastructure, research & development and the Key Strategic Priorities. The Key Strategic Priorities will come under regular review.

Spending on education and training must translate into opportunities. A strong regional policy will be needed to support a more even dispersion of growth in the UK economy (see Chapter 7).

The Strategic Investment Board will also be tasked with promoting green industries and sustainable infrastructure to meet the government's environmental goals.

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<sup>338</sup> See "Patient Strategic Finance: opportunities for State Investment Banks in the UK", Mariana Mazzucato and Laurie Macfarlane, UCL Institute for Innovation and Public Purpose, December 2017, p. 21, [https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/iipp\\_wp\\_2017-05\\_patient\\_strategic\\_finance\\_opportunities\\_for\\_state\\_investment\\_banks\\_in\\_the\\_uk.pdf](https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/iipp_wp_2017-05_patient_strategic_finance_opportunities_for_state_investment_banks_in_the_uk.pdf). "In 2015, the UK invested 1.7% of GDP in R&D, compared with 3.3% in Japan, 2.9% in Germany, 2.8% in the US, 2.2% in France and 2% in China. In Scotland investment was even lower, at 1.5% of GDP."

<sup>339</sup> See "Igniting Innovation: Rethinking the Role of Government in Emerging Europe and Central Asia", Itzhak Goldberg, John Gabriel Goddard, Smita Kuriakose and Jean-Louis Racine, The World Bank, September 2011, p. 27, <https://openknowledge.worldbank.org/bitstream/handle/10986/2358/647000PUB0EPI000Box361544B00PUBLI00.pdf?sequence=1&isAllowed=y>. "There are two main sources of market failure with respect to R&D: partial appropriability (owing to spillovers), which does not allow inventors to capture all the benefits of their invention, and information asymmetries – for example, the difference between the information that an inventor looking for financing has about an invention and the information that the potential financier has. These failures inhibit private firms from investing enough in innovation and R&D, thus depriving the economy of one of the key levers for sustained growth."

## Data science

Data analysts and scientists working within the Strategic Investment Board will create and analyse new data sets (see Chapter 6).<sup>340</sup> All of this will be done with due protection to the public and industry's interests in privacy. This data will be critical to assessing the impact of the government's industrial strategy.

New surveys and other means of data collection will need to be developed alongside current work carried out by the Treasury, Department for Business, Energy and Industrial Strategy, Bank of England, UK Research and Innovation and the Office for National Statistics (ONS). The ONS has already established several organisations tasked with measuring new forms of economic activity and utilising new techniques to improve data collection. These include the Economic Statistics Centre of Excellence (ESCoE) and the ONS Data Science Campus (see Chapter 6). Automated 'scraping' software and 'data curation' can now generate daily price indexes. This is the beginning of real-time data usage for economic policymaking.<sup>341</sup>

The Strategic Investment Board (SIB) and the Office for National Statistics will engage with alternative data sources for economic information. This may be done through a committee within the SIB structure, which would have a responsibility to coordinate research, consult and formulate legislation.

Data science will complement policy work within the Strategic Investment Board. For example, the Bank of England has recognised the need to track climate trends, given their possible impact on the productive capacity of the economy, and to prevent 'stranded assets'.<sup>342</sup> The current government's Green Finance Taskforce has proposed the establishment of a Climate Analytics Taskforce to improve climate risk management.<sup>343</sup> Enhanced data analytics must be accompanied by improved economic modelling of the effects of climate change.

## Principles underpinning the Strategic Investment Board

The Strategic Investment Board will oversee and support investment, coordinating input from the Bank of England, the National Investment Bank, the National Transformation Fund and UK Research

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<sup>340</sup> See, for example, the work carried out by MIT Sloan School of Management and their "Billion Prices Project", <http://www.thebillionpricesproject.com/>.

<sup>341</sup> See "The Billion Prices Project: Using Online Prices for Measurement and Research", Alberto Cavallo and Roberto Rigobon, *Journal of Economic Perspectives*, Vol. 30, No. 2, Spring 2016, pp. 151–178, <https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.30.2.151>.

<sup>342</sup> See 'Letter from Mark Carney, Governor of Bank of England, to Joan Walley MP, Chair of the Environmental Audit Committee', October 30<sup>th</sup> 2014, on stranded assets; available online at <https://www.parliament.uk/documents/commons-committees/environmental-audit/Letter-from-Mark-Carney-on-Stranded-Assets.pdf>. See also "Climate Change and the Macro-Economy: A Critical Review", Sandra Batten, Bank of England, Staff Working Paper No. 706, January 2018, <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2018/climate-change-and-the-macro-economy-a-critical-review.pdf>.

<sup>343</sup> See "Accelerating Green Finance", Green Finance Taskforce, March 2018, p. 8, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/703816/green-finance-taskforce-accelerating-green-finance-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/703816/green-finance-taskforce-accelerating-green-finance-report.pdf).



and Innovation (see Appendix 3). Government-led strategies have already been successful in the US, Singapore, South Korea, China and Japan.<sup>344</sup>

This has yielded globally and strategically competitive industries. Apple and Google benefitted greatly from innovation in the public sector. South Korea and Japan have each relied on coordination between the private sector and government to drive forward their motor vehicle industries and, more recently, in semiconductors (South Korea) and robotics (Japan).<sup>345</sup>

Singapore has made a virtue out of government and private sector coordination to create a knowledge economy,<sup>346</sup> ‘crowding in’ investment from the private sector.

Semiconductors are the top priority of the ten industries promoted under the "Made in China 2025" initiative. The National Integrated Circuit Industry Investment Fund is in its second phase of fundraising “for at least 150 billion yuan”: the fund provides seed capital, which is designed to “turbocharge investment from local governments and the private sector”.<sup>347</sup> Matching the industry leaders (US, South Korea, Taiwan and Japan) is the first step, but the ultimate target is primacy in programmable chips to underpin China’s ambitions in artificial intelligence.

The Strategic Investment Board (SIB) will require individuals with skills in entrepreneurship, sciences, technology, venture capital and equity investment. The SIB will also include senior civil servants, the

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<sup>344</sup> For example, the US Government has enacted programmes that have led technological growth. See “4 Government Programs that Drive Innovation”, Forbes, July 2<sup>nd</sup> 2013, <https://www.forbes.com/sites/gregsatell/2013/07/02/4-government-programs-that-drive-innovation/#a1fc0343978e>.

<sup>345</sup> The Science and Technology Coordination system in South Korea presided over by the President of South Korea played an important coordinating role. See “Korea’s Experience with Economic Development and Transformation”, Kyung Soon Song, Extractives-led Local Economic Diversification (ELLED) Conference, January 28<sup>th</sup> 2016, <http://pubdocs.worldbank.org/en/897421455304640570/Kyung-Song-Korean-Experience-Session-4.pdf>. The development of the industrial sector (chaebol) in South Korea was a ‘cause’ of government-supported development. See “The Korean Miracle (1962-1980) Revisited: Myths and Realities in Strategy and Development”, Kwan Kim, Kellogg Institute, p. 48, [https://kellogg.nd.edu/sites/default/files/old\\_files/documents/166\\_0.pdf](https://kellogg.nd.edu/sites/default/files/old_files/documents/166_0.pdf). The Ministry of Economy, Trade and Industry of Japan coordinates activities and sets goals between Government, universities and the private sector. See “Robot Industry”, Ministry of Economy, Trade and Industry, [www.meti.go.jp/english/policy/mono\\_info\\_service/robot\\_industry/index.html](http://www.meti.go.jp/english/policy/mono_info_service/robot_industry/index.html). Japan remains the world leader in industrial robot production with 52% of global industrial robot production. See “Robots: Japan delivers 52 percent of global supply”, International Federation of Robotics, November 23<sup>rd</sup> 2017, <https://ifr.org/ifr-press-releases/news/robots-japan-delivers-52-percent-of-global-supply>.

<sup>346</sup> Mariana Mazzucato’s book, *The Entrepreneurial State: Debunking Public vs Private Sector Myths* (Anthem Press, 2013), sets out some of the history of mission-oriented government strategies. For an analysis of the instruments used in East Asia, see “Export Growth and Industrial Policy: Lessons from the East Asian Miracle Experience”, John Weiss, ADB Institute, February 2005, [http://siteresources.worldbank.org/EXT/EXPCOMNET/Resources/2463593-1213975515123/17\\_Weiss.pdf](http://siteresources.worldbank.org/EXT/EXPCOMNET/Resources/2463593-1213975515123/17_Weiss.pdf).

<sup>347</sup> See “China’s upstart chip companies aim to topple Samsung, Intel and TSMC”, Nikkei Asian Review, April 25<sup>th</sup> 2018, <https://asia.nikkei.com/Spotlight/Cover-Story/China-s-upstart-chip-companies-aim-to-topple-Samsung-Intel-and-TSMC>.

Chancellor of the Exchequer, and the Secretary of State for the Department for Business, Energy and Industrial Strategy (and/or Chief Secretary of the Treasury).

Scientists, working alongside businesses, should be instrumental in investment decisions. At present, the scientists' contribution to the government's economic strategy is purely advisory.

### Restructuring the Bank of England & regional offices

Restructuring and relocating core Bank of England functions will provide a counterweight to the dominance of London. It will also be critical for the development of regional capital markets. Chapter 7 outlines the importance of a regional equity capital markets infrastructure, using venture capital funds supported by the Applied Sciences Investment Fund and the National Investment Bank. Too many of the fastest growing companies in technology are concentrated in London and the South East, close to UK financial institutions.<sup>348</sup>

As outlined in *Financing Investment: Interim Report*<sup>349</sup>, to ensure effective coordination of economic policy we propose that:

- The main Bank of England office is set up in Birmingham, alongside the Strategic Investment Board, the National Transformation Fund and the National Investment Bank. The Birmingham office would house the Financial Policy Committee and the Monetary Policy Committee.
- Bank of England offices would be established in Glasgow, Cardiff and Belfast, with smaller regional offices in Newcastle and Plymouth.
  - Their function would be to ensure that productive lending is geared towards the needs of local businesses through Bank of England offices, which will have a more in-depth knowledge of their regional economies.
  - Currently, the Bank of England relies upon a network of economic agents across the country to feed back to Threadneedle Street, London. However, many regions are still underweighted in policy decisions.<sup>350</sup>

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<sup>348</sup> See Chapter 7 – Clusters, scale-ups and VC funding.

<sup>349</sup> See *Financing Investment: Interim Report*, GFC Economics Ltd and Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, p. 50, <http://www.gfceconomics.com/wp-content/uploads/2017/12/Financing-Investment-report-combined-PDF.pdf>.

<sup>350</sup> There are 26 Bank of England (BoE) agents for the whole of the UK. Their main function is to carry out surveys for the BoE and promote interaction with businesses. See “Agents”, Bank of England, <https://www.bankofengland.co.uk/about/people/agents>. Useful as it may be, data sources must be created with the aim of producing analysis to assist the Strategic Investment Board as part of a coordinated regional development process. This will require a much bigger commitment by the BoE to regional needs.

- The Financial Policy Committee and Monetary Policy Committee meetings are held in Birmingham.
- The Financial Policy Committee should have representatives from each region.
- The Bank of England London office retains international bank supervision, markets, financial markets infrastructure and insurance.

#### Bank of England mandate – complementing strategic priorities

The Bank of England mandate should be expanded with an enhanced monetary policy framework fit for Industry 4.0 and a knowledge-intensive services economy (see Chapter 1).<sup>351</sup>

Using their existing powers, the Financial Policy Committee and the Prudential Regulation Authority can support productivity and investment by directing banks to shift their lending priorities to productive sectors of the economy. Regulation (EU) 575/2013 (“CRR”) Article 124 (2) states that the regulator may: “set a higher risk weight or stricter criteria ... where appropriate, on the basis of financial stability considerations.”<sup>352</sup>

Indeed, “The FPC has two main powers. It can make Recommendations to anybody, including to the PRA and FCA. It can also, where the Government has given the FPC a power of Direction, direct the regulators to implement a specific measure to further the FPC’s objectives”.<sup>353</sup>

The Financial Policy Committee has the authority to adjust risk weights for specific sectors to achieve policy goals.<sup>354</sup> These will be the priorities agreed by the Strategic Investment Board with the Bank of England. The Prudential Regulation Authority also has the power to set Pillar 2A and 2B capital requirements to steer lending into the productive sectors of the economy as a means of increasing financial stability.

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<sup>351</sup> McKinsey & Company define Industry 4.0 as the fourth major upheaval in modern manufacturing. It is the “next phase of digitization of the manufacturing sector, driven by four disruptions: the astonishing rise in data volumes, computational power, and connectivity... the emergence of analytics and business-intelligence capabilities; new forms of human-machine interaction; and improvements in transferring digital instructions to the physical world, such as advanced robotics”. See “Manufacturing’s next act”, McKinsey & Company, June 2015, <https://www.mckinsey.com/business-functions/operations/our-insights/manufacturings-next-act>.

<sup>352</sup> See “Regulation (EU) No 575/2013 of the European Parliament and of the Council, on prudential requirements for credit institutions and investment firms and amending regulation”, European Union, June 26<sup>th</sup> 2013, p. L 176/80, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R0575&from=EN>.

<sup>353</sup> See Financial Stability Report June 2017, p. 7. <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-report/2017/june-2017.pdf?la=en&hash=EB9E61B5ABA0E05889E903AF041B855D79652644>.

<sup>354</sup> See “Supplement to the December 2015 Financial Stability Report: The framework of capital requirements for UK banks”, Bank of England, December 2015, <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-report/2015/supplement-december-2015.pdf?la=en&hash=61C9D1CFFC64D5E5A2C2B3595E508921B5953AB3>.

Regulatory innovation will be needed to encourage the use of intellectual property as collateral. The US, Japan, South Korea, China and Singapore all provide some level of state support either in lending or in ensuring more clarity in ownership rights on patent registers.<sup>355</sup>

## The National Transformation Fund

The National Transformation Fund will have primary responsibility for infrastructure investment in the UK.<sup>356</sup> The selection of infrastructure investment projects will be driven by the Strategic Investment Board.

Although it will have features of both the Singapore development bank and Asian Infrastructure Investment Bank models, with their focus on infrastructure projects, it will need to fit the requirements and circumstances of the UK.

Initially, this will be subject to the National Transformation Fund's institutional capacity (staff, financial and risk capabilities). Institutional capacity building will be a key priority for the first four years.

Our initial proposal is for the National Transformation Fund to be organised along the lines of the Asian Infrastructure Investment Bank. An advantage of this is to allow for third-party investment, further outlined below under 'Funding and asset liability management'.

State aid issues will need addressing. There is a precedent across the European Union for national development banks and there are a significant number of exemptions that could be applied to the National Transformation Fund if required.<sup>357</sup>

### Regional National Transformation Fund offices

The regional National Transformation Fund (NTF) offices will replicate the national office in Birmingham. They will be involved in the research and identification of infrastructure investment within respective regions. They will be directly involved with managing infrastructure projects – with large or complex projects led or supported by the NTF head office.

### Mandate

The National Transformation Fund (NTF) will take its direction from the Strategic Investment Board through published guidelines.

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<sup>355</sup> See "IP Increasingly Seen As Enabler For Innovation Finance, IP Offices Say", Intellectual Property Watch, October 8<sup>th</sup> 2014, <http://www.ip-watch.org/2014/10/08/ip-increasingly-seen-as-enabler-for-innovation-finance-ip-offices-say/>.

<sup>356</sup> See "Creating an Economy That Works for All", The Labour Party, <https://labour.org.uk/manifesto/creating-economy-works/>.

<sup>357</sup> See "Patient Strategic Finance: opportunities for state investment banks in the UK", Mariana Mazzucato and Laurie Macfarlane, UCL Institute for Innovation and Public Purpose, December 2017, pp. 52-55, [https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/iipp\\_wp\\_2017-05\\_patient\\_strategic\\_finance\\_opportunities\\_for\\_state\\_investment\\_banks\\_in\\_the\\_uk.pdf](https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/iipp_wp_2017-05_patient_strategic_finance_opportunities_for_state_investment_banks_in_the_uk.pdf).

The National Transformation Fund head office, in consultation with each regional office, will allocate funding for infrastructure spending.

The National Transformation Fund will take the lead on collaborations with the private sector for the management, construction and delivery of infrastructure projects.

The National Transformation Fund (NTF) will want to take new approaches to large project management using local initiatives, such as 'Project 13' developed by the Infrastructure Client Group.<sup>358</sup> It will seek out infrastructure project leaders already delivering efficiency and productivity. This will allow the NTF to build requisite skills and expertise in the UK.

Cost and time overruns must be limited to exceptional circumstances and not due to poor planning and budgeting.

In the terminology of 'Project 13', the National Transformation Fund needs to be a mix of capable owners and integrators.<sup>359</sup> This ensures expert skills are shared with infrastructure owners and project managers, with an aim to drive quality through the whole chain of the project.

The National Transformation Fund (NTF) head office will provide technical support to the contractual and procurement process, until the legal and commercial skills base is developed in each regional office. The NTF will lead contract negotiations for high-value and/or high-risk infrastructure. Contract management will be a core skill to be developed within the NTF. High-value contracts will be reviewed by the NTF head office, to ensure consistency of approach across regions.

Contracting parties must be able to show financial strength and resilience for the work they undertake. Pricing cannot be the dominant factor for outsourcing. Contracting parties to big infrastructure works must show a high level of expertise and skill.

### Capital

The National Transformation Fund will, over time, have equity capital of up to £20 billion. However, it may start out with £500 million and move to £1 billion by end of year 1, as it builds capacity to start business operations. The government will be the 100% shareholder. Equity issuance will proceed in line with the growth of infrastructure loans and the Board's authorised leverage ratio. On the debt

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<sup>358</sup> See "Project 13 launch will improve how infrastructure is delivered", Institution of Civil Engineers, May 1<sup>st</sup> 2018, <https://www.ice.org.uk/news-and-insight/latest-ice-news/project-13-launches>.

<sup>359</sup> See "P13 BLUEPRINT", Institution of Civil Engineers, May 2018, p. 7 & p. 14, <http://www.p13.org.uk/wp-content/uploads/2018/04/P13-Blueprint.pdf>. According to ICE, 'owner' is the "organisation which owns and operates the infrastructure, promotes the investment in the infrastructure programme, receives the completed facilities and puts them into operation." The 'integrator' is the "organisation that plans and delivers the infrastructure programme. It manages the suppliers and advisors, coordinates planning, oversees design, construction, maintenance and operations as requested by owner."

issuance side, a government guarantee should ensure an AA rating (matching the current government rating).

Gilt issuance amounts for the National Transformation Fund's (NTF) equity capital should be managed to ensure yields and bid-to-cover ratios maintain market stability.<sup>360</sup> Any additional capital would be from debt issued by the NTF.

#### Funding and asset liability management

The National Transformation Fund (NTF) would administer a comprehensive debt funding platform. The NTF Treasury division would establish and operate a Euro Medium Term Note Programme to issue debt to international capital market investors and public & private sector pension funds, for funding and liquidity requirements. With a government guarantee in place, funding costs should be close to gilt yields. There are opportunities to offer sustainable and green bonds for environmental and climate-focussed infrastructure projects to an increasingly interested class of 'sustainable investors'.

A Euro Commercial Paper (ECP) programme may be needed to ensure proper cash management operations can be carried out. This would be determined by the National Transformation Fund's (NTF) Executive Management Committee and the Board. ECP issuance levels would be equivalent to the UK Treasury Bill funding levels. Such short-term borrowing will assist in matching any short-term assets in the loan book and managing working capital needs. On the other side of the banking book, the NTF will need powers to invest in AAA assets with varying terms and currencies, to ensure that the carry cost of funds is offset prior to deployment. The aims will be to ensure that portfolio assets will be highly liquid and rated, to protect principal.

The National Transformation Fund's Treasury will ensure hedging (and where required, repo operations) is carried out for efficient liquidity and asset liability management.

Debt funding may need to be offered in different currencies and on a fixed or floating rate basis. This will be hedged to manage risk. Loan assets with market risks will be managed by a mix of back-to-back funding and hedging as appropriate.

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<sup>360</sup> The government could issue a mix of 10, 30 and 55-year gilts to fund equity if it needed a significant increase in its debt funding operations.

### Regulatory framework

The National Transformation Fund could be set up based on the KfW (Germany)<sup>361</sup> or Kommunalbanken AS (Norway) infrastructure development models.<sup>362</sup> These entities are established by statute and are effectively not regulated under EU banking laws. KfW is a statutorily-created entity and designated as a bank. It is legally supervised by the German Federal Ministry of Finance and the Federal Ministry of Economics and Technology. It falls outside of commercial banking regulations. Kommunalbanken AS is a local government funding agency owned entirely by the Norwegian Royal Ministry of Local Government and Regional Development.

### Governance framework of the National Transformation Fund

The National Transformation Fund (NTF) will not be authorised by the Prudential Regulation Authority or the Financial Conduct Authority from a governance and control perspective. Regardless, the NTF would have in place the typical systems and controls required of a bank to manage the business operations. This includes:

- Asset and liability management;
- Risk management frameworks covering operational risk, credit risk, counterparty risk, settlement risk, leverage; and
- Treasury management for capital, funding and liquidity.

In addition, the National Transformation Fund will have a more robust legal, project and contract management skill set for infrastructure management.

The new Asian Infrastructure Investment Bank, the European Bank for Reconstruction and Development, the Nordic Investment Bank and KfW provide useful examples of governance structures for the National Transformation Fund.<sup>365</sup> It is important that these are designed to prevent capture by interest groups.

See Chart 5.5 for the structure of the National Transformation Fund head office in Appendix I.

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<sup>361</sup> See also Article 12 of the “Law Concerning Kreditanstalt für Wiederaufbau”, KfW, July 18<sup>th</sup> 2013, [https://www.kfw.de/Download-Center/KfW-Gesetz-und-Satzung-sowie-Geschäftsordnungen/Law-concerning-KfW-and-KfW-By-laws/KfW\\_Gesetz\\_E.pdf](https://www.kfw.de/Download-Center/KfW-Gesetz-und-Satzung-sowie-Geschäftsordnungen/Law-concerning-KfW-and-KfW-By-laws/KfW_Gesetz_E.pdf).

<sup>362</sup> See Article 2 of the “Articles of Association”, Kommunalbanken AS, [www.kommunalbanken.no/en/about-us/ownership-and-governance/articles-of-association](http://www.kommunalbanken.no/en/about-us/ownership-and-governance/articles-of-association). Note also the nature of Kommunalbanken AS means that it has effectively a government guarantee, which supports its AAA status.

<sup>365</sup> For an analysis of the approach of KfW and Brazil’s BNDES, see “The rise of mission-oriented state investment banks: the cases of Germany’s KfW and Brazil’s BNDES”, Mariana Mazzucato and Caetano C.R. Penna, ISI Growth, October 2015, [http://www.isigrowth.eu/wp-content/uploads/2015/11/working\\_paper\\_2015\\_1.pdf](http://www.isigrowth.eu/wp-content/uploads/2015/11/working_paper_2015_1.pdf).

## National Investment Bank and Royal Bank of Scotland – SME funding

The National Investment Bank (NIB) will act as the lending entity to the Royal Bank of Scotland (RBS). The RBS will be specifically mandated to support the small & medium-sized enterprise (SME) market, further developing its existing skills required to support SMEs and deliver requisite funding.<sup>366</sup> This assumes that the RBS is still publicly controlled. The RBS would be akin to a development bank, making use of its existing regional infrastructure.

In the absence of the Royal Bank of Scotland taking on this role, the National Investment Bank (NIB) would need to build out an SME lending operation and a regional presence. Organisationally, it would be set up along the same lines of the National Transformation Fund (NTF). The NIB could co-locate in the NTF offices.<sup>367</sup>

### The Royal Bank of Scotland – preferred option

Business relationship managers at the Royal Bank of Scotland would need to target small & medium-sized enterprises, helping the development of their businesses.

The publicly-owned bank will seek out and work with Local Enterprise Partnerships, clusters of small & medium-sized enterprises (SMEs), business associations focussed on SMEs, and universities. Data sets agreed with the Strategic Investment Board will be used to monitor performance.

The Royal Bank of Scotland could also support export finance initiatives led by the Export Credits Guarantee Department.

Investment banking skills could be utilised to support long-term patient capital through venture capital investments as well as the Royal Bank of Scotland's (RBS) role in debt funding for businesses. The RBS would work alongside the Applied Sciences Investment Fund as part of a regional capital markets strategy (see Chart 5.2).

The Royal Bank of Scotland will provide advisory services to actively seek out means of assisting and upskilling small & medium-sized enterprises.<sup>368</sup> It will be a collector and disseminator of data, playing a critical role in the industrial strategy.

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<sup>366</sup> For a survey of development banks that tend to focus on SME lending, see “Global Survey of Development Banks”, Jose de Luna-Martinez and Carlos Leonardo Vicente, The World Bank, February 2012, <http://documents.worldbank.org/curated/en/313731468154461012/pdf/WPSS969.pdf>. There are a number of legal issues that need to be researched as to how a mandate may work and impact on the bank and its costs. Regardless, we believe that a different model needs to be pursued by the bank – doing the same thing will not achieve success.

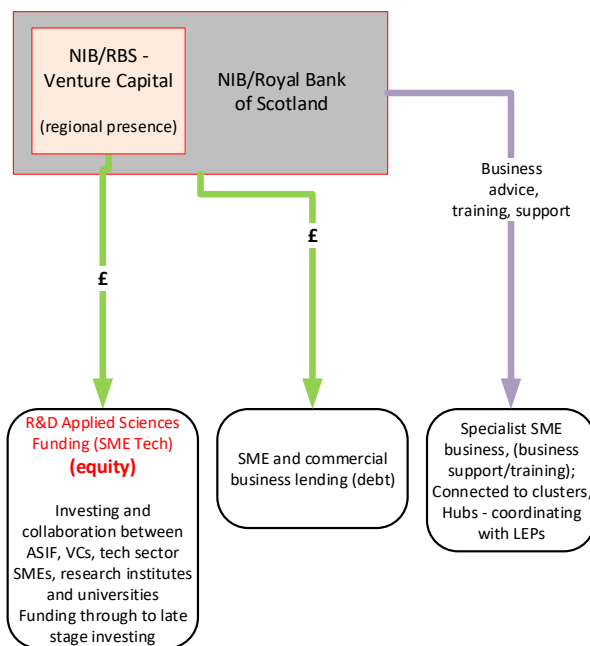
<sup>367</sup> See “A National Investment Bank for Britain: Putting dynamism into our industrial strategy”, The Labour Party, <https://labour.org.uk/wp-content/uploads/2017/10/National-Investment-Bank-Plans-Report.pdf>.

<sup>368</sup> The Scaleup Institute has made some recommendations about the importance of local ecosystems. See “Annual Scaleup Review 2017”, Scaleup Institute, November 2017, pp. 86-88,



The Royal Bank of Scotland's (RBS) investment banking skills could also further the development of regional capital markets through venture capital (VC) funds and regional stock exchanges, which may play a significant part in developing and scaling regional SMEs.<sup>369</sup> The RBS will work alongside the Applied Sciences Investment Fund to promote early- to late-stage VC funding.

Chart 5.2: Royal Bank of Scotland, SME funding specialist



### Rationale

Banks have developed few innovative tools to address the gap in funding for small & medium-sized enterprises (SMEs) other than the continued expansion of home lending.<sup>370</sup> Under the Small Business Enterprise and Employment Act (2015), banks that refuse financing for SMEs are required to seek out alternative sources of financing for them.<sup>371</sup> However, funding to SMEs has not improved.<sup>372</sup> Although the British Business Bank was created to help SMEs, the KfW plays a much more direct role in

[http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute\\_Annual\\_ScaleUp\\_Review\\_2017.pdf](http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute_Annual_ScaleUp_Review_2017.pdf).

<sup>369</sup> We plan to publish a paper in late 2018 on regional capital markets and VC funding.

<sup>370</sup> The Royal Bank of Scotland Group plc December 2017 Annual Report shows commercial banking net lending down by £4.9 billion and gross new mortgage lending of £31 billion in its UK Personal and Business Banking division. See “Annual Results for the year ended 31 December 2017”, Royal Bank of Scotland, p. 3, <https://www.rbs.com/content/dam/rbs.com/rbs/PDFs/Annual-Results-2017.pdf>.

<sup>371</sup> See “Bank turned down your small business loan? Now it must offer an alternative”, The Guardian, November 1<sup>st</sup> 2016, <https://www.theguardian.com/small-business-network/2016/nov/01/bank-turned-down-small-business-loan-alternative-funding-referral>.

<sup>372</sup> See “Smaller businesses offered route to alternative finance”, Financial Times, November 1<sup>st</sup> 2016, <https://www.ft.com/content/cd0a9132-9f8c-11e6-86d5-4e36b35c3550>. See also “Banks ‘reluctant to lend’ to small businesses, MPs told”, Financial Times, March 30<sup>th</sup> 2018, <https://www.ft.com/content/fc6640a8-3427-11e8-ae84-494103e73f7f>. See also “Evaluating changes in bank lending to UK SMEs over 2001-2012 – ongoing tight credit?”, Department for Business Innovation & Skills, April 2013, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/193945/bis-13-857-evaluating-changes-in-bank-lending-to-uk-smes-2001-12.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/193945/bis-13-857-evaluating-changes-in-bank-lending-to-uk-smes-2001-12.pdf).

supporting SME business financing.<sup>373</sup> The Royal Bank of Scotland would take on this role of SME financier and provider of advisory services.

## UK Research and Innovation

Under its current structure, UK Research and Innovation (UKRI) is focussed on the ‘discovery’ stages of R&D (i.e. the research, not the development). Innovate UK and its Industrial Strategy Challenge Fund, as well as other mechanisms of applied sciences funding, are removed from UKRI.

A Labour government should put funding for fundamental (discovery) research and applied sciences on an equal footing (see Chart 5.3).

Funding of ‘discovery’ research will continue to be carried out via UK Research and Innovation. High-level funding needs will be coordinated by the Strategic Investment Board.

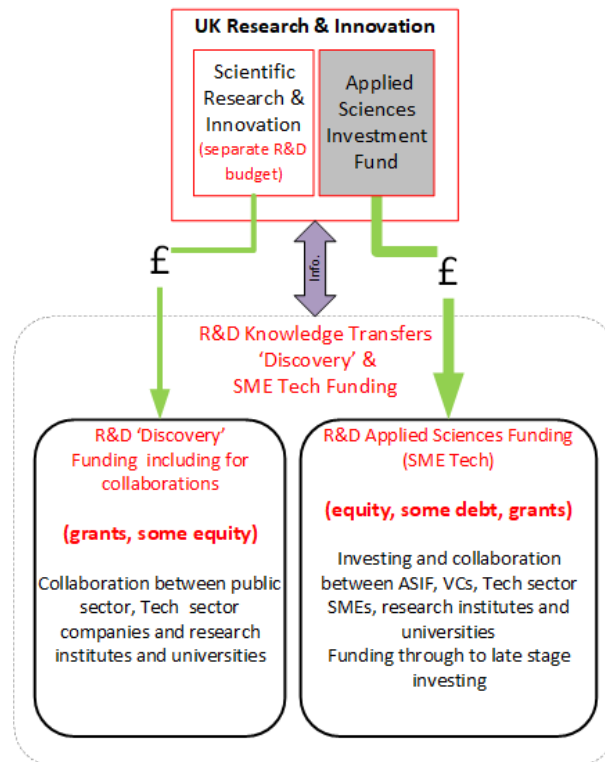
Knowledge transfers by UK Research and Innovation (UKRI) entities (and collaborating universities, institutes, and private sector actors) should be fed through to the Strategic Investment Board (SIB), as well as the public (to allow a wide dispersion of knowledge of science and technology research and uses). However, the structure and organisation of newly created institutions must encourage an entrepreneurial spirit. Private sector involvement is critical, and can only succeed if the relevant public sector institutions are flexible, nimble and responsive to changes in the opportunities from technological change.

This will require staff at these entities to have the requisite skills to assess and understand how technology is being deployed within the economy.

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<sup>373</sup> See “How the government is failing small businesses on financing options”, [smallbusiness.co.uk](http://smallbusiness.co.uk), October 18<sup>th</sup> 2016, <http://smallbusiness.co.uk/government-failing-small-businesses-2-2534588/>. “In the last ten years alone, British SMEs have shared a ministerial portfolio with larger enterprises, universities and FE colleges, international trade, regulatory reform, energy and climate change. They’re always competing for attention and resources with other policy areas; the fact that government initiatives tend to be undercooked, neglected, or discarded entirely isn’t necessarily a surprise.” The author also comments on the failures of the Funding for Lending Scheme (FLS) mainly because it needed the high street banks to do their part. The British Business Bank (BBB) relied on high street banks to on-lend too. The BBB has had more luck with P2P lending, but fundamentally there remains a problem.

Chart 5.3: UK Research and Innovation, fundamental sciences and goal-oriented applied research



### Applied Sciences Investment Fund (ASIF) – Key Strategic Priorities

The Applied Sciences Investment Fund (ASIF) will subsume the British Business Bank (BBB) into its structure. The ASIF will take responsibility for delivering technology funding to small & medium-sized enterprises. Expanding on the BBB structure, widening its mandate and developing an active approach to investment will be essential. The ASIF would want to ensure it reaches all regions. This could be done by co-location with the repurposed Royal Bank of Scotland, with a specific remit for venture capital investment operations in each region and major cities.

The funding of the Applied Sciences Investment Fund should be determined by the Strategic Investment Board in consultation with the government.

#### Mandate

The Applied Sciences Investment Fund (ASIF) will encompass Innovate UK and the Industrial Strategy Challenge Fund, which already fund applied R&D for the Key Strategic Priorities.

The Applied Sciences Investment Fund (ASIF) will remain close to science and technology developments. This will give the ASIF the opportunity to identify and support start-ups and scale-ups that focus on the Key Strategic Priorities.

Existing funding channels for the commercialisation of R&D will need to change to deliver success at a meaningful level. Scaling up enterprises is a persistent problem: the UK R&D funding scene is more

representative of an incubator for offshore investors. Barriers to digitalisation of manufacturing (process of implementation, internal expertise and workforce skills) show through in the very low rate of investment in Internet of Things by small & medium-sized enterprises in manufacturing. More can be done to overcome this.<sup>374</sup>

The Applied Sciences Investment Fund would act as a venture capital (VC) investor. This could be backed up by further bank and private sector VC funds (and a Royal Bank of Scotland VC fund). This would facilitate multi-round VC funding to support scaling up.

The Applied Sciences Investment Fund (ASIF) will offer grants with a dedicated follow-up on where and how to develop such candidate firms. The ASIF will provide business support directly and indirectly through Local Enterprise Partnerships, Accelerators and Innovation Hubs.

We further outline these issues in Chapter 7.

## Conclusion

The focus of this chapter has been on the ‘bricks and mortar’ design of these institutions, as opposed to the political preparation for the establishment of these institutions. Nevertheless, two points can be made regarding the establishment of these institutions.

Firstly, it would be helpful to stress-test the design of these institutions – through a series of forums and workshops – in partnership with relevant stakeholders. The key would be to solicit helpful feedback while avoiding the risk of capture.

Secondly, once the design of these institutions is formalised, legislation will be necessary to set out the functions and limits of the new institutions. New legislation is likely to be required.<sup>375</sup> New regulations will also be needed for the refinements to the Bank of England’s structure, and the Applied Sciences Investment Fund. Further analysis would be required to determine the legal and statutory process to mandate the Royal Bank of Scotland to target lending to small & medium-sized enterprises and venture capital investments.

These are not technocratic tweaks, nor bloated bureaucratic interventions. Instead, what has been proposed here are practical ways to realise a shift towards a nimble, strategic, forward-looking industrial strategy – and to achieve an ambitious investment upgrade that is long overdue in the UK.

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<sup>374</sup> Smart manufacturing and the application of the ‘Internet of Things’ (IoT) can provide significant productivity gains. Manufacturers are supported in Germany, the US and Japan. See “Why Manufacturing Digitalization Matters and How Countries are Supporting It”, Information Technology & Innovation Foundation, April 2018, [http://www2.itif.org/2018-manufacturing-digitalization.pdf?\\_ga=2.40299815.426679534.1525772723-1541960669.1525772723](http://www2.itif.org/2018-manufacturing-digitalization.pdf?_ga=2.40299815.426679534.1525772723-1541960669.1525772723).

<sup>375</sup> It will not be possible to set up these institutions under non-statutory executive authority, such as the Royal Prerogative.

## Appendix I

### The Strategic Investment Board

The Chancellor will convene a committee of civil servants to establish the Strategic Investment Board. The Chancellor will seek out candidates to sit on an Implementation Committee.

The Implementation Committee will work closely with the Government Digital Service in scoping out the data architecture needs of the Strategic Investment Board.

It should be noted that the role of the existing Infrastructure Commission vis-à-vis the Strategic Investment Board and other advisory bodies with a similar remit will need to be evaluated.

### The National Transformation Fund

The Implementation Board for the National Transformation Fund (NTF) will be convened by the Chancellor. Implementation should be guided by the Department for Business, Energy and Industrial Strategy policy teams and private sector expertise. The Implementation Board's role will be to carry out the administrative tasks to establish the NTF.

The Implementation Board will follow a similar path for the creation of the British Business Bank, which was housed within the Department for Business, Innovation and Skills prior to its establishment as a public limited company.<sup>376</sup>

The Implementation Board will be the primary body charged with the establishment of the National Transformation Fund (NTF). The Implementation Board will secure offices and hire administrative staff. It will lead the candidate search for the NTF's Board of Directors.<sup>377</sup> The Implementation Board will then support the NTF's Board of Directors in their search for the remaining five 'skilled' non-executive directors.

The Implementation Board will:

- Help with the appointment of the remainder of the NTF Group Executive Committee and regional CEOs.
- Plan for regional offices.
- Help with the search for candidates for NTF Regional Executive Committee roles.

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<sup>376</sup> See "Business Secretary appoints finance experts to Board of new British Business Bank", GOV.UK, October 17<sup>th</sup> 2013, <https://www.gov.uk/government/news/business-secretary-appoints-finance-experts-to-board-of-new-british-business-bank>.

<sup>377</sup> The National Transformation Fund's Board of Directors is comprised of the Chairperson; the Group Chief Executive Officer; five non-executive directors, each with business and technical skills in infrastructure, business management, banking and risk; and the four Strategic Investment Board non-executive directors.

### The Applied Sciences Investment Fund

The establishment of the Applied Sciences Investment Fund (ASIF) will be initiated by the Department for Business, Energy and Industrial Strategy (BEIS) and UK Research and Innovation (UKRI).

The research institutes that make up UK Research and Innovation will need additional administration and business advisors to connect the Applied Sciences Investment Fund to other institutes, universities and private sector start-ups and scale ups. Lessons can be learned from existing funds and public institutions in other countries with similar missions. There are several examples in the field of renewable energy, including Sustainable Development Technology Canada and the US Advanced Research Project Agency – Energy.

Other issues include how to coordinate the UK Research and Innovation with the Department for Business, Energy and Industrial Strategy offices for Life Sciences, the Centre for Connected and Autonomous Vehicles, and the Office for Low Emission Vehicles, and how they fit into the proposed structures.

Further work will be required to map these proposed changes.

### The Royal Bank of Scotland

Changing the mandate of the Royal Bank of Scotland will require shareholder approval. The UK government is a controlling shareholder. It has the right to change the bank's strategy and install board members.

### The Applied Sciences Investment Fund – merging with the British Business Bank

The Strategic Investment Board will initially be responsible for reviewing the roles and personnel of the British Business Bank's board and executive management. This would be done in tandem with the Applied Sciences Investment Fund board and executive structures that will be put in place.

The Applied Sciences Investment Fund's (ASIF) executive management will work with the British Business Bank's board and executive management to merge the entity into the ASIF and strengthen its capacity around technology-focussed small & medium-sized enterprise lending.

The Applied Sciences Investment Fund's regional offices will be responsible for working with businesses, banks and VC firms in their region. Each office will work closely with the existing Catapults and Accelerators in their region.

All small & medium-sized enterprises should be able to build business management skills with support from the Royal Bank of Scotland/National Investment Bank and the Applied Sciences Investment Fund, along the lines of the Singapore Capability Development Grant (SCDG). The SCDG provides grants and funding to develop business management skills for growth in small & medium-sized enterprises in

Singapore.<sup>378</sup> The grant process model is simple, efficient and transparent, with a quick decision-making panel from the business sector. Accountability controls would be integral to this model.

### Strategic Investment Board

- At its inception, Board members of the Strategic Investment Board will be appointed directly by the Treasury.<sup>379</sup>
- Appointments:
  - The Chancellor will appoint renowned scientists, researchers, and other individuals with relevant expertise, with a focus on technology and innovation, based on expert recommendations;<sup>380</sup>
  - Business leaders in key strategic sectors will also be appointed;<sup>381</sup>
  - Senior officials (permanent secretaries and others) from the Treasury, the Bank of England, the Department for Business, Energy and Industrial Strategy, the National Transformation Fund and the National Investment Bank will be given seats on the Board; and
  - There will be equal representation on the Board between science & research, the business community and government officials.<sup>382</sup>

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<sup>378</sup> See “Capability Development Grant (CDG)”, Enterprise Singapore, <https://www.spring.gov.sg/Growing-Business/Grant/Pages/capability-development-grant.aspx>.

<sup>379</sup> At present, the Council for Science and Technology (CST) is the subject of such direct appointment (by the Prime Minister), although it does not have the status of an integrated government department. See “Membership”, Council for Science and Technology”, <https://www.gov.uk/government/organisations/council-for-science-and-technology/about/membership>.

<sup>380</sup> Most of these are already members of various scientific bodies such as the Royal Society. The Treasury will consult with the boards of these existing bodies and invite applications. This would allow it to make full use of the existing structures to show respect for the science community and a sense of continuity whilst implementing a radical research funding programme.

<sup>381</sup> This will be determined by the Key Strategic Priorities (currently artificial intelligence, robotics, clean energy, composites, intelligent mobility, accelerating patient access to drugs and space & satellite technology) as identified by the Council for Science and Technology and UK Research and Innovation, and which will be the responsibility of the Strategic Investment Board upon its establishment. See “Industrial Strategy Challenge Fund: Joint Research and Innovation”, Innovate UK, Department for Business, Energy & Industrial Strategy and UK Research and Innovation, May 25<sup>th</sup> 2017, <https://www.gov.uk/government/collections/industrial-strategy-challenge-fund-joint-research-and-innovation>.

<sup>382</sup> This will create a proper balance between scientific excellence, the practical expertise of the business sector and the strategy (and budgetary constraints) of the government.

The Board will have the authority periodically to review and revise the structures and operations underpinning the Strategic Investment Board.<sup>383</sup> This will prevent the establishment of ‘network monopolies’<sup>384</sup> within the SIB and ensure that its structures and operations remain relevant.

The term of the Board will be five years.<sup>385</sup>

Standing committees will be focussed on maintaining the core mission of the Strategic Investment Board. For example, one standing committee will monitor the funding and commercialisation of the Key Strategic Priorities. Another committee would oversee coordination and collaboration between Treasury, Department for Business, Energy and Industrial Strategy, the Bank of England, the National Transformation Fund, the National Investment Bank and the Office for National Statistics.

Specialist committees within the Strategic Investment Board structure will be composed of science and technology experts, business advisors and relevant government departments to:

- Ensure that the Strategic Investment Board uses data and science to improve understanding of the economy;
- Advise on science, technology and its commercialisation. This may be done by UK Research and Innovation and National Investment Bank technical specialists, and include advice on the determination of Key Strategic Priorities;
- Coordinate education, apprenticeships and universities to increase skills and training in STEM and key technology areas; and
- Coordinate with, advise and make recommendations to Treasury on simplifying the current tax rules and necessary applications for tax reliefs for companies involved in business sectors that are a strategic priority.

The Strategic Investment Board will have an administration team headed by a Chief Executive Officer, to coordinate and administer the Board, committees, technical staff and policy advisors.

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<sup>383</sup> This clause draws on the following provision in the Royal Society’s Charter from 1662: Council “shall and may have full authority, power, and faculty from time to time to draw up, constitute, ordain, make, and establish such laws, statutes, acts, ordinances, and constitutions as shall seem to them, or to the major part of them, to be good, wholesome, useful, honourable, and necessary, according to their sound discretions, for the better government, regulation, and direction of the Royal Society aforesaid, and of every Member of the same, and to do and perform all things belonging to the government, matters, goods, faculties, rents, lands, tenements, hereditaments, and affairs of the Royal Society aforesaid.” See “Translation of First Charter, granted to the President, Council, and Fellows of the Royal Society of London, by King Charles the Second, A.D. 1662”, Royal Society, [https://royalsociety.org/~media/Royal\\_Society\\_Content/about-us/history/Charter1\\_English.pdf?la=en-GB](https://royalsociety.org/~media/Royal_Society_Content/about-us/history/Charter1_English.pdf?la=en-GB).

<sup>384</sup> Network monopolies are entrenched information hubs.

<sup>385</sup> To ensure a long-term focus and to align it with the current fixed-term parliament.



## Bank of England

The Bank of England currently has four deputy governors, and one chief operating officer:<sup>386</sup>

- Deputy Governor, Monetary Policy
- Deputy Governor, Financial Stability
- Deputy Governor, Prudential Regulation
- Deputy Governor, Markets & Banking
- Chief Operating Officer

This will be reduced to two deputy governors, and one chief operating officer (see Chart 5.4):

- Deputy Governor for UK Banking and Investment
- Deputy Governor for Markets, Insurance and International Banks
- Chief Operating Officer

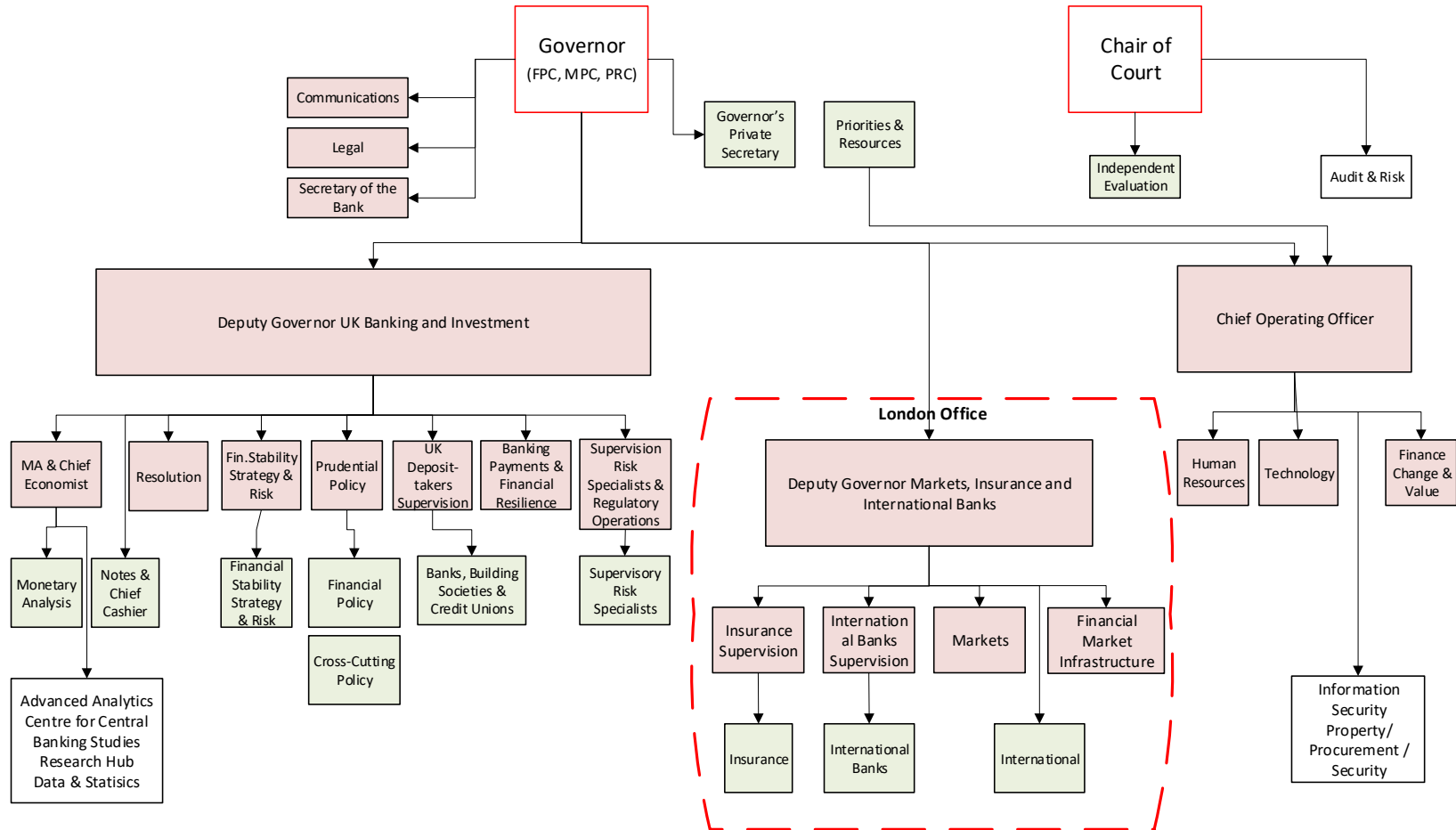
The role of the Deputy Governor of Monetary Policy will disappear:

- Monetary policy will be taken over by the Deputy Governor for UK Banking and Investment; as will the departments of Monetary Analysis and Notes & Chief Cashier.
- The financial market infrastructure department and the international department will come under the control of the Deputy Governor for Markets, Insurance and International Banks.
- This will place most of the international elements of the Bank of England's work in the London office.
- Departments of Supervisory Risk Specialists & Regulatory Operations, Banking Payments and Financial Resilience, and UK Deposit-Takers Supervision will come under the Deputy Governor for UK Banking and Investment.
- The Chief Operating Officer will be based in Birmingham.
- Human resource and technology functions will be split between London and Birmingham with overall control in Birmingham, and include 'finance, change & value' and internal audit.

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<sup>386</sup> For further details on the Bank of England structure, see "Bank of England Organogram", Bank of England, <https://www.bankofengland.co.uk/-/media/boe/files/about/people/orgchart.pdf>.

Chart 5.4: Bank of England location change to Birmingham



**KEY**

- Member of Executive Directors Committee
- Director

The rationale for the change is twofold. First, the Bank of England needs to play a more active role in overseeing financial stability, paying closer attention to how bank lending can finance or support stronger productivity growth – while not drawing away from the need to supervise banks and their resilience. Second, the process of moving the BoE will require a split of its operations.

This proposed structure is a first draft of how the National Transformation Fund may be set up (see Chart 5.5).

The Group Board of Directors will carry out the mandate of the Strategic Investment Board's priorities.

The Group Board of Directors should have all the technical skills required for the operation of a bank, with specific skills in infrastructure management. This should be an enhanced version of a typical Prudential Regulatory Authority bank governance model. Elements of the Asian Infrastructure Investment Bank and European Bank for Reconstruction and Development models should be taken into account to reflect the infrastructure project financing. The National Transformation Fund should be looking for the latest developments in funding and managing infrastructure. This should be reflected in the make-up of the Group Board of Directors and Executive Committee. The Board of Directors should be comprised of:

- The Group Chair (to be appointed by the Strategic Investment Board, SIB);
- The Group CEO (to be appointed by the SIB);
- Five non-executive directors (each with business and technical skills in infrastructure, business management, banking and risk, and appointed by the Group Board of Directors); and
- Four 'public sector' non-executive directors (SIB appointments including representatives from the Bank of England, the National Investment Bank and the Applied Sciences Investment Fund).

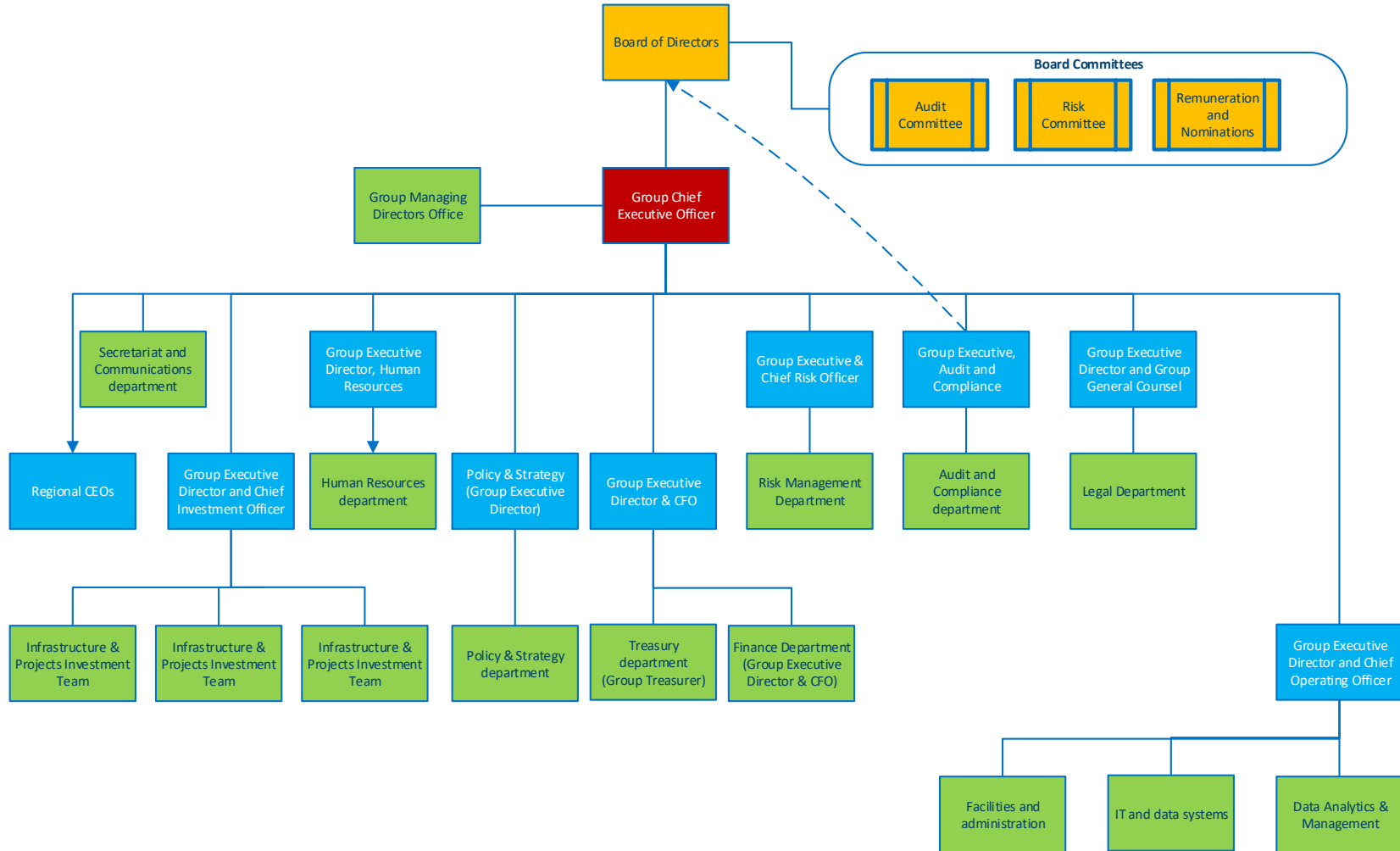
The Group Board committees should be appointed by the Board of Directors. The committees are:

- Audit;
- Risk; and
- Remuneration and Nominations.

The roles of the Group Executive Committee should cover the key functions of the National Transformation Fund (NTF) and each regional office. This should ensure a structure to enable sufficient management and monitoring of the NTF's activities. They are as follows:

- Group Chief Executive Officer;
- Group Chief Financial Officer – responsible for the National Transformation Fund’s (NTF) financial strategies and policies including the Treasury department;
- Group Chief Operating Officer – responsible for operations, data management and systems and project management systems;
- Group General Counsel – responsible for the NTF’s legal risk (paying particular attention to privacy) and policies for the NTF and its contractual relationships with counterparties including project partners and construction firms;
- Group Executive Audit & Compliance – responsible for internal audit and regulatory compliance;
- Group Executive Human Resources – responsible for all human resource matters;
- Group Chief Risk Officer – responsible for oversight of the NTF’s risk profile (risk management and risk limits);
- Group Chief Investment Officer – responsible for management of infrastructure investment (‘identification to implementation’);
- Group Executive Director, Policy and Strategy; and
- CEO for each Regional Office.

Chart 5.5: National Transformation Fund head office organisation structure



### Nominations and appointments

It is proposed that nominations for the Board’s non-executive directors (non-SIB appointments), group executive committee and regional CEOs will initially be appointed by the National Transformation Fund Implementation Board. Thereafter, the Nominations and Appointments Matrix will apply (see Table 5.1).

Table 5.1

<b>National Transformation Fund appointments matrix</b>		
<b>Nominations</b>	<b>Decision makers - nominations</b>	<b>Decision makers - appointments</b>
Group Chairperson, Group CEO, four ‘public sector’ non-executive directors	Strategic Investment Board	Strategic Investment Board
Five ‘skilled’ non-executive directors, Group Executive Committee members (excluding Regional CEO)	National Transformation Fund Implementation Board (for the initial appointments), thereafter: Remuneration & Nominations Committee	Group Board of Directors
Remuneration & Nominations Committee	Group Board of Directors	Group Board of Directors
Audit	Group Board of Directors	Group Board of Directors
Risk	Group Board of Directors	Group Board of Directors
Regional Chairperson	Remuneration & Nominations Committee	Group Board of Directors
Regional Board of Directors	Regional Chairperson + Remuneration & Nominations Committee	Group Board of Directors
Regional CEOs	Regional Chairperson + Remuneration & Nominations Committee	Regional Board of Directors
Regional executive committee members	Remuneration & Nominations Committee + Regional Chairperson + Regional CEO	Regional Board of Directors

### The National Transformation Fund’s regional offices

Each regional office will have a Regional Board of Directors and an Executive Committee and will report up to the Group Executive Committee. Each Regional Chair will report to the Group Chair. Each regional CEO will report directly to the Regional Chair with dotted line reporting to the Group CEO.

Coordination between the National Transformation Fund head office and regional offices can be enhanced through quarterly meetings of the group and regional Chairs, with group and regional CEOs.

The Regional Board will be appointed in accordance with the Nominations and Appointments Matrix.

- Regional Chair;
- Regional CEO;
- Four non-executive directors (each with business and technical skills in infrastructure, business management, banking and risk); and
- Three 'public sector' non-executive directors.

The Regional Executive Committee will replicate the roles of the Group Executive Committee covering the key functions of the regional office. The Regional Executive Committee will be led by the CEO, with Regional Executive Committee members reporting directly to the CEO. Each of the executive committee roles will 'dotted line' report to their Group Executive Committee equivalent.

The roles will be:

- Chief Executive Officer;
- Chief Financial Officer – responsible for the regional National Transformation Fund (NTF) office's financial strategies and policies including the Treasury department;
- Chief Operating Officer – responsible for operations, data management & systems and project management systems;
- General Counsel – responsible for the regional NTF office's legal risk and policies and its contractual relationships with counterparties, including project partners and construction firms;
- Executive Director Audit & Compliance – responsible for internal audit and regulatory compliance;
- Executive Director Human Resources – responsible for all human resource matters;
- Chief Risk Officer – responsible for oversight of the regional NTF office's risk profile (risk management and risk limits); and
- Chief Investment Officer – responsible for management of the regional infrastructure investment (identification to implementation).

## Appendix 2

### Government's approach to SME funding issues

The UK government has also entered into a 'partnership' with some of the UK's largest banks to increase lending to small & medium-sized enterprises (SMEs), particularly for exports. The Government announced in July 2017 that through the Export Credits Guarantee Department, it will guarantee around 80% of the loans extended towards export-orientated SMEs, because of their purported high-risk nature.<sup>387</sup> This is a failure if the government is liable for nearly all the losses. There is an urgent need for reform – or a new lending model – if banks cannot lend without these protections.

Challenger banks have not meaningfully added to SME lending. Almost all of them use broker distribution as their route to market. Instead, they are providing capacity to the market through lower prices and easier underwriting standards. This is pro-cyclical and is not expanding permanent capacity to fund lending to productive sectors. It is unlikely that this model will help fill the SME funding gap.<sup>388</sup>

The British Business Bank (BBB) – established in 2012 – is a state-owned economic development bank designed to increase lending to SMEs. This has also fared poorly because of excessive reliance on lending by the traditional high street banks. The BBB and the European Investment Bank have provided funding to the larger peer-to-peer (P2P) lenders with some moderate success, but volumes are still low: for example, Funding Circle has extended just £3.4 billion in loans between 2010 and June 2016.<sup>389</sup>

Open Banking went live in January 2018. Under the rules, banks (nine currently) with a certain market share must use a common API (application programming interface) standard in order to share data with other providers such as P2P lenders. Zopa and Lending Works are already in preparation. The current group of new lenders are as yet unable to deliver meaningful volumes of lending to the productive sector. Nevertheless, they are taking market share from the banks.<sup>390</sup>

Many alternative lenders are also prohibitively expensive. In the US, satisfaction with online lenders is poor compared to traditional banks. This reflects the much higher interest rates charged by online lenders.<sup>391</sup> According to one 'loan broker', "alternative loans typically have an annual percentage rate of 40% to 60%."<sup>392</sup> This is not always the case with SME business lending rates in the UK, but this is

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<sup>387</sup> See "UK government signs deal with big banks to increase SME lending, Financial Times, July 12<sup>th</sup> 2017, <https://www.ft.com/content/06318472-663c-11e7-8526-7b38dcaef614>.

<sup>388</sup> See Chapter 8 – Challenger banks.

<sup>389</sup> See "Our Statistics", Funding Circle, <https://www.fundingcircle.com/uk/statistics/>.

<sup>390</sup> See "UK fintechs take market share from dominant high-street banks", Financial Times, November 2<sup>nd</sup> 2017, <https://www.ft.com/content/ae1f7818-bf2b-11e7-b8a3-38a6e068f464>.

<sup>391</sup> See "Small businesses hate fintech lenders more than big banks", Financial Times, April 12<sup>th</sup> 2017, <https://ftalphaville.ft.com/2017/04/12/2187388/small-businesses-hate-fintech-lenders-more-than-big-banks/>.

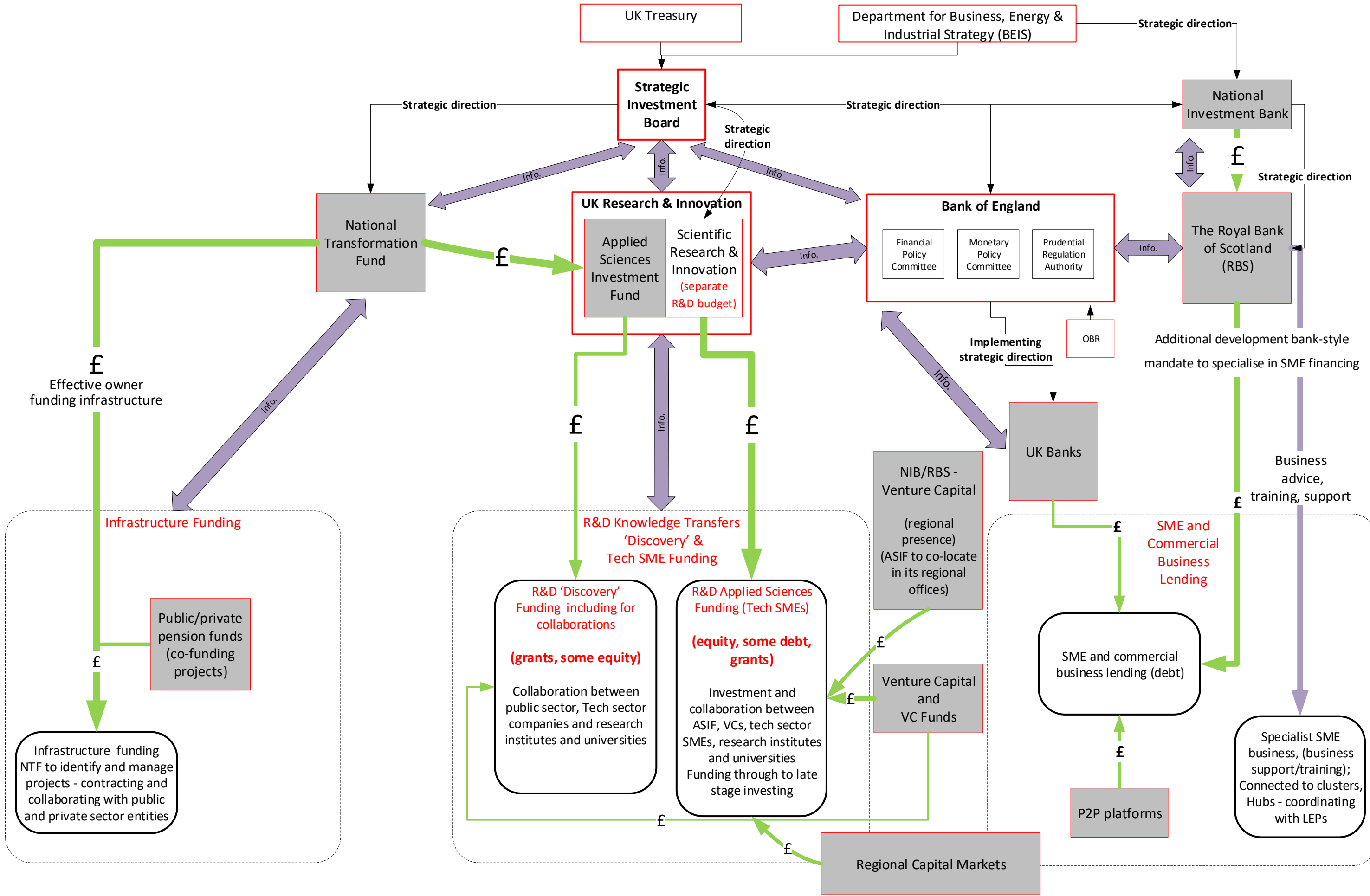
<sup>392</sup> See "The Six-Minute Loan: How Kabbage is Upending Small Business Lending – And Building A Very Big Business", Forbes, May 25<sup>th</sup> 2015, <https://www.forbes.com/sites/darrendahl/2015/05/06/the-six-minute-loan-how-kabbage-is-upending-small-business-lending-and-building-a-very-big-business/#23ee9a8a9042>.



still supported by government funds (British Business Bank or European Investment Bank), which covers the lack of investors willing to lend funds at such rates.

Equity funding is crucial. Public and private venture capital still needs expanding (see Chapter 7). Further work will be done on regional stock exchanges as another channel for equity investment.

# APPENDIX 3 INDUSTRIAL STRATEGY



# Chapter 6: The technology cycle and economic statistics

## The technology cycle and economic statistics

### Semiconductor deflation key to technology cycle

The weak productivity growth officially recorded since the crisis of 2007/08 has sparked intense debate (see Chart 6.1).<sup>393</sup> Some economists argue that today's technological advances are less ground-breaking than previous inventions.

In truth, quantum computers, robotics, 5G and blockchain will all to varying degrees offer the potential for significant productivity gains. Recent developments in the semiconductor industry suggest that the pace of innovation is, if anything, likely to accelerate too.

The challenge for policymakers is clear. Better data will be needed to ensure that investment, both public and private, produces the best returns. The fourth industrial revolution is not being measured accurately.

The main challenge lies in measuring prices used to deflate nominal expenditures. Quality-adjusted prices are proving more difficult to construct for products and services that experience rapid technological change.

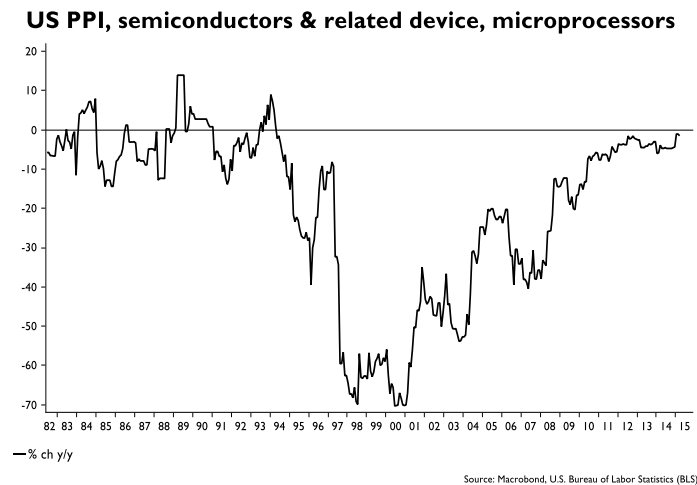
Advances in semiconductor technology have historically driven down constant-quality prices for microprocessors (MPUs), lowering the price of information technology goods. Nevertheless, by the mid-2000s, the fall in official price indices for microprocessors had started to ease. The big decline in the producer price index (PPI) for MPUs ground to a halt (see Chart 6.2).

Chart 6.1



<sup>393</sup> Source: "A Millennium of Macroeconomic Data", Bank of England, <https://www.bankofengland.co.uk/statistics/research-datasets>.

Chart 6.2



The advances in scaling that had driven the semiconductor industry had slowed: the “technological revolution” that spawned the dotcom boom and continued into the early 2000s was apparently over. The official data also cast doubt on Moore’s Law. This well-established rule of thumb suggested that computing power would double every 18 to 24 months. It appeared that the improvements in capacity of semi-conductor chips were fast approaching a limit. In this scenario, productivity growth would stall and living standards would increase at a slower rate. The “secular stagnation” camp, it appeared, had won the argument.<sup>394</sup>

The smaller price declines – and the implied slower rate of innovation – were not consistent with the miniaturisation (i.e. scaling reductions) achieved in the semiconductor industry. The average technology cycle – the time required to secure a 30% reduction in the width of the smallest feature on a chip – remained substantially shorter than the three-year cycle evident before the 1990s. Manufacturers were finding novel solutions to circumvent the challenge of squeezing ever more transistors onto a chip.

In March 2013, an important paper published by the Federal Reserve asked: *Is the Information Technology Revolution Over?*<sup>395</sup> More appropriate statistical techniques – hedonic regressions – were used to estimate a new price index for microprocessor units (MPUs). The authors found that semiconductor technology had in fact “continued to advance at a rapid pace”.<sup>396</sup> The US Bureau of Labor Statistics

<sup>394</sup> See “Why stagnation might prove to be the new normal”, Lawrence Summers, Financial Times, December 15<sup>th</sup> 2013, <https://www.ft.com/content/87cb15ea-5d1a-11e3-a558-00144feabdc0>. See also “The case for secular stagnation is more convincing than ever”, Lawrence Summers, Financial Times, February 18<sup>th</sup> 2016, <https://www.ft.com/content/cca662ec-d44b-3419-864e-ac7ccfb0d125>. See also, “Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds”, Robert J. Gordon, NBER Working Paper No. 18315, August 2012, <http://www.nber.org/papers/w18315>.

<sup>395</sup> See “Is the Information Technology Revolution Over?”, David Byrne, Stephen Oliner & Daniel Sichel, Federal Reserve, March 2013, <https://www.federalreserve.gov/pubs/feds/2013/201336/201336pap.pdf>.

<sup>396</sup> Ibid. p. i.

(BLS) price index for microprocessors may have “substantially understated the rate of decline in prices in recent years.”<sup>397</sup> The pace of innovation was not slowing.

This paper has since been updated and revised on several occasions. The latest version was published in January 2017, entitled: *How Fast are Semiconductor Prices Falling?*<sup>398</sup> The authors again concluded that microprocessor unit (MPU) prices were being mismeasured. From 2004 to 2009, their hedonic index fell faster than the official producer price index (PPI) for MPUs. From 2009 to 2013, this gap widened further, with the authors’ hedonic index “falling at an average annual rate of 42 percent, while the PPI declined at only a 6 percent rate.”<sup>399</sup>

The potential data errors extend well beyond semiconductors. Federal Reserve Economist David Byrne, alongside co-authors, has attempted to measure quality-adjusted prices for a range of high-tech goods using the full post-war history of information technology price research, as well as more recent studies.<sup>400</sup> New deflators were constructed for personal computers, multi-user computers, data storage equipment, communications equipment, special purpose electronics (e.g. with medical, military, aerospace, laboratory and industrial applications) and software. These were collected together in a paper published in 2016.<sup>401</sup>

All told, the *alternative* price index (using the newly constructed deflators) showed declines of 4% per year for 2004-14, three percentage points faster than the official price index (which fell 1% per annum over this period).<sup>402</sup>

The alternative price index also showed faster price declines during the 1995-2004 period (9% per year, compared to 6% per year based on the old price index). In other words, the ‘slowdown’ was just as large as before. In this sense, the productivity ‘puzzle’ remains unsolved.<sup>403</sup>

Nevertheless, the question of accurate deflation remains a relevant one for policymakers. If the true rate of inflation is much lower than observed in official statistics, then this should be factored into policy decision-making, irrespective of whether mismeasurement was more pernicious in the past.

The authors also offer several caveats: “the composition of IT [information technology] investment has shifted appreciably toward components for which measurement is more uncertain. Most notably,

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<sup>397</sup> Ibid.

<sup>398</sup> See “How Fast are Semiconductor Prices Falling?”, David Byrne, Stephen Oliner & Daniel Sichel, Federal Reserve, January 2017, <https://www.federalreserve.gov/econresdata/feds/2017/files/2017005pap.pdf>.

<sup>399</sup> Ibid.

<sup>400</sup> See “Does the United States Have a Productivity Slowdown or a Measurement Problem?”, David Byrne, John Fernald and Marshall Reinsdorf, Brookings Papers on Economic Activity, Spring 2016, <https://www.brookings.edu/wp-content/uploads/2016/03/byrnetextspring16bpea.pdf>.

<sup>401</sup> Ibid.

<sup>402</sup> Ibid.

<sup>403</sup> Ibid. p. 110. “taken together, our adjustments turn out to make the post-2004 slowdown in labor productivity even larger than measured.”

software investment has gone from 39 percent of IT investment for the period 1995–2004 to 48 percent for 2005–14. Also, special-purpose equipment’s share has increased, bringing the share for which measurement is more uncertain to 68 percent. Thus, our confidence in the IT price indexes, even as amended in the alternative indexes, has deteriorated markedly because of compositional shifts.”<sup>404</sup>

In a follow-up paper, the same authors noted that “much of the discussion has merely scratched the surface. More research on specialized equipment and software and emerging digital services is needed to fully account for IT-related improvements. Beyond IT, health care and other services have never been well measured.”<sup>405</sup>

Indeed, arguably the greatest scope for mismeasurement exists in services.<sup>406</sup> Quality improvements in services are hard to estimate. In many cases, the unit of output (needed to measure productivity) cannot be properly defined. Digital services present a particularly difficult challenge. Research in this area is still at a very early stage.

### Falling chip prices

Benchmark prices for DRAM (dynamic random-access memory) and NAND flash memory have dropped 14.8% and 19.4% year-to-date, respectively.<sup>407</sup> Some of this decline may be due to a slowdown in spending on crypto-assets.<sup>408</sup>

Nevertheless, the larger technology companies are investing heavily. The growth rate in capital expenditures was projected to have accelerated to 59.8% y/y for the S&P 500 Information Technology sector in Q1.<sup>409</sup> Alphabet and Facebook both spent 23% of revenues on investment in the last quarter.<sup>410</sup>

The technology giants are ramping up spending on cloud computing. Intel’s share price is up 50.3% year-to-date.<sup>411</sup> The company is benefitting from huge investments in cloud infrastructure. Intel’s Data

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<sup>404</sup> Ibid.

<sup>405</sup> See “Does Growing Mismeasurement Explain Disappointing Growth?”, David Byrne, John G. Fernald, and Marshall Reinsdorf, Federal Reserve Bank of San Francisco Economic Letter, February 13<sup>th</sup> 2017, <https://www.frbsf.org/economic-research/files/el2017-04.pdf>.

<sup>406</sup> See *AI: American Innovation and the Economic Recovery*, Graham Turner and Demetris Pachnis, June 2016, 2QT Limited (Publishing).

<sup>407</sup> Source: Bloomberg Anywhere; inSpectrum Tech. Inc. Accessed June 12<sup>th</sup> 2018.

<sup>408</sup> See “Cryptocurrency slowdown throws cold water on DRAM market”, Nikkei Asian Review, May 17<sup>th</sup> 2018, <https://asia.nikkei.com/Business/Business-Trends/Cryptocurrency-slowdown-throws-cold-water-on-DRAM-market>.

<sup>409</sup> See “Technology companies are driving a capital spending surge”, CNBC, May 2<sup>nd</sup> 2018, <https://www.cnbc.com/2018/05/02/technology-companies-are-driving-a-capital-spending-surge.html>.

<sup>410</sup> See “Big tech ploughs money into capex and buybacks”, Financial Times, May 16<sup>th</sup> 2018, <https://www.ft.com/content/8dcd2ae2-5913-11e8-bdb7-f6677d2e1ce8>.

<sup>411</sup> Source: Macrobond. Accessed June 12<sup>th</sup> 2018.

Center Group posted revenue growth of 24% y/y in Q1, helped by strong demand for artificial intelligence applications.<sup>412</sup>

Other areas of Intel's business also posted robust revenue growth: the Internet of Things Group (17% y/y), Non-Volatile Memory Solutions Group (20% y/y) and Programmable Solutions Group (17% y/y) all contributed.<sup>413</sup>

### Programmable chips

The shift towards specialised chips could raise performance, and the underlying trend for productivity, even more quickly. The first set of specialised processors are known as “application-specific integrated circuits”, which are hard-wired for one purpose.<sup>414</sup> Manufacturers are now able to optimise individual tasks. For example, digital signal processing chips have improved image enhancements in smartphones by a factor of 25.<sup>415</sup>

Graphics processing units (GPUs) have increased the speed of tasks using artificial intelligence by anywhere from 10 to 100-fold.<sup>416</sup> Nvidia unveiled a new chip last year that captures 3-D snapshots of video games with 32 times the resolution of computer displays.<sup>417</sup> The resulting images can be viewed from multiple angles, and the new chip will be used in virtual reality goggles. Apple is bringing the design of GPUs in-house, reflecting the strategic importance of these processors to smartphones.<sup>418</sup> They are also central to other applications, including facial recognition, and have become increasingly important in the data centres used by the big public clouds such as Amazon Web Services and Microsoft Azure.

Specialised chips are instrumental to the smooth operation of Apple's new features, such as touch ID fingerprint sensors, better voice connectivity and faster data transmission.<sup>419</sup> Many of the recent improvements in iPhones rely on customised chips.<sup>420</sup>

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<sup>412</sup> Source: Bloomberg Anywhere. The Data Center Group develops workload-optimised platforms for compute, storage, network, and related functions, which are designed for and sold into the enterprise and government, cloud, and communications service providers market segments.

<sup>413</sup> Ibid.

<sup>414</sup> See “The rise of artificial intelligence is creating new variety in the chip market, and trouble for Intel”, The Economist, February 25<sup>th</sup> 2017, <https://www.economist.com/business/2017/02/25/the-rise-of-artificial-intelligence-is-creating-new-variety-in-the-chip-market-and-trouble-for-intel>.

<sup>415</sup> See “How Chip Designers Are Breaking Moore's Law”, Wall Street Journal, March 19<sup>th</sup> 2017. <https://www.wsj.com/articles/how-chip-designers-are-breaking-moores-law-1489924804>.

<sup>416</sup> Ibid.

<sup>417</sup> See “Nvidia Pushes Chip Speed Higher, Price Lower”, Wall Street Journal, May 7<sup>th</sup> 2016, <https://www.wsj.com/articles/nvidia-pushes-chip-speed-higher-price-lower-1462594938>.

<sup>418</sup> See “Apple looks long-term with in-house development of GPUs”, Financial Times, April 4<sup>th</sup> 2017, <https://www.ft.com/content/8c778fae-18df-11e7-a53d-df09f373be87>.

<sup>419</sup> See “How Chip Designers Are Breaking Moore's Law”, Wall Street Journal, March 19<sup>th</sup> 2017. <https://www.wsj.com/articles/how-chip-designers-are-breaking-moores-law-1489924804>.

<sup>420</sup> See “Innovation in Tech Evolves in New Ways”, Wall Street Journal, September 12<sup>th</sup> 2016, <https://www.wsj.com/articles/innovation-in-tech-evolves-in-new-ways-1473608660>.



The other type of specialised processor is known as a Field Programmable Gate Array (FPGA). Software is removed from the standard central processing unit (CPU) and placed in a separate processor. The critical feature of FPGAs is that they are programmable, making them reusable and offering greater flexibility. FPGAs fit well with machine learning and AI applications.<sup>421</sup>

Intel's Programmable Solutions Group (PSG) "offers programmable semiconductors, primarily field-programmable gate arrays (FPGAs) and related products for a broad range of market segments, including communications, data center, industrial, military, and automotive."<sup>422</sup> According to Intel, "The Programmable Solutions Group (PSG) won new designs [in Q1] with server OEMs adding Intel's field programmable gate array (FPGA) acceleration to their data center offerings".<sup>423</sup>

Intel bought Alterra – which specialises in Field Programmable Gate Array (FPGA) chips – in 2015 for a deal worth \$16.7bn. FPGAs are now gaining traction in data centres. "Microsoft has been using Altera FPGAs in its servers to run many of the neural networks behind services such as Bing searches, Cortana speech recognition, and natural-language translation."<sup>424</sup> Indeed, "Microsoft is pitching the idea of running AI projects atop chips called FPGAs, whose designs can be reprogrammed to support new forms of software on the fly."<sup>425</sup>

Nvidia posted solid revenues in Q1 2018 too: "Datacentre revenues – where it counts cloud computing providers such as Amazon and Microsoft as customers – reached \$701m, up 71 per cent."<sup>426</sup>

So far, the transition to cloud computing is allowing multiple chip companies to sustain strong revenue growth. However, competition from the larger technology companies is intensifying: Facebook is seeking to build a team that will allow it to develop its own chips, reducing its reliance on Intel and Qualcomm.<sup>427</sup> Amazon is hiring engineers to work on FPGAs to improve video processing speeds at Amazon Web Services (AWS).<sup>428</sup> AWS acquired video-processing start-up Elemental and chipmaker

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<sup>421</sup> See "FPGAs to better machine learning and AI applications", newelectronics, June 27<sup>th</sup> 2017, <http://www.newelectronics.co.uk/electronics-technology/fpgas-key-to-machine-learning-and-ai-apps/156849/>.

<sup>422</sup> See "Intel Reports First-Quarter Financial Results", Intel Corporation, April 26<sup>th</sup> 2018, [https://s21.q4cdn.com/600692695/files/doc\\_financials/2018/Q1/Q1-2018\\_EarningsRelease-FINAL.pdf](https://s21.q4cdn.com/600692695/files/doc_financials/2018/Q1/Q1-2018_EarningsRelease-FINAL.pdf).

<sup>423</sup> Ibid.

<sup>424</sup> See "Intel pushes FPGAs into the data center", ZDNet, October 5<sup>th</sup> 2017, <https://www.zdnet.com/article/intel-pushes-fpgas-into-the-data-center/>.

<sup>425</sup> See "Microsoft charts its own path on artificial intelligence", Wired, May 7<sup>th</sup> 2018, [https://www.wired.com/story/microsoft-charts-its-own-path-on-artificial-intelligence/?mbid=email\\_onsiteshare](https://www.wired.com/story/microsoft-charts-its-own-path-on-artificial-intelligence/?mbid=email_onsiteshare).

<sup>426</sup> See "Nvidia revenues boosted by data centres, gamers", Financial Times, May 10<sup>th</sup> 2018, <https://www.ft.com/content/0c20ceec-5489-11e8-b24e-cad6aa67e23e>.

<sup>427</sup> See "Facebook Is Forming a Team to Design Its Own Chips", Bloomberg, April 18<sup>th</sup> 2018, <https://www.bloomberg.com/news/articles/2018-04-18/facebook-is-forming-a-team-to-design-its-own-chips>.

<sup>428</sup> See "Amazon is hiring semiconductor engineers to make its cloud better at streaming video", CNBC, May 15<sup>th</sup> 2018, <https://www.cnbc.com/2018/05/15/aws-considers-fpgas-for-elemental-video-processing-tool.html>.

Annapurna Labs in 2015. Since the acquisition of the Israeli chipmaker, AWS has been designing its own chips. Google and Microsoft are also engaged in their own chipmaking projects.<sup>429</sup>

## Productivity, data and policymaking

Technology mismeasurement is not a purely academic issue. It is critical for monetary policy too. The productivity targets outlined in Chapter 1 will require in-depth research to measure output accurately. This is a challenging task given the current pace of innovation.

An independent review of UK economic statistics led by Professor Sir Charles Bean (the Bean Review) suggested that “if the digital economy was fully captured by official statistics, it could add between one-third and two-thirds of a percent to the growth rate of the UK economy.”<sup>430</sup> The report recommended, amongst other important proposals, that the Office for National Statistics “set up a research centre and work with academics and businesses to find ways to better measure this economic activity” as well as establish a “data science hub” to “make more use of big data”.<sup>431</sup>

Several promising initiatives have since emerged. The Economic Statistics Centre of Excellence (ESCoE) has been created by the Office for National Statistics in direct response to the Bean Review. The “ESCoE is made up of a consortium of leading institutions led by the National Institute of Economic and Social Research (NIESR) with King’s College London, innovation foundation Nesta, University of Cambridge, Warwick Business School (University of Warwick) and Strathclyde Business School.”<sup>432</sup> It is a “dedicated academic centre of expertise” in economic statistics, that aims to overcome some of the key challenges statisticians face in measuring new forms of economic activity.<sup>433</sup>

There are 13 ongoing projects split into three broad categories: 1) National accounts and beyond GDP, 2) Productivity and the modern economy and 3) Regional and labour market statistics.<sup>434</sup> For example, Productivity and the modern economy encompasses three projects that are particularly critical for a deep understanding of a 21<sup>st</sup> century economy:

- Project 2.1: Measuring activity in services sectors
- Project 2.2: Measurement issues in the modern economy
- Project 2.3: Sectoral productivity estimates

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<sup>429</sup> See “The rise of AI is forcing Google and Microsoft to become chipmakers”, Wired, July 25<sup>th</sup> 2017, <https://www.wired.com/story/the-rise-of-ai-is-forcing-google-and-microsoft-to-become-chipmakers/>.

<sup>430</sup> See “Press notice: ‘Take economic statistics back to the future,’ says Charlie Bean”, Independent review of UK economic statistics: final report, March 11<sup>th</sup> 2016, <https://www.gov.uk/government/publications/independent-review-of-uk-economic-statistics-final-report/press-notice-take-economic-statistics-back-to-the-future-says-charlie-bean>.

<sup>431</sup> Ibid.

<sup>432</sup> See “About ESCoE”, Economic Statistics Centre of Excellence, <https://www.escoe.ac.uk/about-escoe/>.

<sup>433</sup> Ibid.

<sup>434</sup> See “Projects”, Economic Statistics Centre of Excellence, <https://www.escoe.ac.uk/projects/>.

In a recent discussion paper, the Economic Statistics Centre of Excellence (ESCOE) concluded: “UK industries that saw the biggest reductions in productivity growth tended to be internationally competitive and more dependent on global demand than other industries. They were also industries where productivity is difficult to measure”.<sup>435</sup>

Indeed, “Three fifths of the gap is accounted for by a few industries that together account for less than one fifth of market sector value added: telecommunications, finance, mining and quarrying, electricity and gas, pharmaceuticals and computer programming”.<sup>436</sup>

The authors of this paper note:

“hours worked have risen faster than before the crisis in three quarters of the 59 industries we consider. As a result, compared with the pre-crisis period, labour productivity growth remains relatively weak over the period 2011 to 2015 in two thirds of these industries”.<sup>437</sup>

A lack of investment has contributed to the slowdown in productivity growth too. Real business investment fell 0.2% q/q in Q1 2018 and was up just 2.0% y/y.<sup>438</sup> There were some encouraging signs that spending on intellectual property products and ICT & other machinery equipment has improved after a recent slump. However, the UK continues to lag other countries, notably the US.<sup>439</sup>

The Office for National Statistics has also established a Data Science Campus, with the aim of building “a new generation of tools and technologies to exploit the growth and availability of innovative data sources and to provide rich informed measurement and analyses on the economy, the global environment and wider society.”<sup>440</sup> The ONS Data Science Campus aims to “explore the power of cutting-edge data science methodologies: artificial intelligence, clustering, random forests, neural networks, [and] text mining”.<sup>441</sup>

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<sup>435</sup> See “Below the Aggregate: A Sectoral Account of the UK Productivity Puzzle”, Rebecca Riley, Ana Rincon-Aznar and Lea Samek, ESCoE Discussion Paper 2018-06, May 2018, <https://www.escoe.ac.uk/wp-content/uploads/2018/05/ESCoE-DP-2018-06.pdf>.

<sup>436</sup> Ibid.

<sup>437</sup> Ibid.

<sup>438</sup> See “Business investment in the UK: January to March 2018 provisional results”, Office for National Statistics, May 25<sup>th</sup> 2018, <https://www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/businessinvestment/januarytomarch2018provisionalresults>.

<sup>439</sup> Ibid. According to the Office for National Statistics, real spending on intellectual property products and ICT & other machinery equipment rose to 6.23% of real Gross Domestic Product in Q1.

<sup>440</sup> See “Data Science Campus: Building world-leading expertise in the innovative application of data science”, Office for National Statistics, <https://www.ons.gov.uk/aboutus/whatwedo/datasciencecampus>.

<sup>441</sup> See “Data science for the public good”, Data Science Campus, <https://datasciencecampus.ons.gov.uk/projects/>.

The Data Science Campus is currently building a “Superfast GDP indicator”, which utilises early returns of turnover for VAT purposes.<sup>442</sup> Other projects include identifying emerging technologies from patent data and using real time ship satellite tracking to understand pressure on UK ports and to measure economic activity, which has also proved successful in some cases.<sup>443</sup>

A new Big Data Team at the Office for National Statistics is “exploring web-scraped price data, machine learning for matching addresses and natural language processing for coding textual survey responses.”<sup>444</sup> The ‘Billion Prices Project’ run by the Massachusetts Institute of Technology (MIT) collects data from over 1,000 online retailers in around 60 countries, generating over 15 million prices daily.<sup>445</sup>

A similar study released in May of this year uses “Adobe Analytics data on online transactions for millions of products in many different categories from 2014 to 2017 to shed light on how online inflation compares to overall inflation, and to gauge the magnitude of new product bias online. The Adobe data is similar to the Billion Prices Project ... which scrapes list prices from the web, except the Adobe data contains actual transaction prices and includes quantities purchased.”<sup>446</sup>

“Using new data on online transactions, this paper shows that aggregate matched-model inflation online from 2014–2017 was more than a full percentage point lower than in the corresponding CPI. In addition, new products were tremendously important. Quantifying the net increase in number of new goods minus the exit of old goods suggests that actual inflation online may have been an additional 1.5 to 2.5 percentage points lower than indicated in matched model price indices like the CPI.”<sup>447</sup>

As noted by Andrew Haldane of the Bank of England, “In time, it is possible these sorts of data could help to create a real-time map of financial and activity flows across the economy, in much the same

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<sup>442</sup> See “Data Science Campus projects”, last updated October 2017, <https://docs.google.com/spreadsheets/d/1meGngs9uC5f3qzJpd3rpKPF8HjR8LHT7PypoUyEwyeU/edit#gid=406433136>.

<sup>443</sup> See “China's Economic Data: An Accurate Reflection, or Just Smoke and Mirrors?”, Michael T. Owyang and Hannah Shell, Federal Reserve Bank of St. Louis, Q2 2017, <https://www.stlouisfed.org/publications/regional-economist/second-quarter-2017/chinas-economic-data-an-accurate-reflection-or-just-smoke-and-mirrors>. Satellite data have been used by some economists to measure economic activity in countries with poor track records of GDP reliability. For example, economists at the Federal Reserve Bank of St. Louis used “satellite data that measures the intensity of man-made night lights (luminosity)” to proxy for Chinese GDP growth.

<sup>444</sup> See “About ONS Big Data”, Office for National Statistics, <https://onsbigdata.github.io/>.

<sup>445</sup> See “Will Big Data Keep Its Promise?”, Andrew Haldane, Bank of England, April 19<sup>th</sup> 2018, p. 6, <https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/will-big-data-keep-its-promise-speech-by-andy-haldane.pdf?la=en&hash=00A4AB2F080BDCDB1781D11DF6EC9BDA560F3D98>.

<sup>446</sup> See “Internet Rising, Prices Falling: Measuring Inflation in a World of E-Commerce”, Austan D. Goolsbee and Peter J. Klenow, AEA Papers and Proceedings, May 2018, Vol. 108: 488–492, <https://www.aeaweb.org/articles?id=10.1257/pandp.20181038>.

<sup>447</sup> Ibid.

way as is already done for flows of traffic or information or weather. Once mapped, there would then be scope to model and, through policy, modify these flows.”<sup>448</sup>

Some estimates suggest that 90% of all data in existence today has been created over the past two years.<sup>449</sup> New techniques are emerging to handle, filter and extract ever greater amounts of information, including machine learning.

More data and accurate, timely tracking of economic activity should be welcomed. A reliable picture of the economy is essential.

The Bank of England is already using machine learning techniques on advertised job vacancies to create a new job classification scheme.<sup>450</sup> The new “description-based” classification scheme for labour demand may be better suited to understanding how the world of work is rapidly changing.

New datasets are emerging that can provide deeper and timelier insights into the economy, aiding policymakers in their work.

Our industrial strategy proposes a closer working relationship between institutions to facilitate the free flow and exchange of data. The Office for National Statistics, the Bank of England and other data-collecting and holding bodies need to share and analyse data. This should enhance the capacity of the relevant authorities to deliver strong productivity growth.

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<sup>448</sup> See “Will Big Data Keep Its Promise?”, Andrew Haldane, Bank of England, April 19<sup>th</sup> 2018, p. 8, <https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/will-big-data-keep-its-promise-speech-by-andy-haldane.pdf?la=en&hash=00A4AB2F080BDCDB1781D11DF6EC9BDA560F3D98>.

<sup>449</sup> Ibid. p. 5.

<sup>450</sup> Ibid. p. 9.



# Chapter 7: Clusters, scale-ups and equity funding

## Clusters, scale-ups and equity funding

### Introduction

Clusters and equity finance are requisite elements for the development of small & medium-sized enterprises (SMEs), particularly SMEs involved in technology. They are the key to helping start-ups to scale up. Ensuring that enough small businesses expand is critical for economic growth and productivity.

A cluster is a “group of firms and related economic actors and institutions located near one another”, which “draw productive advantage from their mutual proximity and connections”.<sup>451</sup> Industry clusters contribute to innovation.

The proposals in this report – such as a shift in the focus of the Royal Bank of Scotland and the creation of an Applied Sciences Investment Fund – should increase the number of effective clusters. This chapter focusses on some of the interventions required (see Appendix I for a discussion of different approaches to cluster development).

Scaling up can strengthen and deepen clusters. A ‘scale-up’ is defined as a business that begins with more than 10 employees and has an average annual growth in employees or turnover greater than 20 percent per annum over a three-year period.<sup>452</sup>

Equity finance is an important source of funding for start-ups.<sup>453</sup> Equity investors can offer advice, are more likely to take on risk, are more flexible and may be less vulnerable in times of financial crises. However, there is very low use of equity financing in the UK: only 1% of small & medium-sized enterprises have used equity finance over the past three years, for example.<sup>454</sup> There is an “equity gap”. A change in policy is urgently needed.

This section of the report proposes a ‘cluster strategy’ that covers the development of clusters, scale-ups and equity finance. The problems with existing clusters in the UK economy are discussed. The uneven growth, lack of coordination across regions and the absence of ambition in the current

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<sup>451</sup> See “Making sense of clusters: Regional Competitiveness and Economic Development”, Brookings Institution, March 2006, p. 8, <https://www.brookings.edu/research/making-sense-of-clusters-regional-competitiveness-and-economic-development/>.

<sup>452</sup> This definition, from the OECD, is cited in “Annual ScaleUp Review 2017”, ScaleUp Institute, November 2017, p. 10, [http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute\\_Annual\\_ScaleUp\\_Review\\_2017.pdf](http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute_Annual_ScaleUp_Review_2017.pdf).

<sup>453</sup> See “From Start-Up to Scale-Up: Examining Public Policies for the Financing of High-Growth Ventures”, Gilles Durufle, Thomas Hellmann, and Karen Wilson, CEPR/Assonime Programme Working Paper, June 2016, p. 5, <https://cepr.org/sites/default/files/Wilson%2C%20Karen%20paper.pdf>.

<sup>454</sup> See “Equitable Equity: Increasing and Diversifying Finance for High-Growth SMEs in the UK’s Regions”, Institute for Public Policy Research, February 2017, pp. 21–22, [https://www.ippr.org/files/publications/pdf/equitable-equity\\_Feb2017.pdf](https://www.ippr.org/files/publications/pdf/equitable-equity_Feb2017.pdf).



approach to clusters are highlighted below. Two competing ways to consider clusters are outlined – the ‘hands-off’ and the ‘hands-on’ models.

The core components of a successful cluster policy for a future Labour government include:

- A bigger role for public R&D funding;
- Improving skills;
- Developing capacity of local authorities to support clusters;
- Deeper collaboration with universities and educational institutions;
- Extensive use of data; and
- Widening access to equity capital across the regions.

### Current clusters and policy approaches

The challenges facing the British economy in preparation for ‘Industry 4.0’ were outlined in *Financing Investment: Interim Report*, in December 2017.<sup>455</sup> Clusters across the regions are underdeveloped. In 2016, productivity in London was 33% above the UK average (Chart 7.1).<sup>456</sup> The South East was the only other region with productivity higher than the average.<sup>457</sup>

According to the OECD, the UK is home to the widest gap in productivity across regions in the 25 members surveyed (Chart 7.2):<sup>458</sup>

The latest Technology Fast 50 report from Deloitte underlines the UK’s regional disparities.<sup>459</sup> In the 2017 edition, 64% of the fastest-growing technology companies were based in London; 6% were in the Southeast, and 8% in Cambridge and the East. The North East, North West and Midlands accounted for just 12% combined.

The capital’s share of the ‘fast 50’ has grown from 8% in 2005 to 64% in 2017. Indeed, London has attracted more investment over the past five years than Paris, Berlin and Amsterdam combined (£13.8bn).<sup>460</sup> Digital technology investment outside of London has increased in recent years, but this has still been skewed towards the ‘Golden Triangle’. This includes Oxford and Cambridge.

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<sup>455</sup> See *Financing Investment: Interim Report*, GFC Economics Ltd & Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, <http://labour.org.uk/wp-content/uploads/2017/12/Financing-Investment-Interim-Report.pdf>.

<sup>456</sup> See “Regional and sub-regional productivity in the UK: February 2018”, Office for National Statistics, February 7<sup>th</sup> 2018, <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/regionalandsubregionalproductivityintheuk/february2018>.

<sup>457</sup> Labour productivity is defined here as gross value added per hour worked.

<sup>458</sup> See “OECD Economic Surveys: United Kingdom”, OECD, October 2017, p. 41, <http://www.oecd.org/eco/surveys/United-Kingdom-2017-OECD-economic-survey-overview.pdf>.

<sup>459</sup> See “UK Technology Fast 50 2017”, Deloitte, <http://www.deloitte.co.uk/fast50/index.html>.

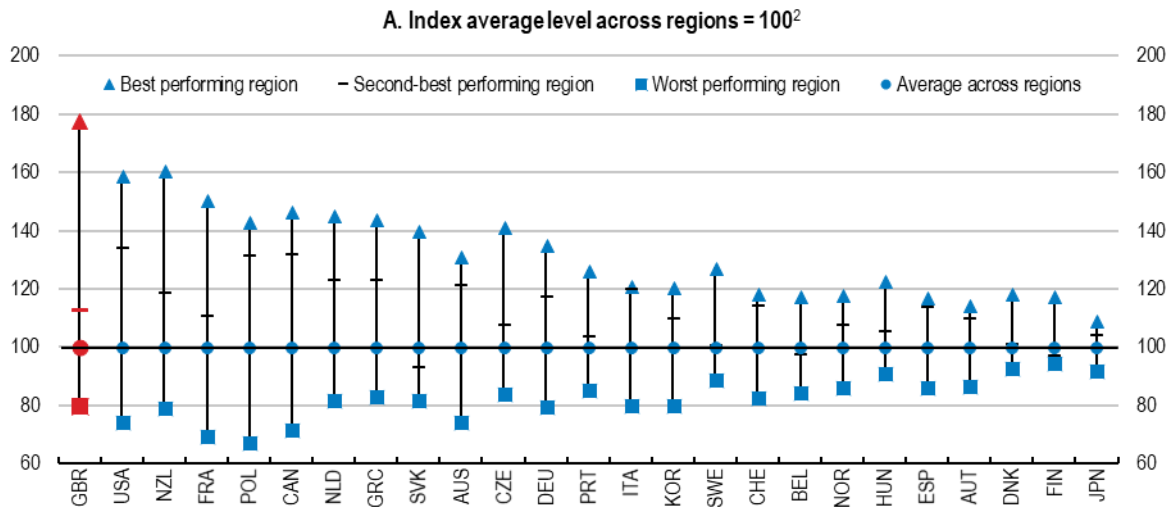
<sup>460</sup> See “TechNation 2017”, TechCity, p. 11, <https://technation.techcityuk.com/>.

Chart 7.1: Labour productivity (gross value added per hour worked) by NUTSI region, unsmoothed, current prices, 2016



Source: Office for National Statistics

Chart 7.2: Gross value added (GVA) per worker by region (at TL2 level), 2014



Source: OECD (2017), "Regional Economy", OECD Regional Statistics (database), April.

The Deloitte survey highlights the skilled workforce of London, access to research hubs and quality infrastructure, which continue to draw companies to the capital city, despite higher costs.<sup>461</sup>

When the Interim Report was published, London's lead over other regions in respect of employment growth was already clear. This lead has since been extended: employment growth in London

<sup>461</sup> Further evidence of regional disparities can be found in Appendix 4.

accelerated to 3.85% y/y in March, the fastest annual increase of any other region in England broken down by NUTS 1<sup>462</sup> (Table 7.A). This was faster than Wales, Scotland and Northern Ireland too.

London has seen a jump in employment of 28.4% since 2007 (Table 7.B).<sup>463</sup> The next biggest increase has occurred in the East, but the rise since 2007 (10.3%) is much smaller. Of the 2.997 million jobs created during this period, 1.05m have been in London (35.0%). More than half of the jobs have been created in London, the South East and the East (1.692 million, 56.5% of the total). These three regions account for 37.5% of the total UK 'working-age' population (16 & over).

Table 7.A<sup>464</sup>

<b>UK employment growth in March 2018, by region</b>	
<b>Region</b>	<b>% ch y/y</b>
UK	1.24
England	1.36
London	3.85
East	1.05
South West	1.23
West Midlands	3.80
South East	0.41
East Midlands	0.78
Yorkshire & the Humber	0.63
North East	1.13
North West	-1.15
Northern Ireland	2.87
Scotland	0.38
Wales	-0.40

Source: Office for National Statistics

Rapid employment growth in London dovetails with its strength in services (see Tables 7.C and 7.D).<sup>465</sup> However, it also underlines the critical importance of a strong regional policy, to create alternative

<sup>462</sup> Nomenclature of Territorial Units for Statistics (NUTS).

<sup>463</sup> Source: Office for National Statistics, Labour Force Survey, <https://www.ons.gov.uk/surveys/informationforhouseholdsandindividuals/householdandindividualsurveys/labourforceurveylfs>.

<sup>464</sup> Ibid.

<sup>465</sup> See "Estimating the value of service exports by destination from different parts of Great Britain: 2015", ONS, July 11<sup>th</sup> 2017, p. 3, <https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/articles/estimatingthevalueofserviceexportsabroadfromdifferentpartsoftheuk/2015>. The Office for National Statistics used employment figures in helping to estimate the regional breakdown of service sector exports. It noted: "For example, if there were £12.7 billion of UK-level service exports to the EU in the information and communication sector, and London

clusters. There is a risk that the dominance of London, the South East and the East may grow without a determined policy to rebalance the economy.

Table 7.B

<b>UK employment, by region</b>				
<b>Employment</b>	<b>Level (millions), 2007 average</b>	<b>Level (millions), March 2018</b>	<b>% change, 2007 average to March 2018</b>	<b>% change, 2007 average to Sep 2017 (unrevised table as used in Interim Report)</b>
UK	29.35	32.34	10.2	9.2
England	24.65	27.41	11.2	10.2
London	3.69	4.74	28.4	26.0
East	2.77	3.06	10.3	9.6
South West	2.53	2.78	9.8	7.3
West Midlands	2.52	2.74	8.7	6.0
South East	4.20	4.56	8.5	10.1
East Midlands	2.14	2.30	7.5	4.6
Yorkshire & the Humber	2.41	2.59	7.4	5.2
North East	1.16	1.23	6.3	6.4
North West	3.21	3.41	6.1	7.0
Northern Ireland	0.79	0.85	7.4	4.6
Wales	1.37	1.45	6.5	4.5
Scotland	2.54	2.63	3.4	4.2

Source: Office for National Statistics

As Gardiner et al observe, regional imbalances – between London and the rest of the economy in the UK – are not inevitable. Regional imbalances are at least partially caused by government action or inaction and should be corrected by appropriate intervention.<sup>466</sup>

Regional imbalances “may have distinctly negative consequences for national economic performance and welfare, consequences that even then need not lead to self-correcting adjustments and a move back toward a less spatially concentrated mode of economic growth.”<sup>467</sup> Indeed, “an economy so reliant on London and the South East is both wasteful and unstable”.<sup>468</sup>

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accounted for half of all employees across the UK in this sector, then London would be apportioned the regional service export value for information and communication to the EU of around £6.0 billion.”

<sup>466</sup> See “Spatially Unbalanced Growth in the British Economy”, Ben Gardiner, Ron Martin, Peter Sunley, and Peter Tyler, *Journal of Economic Geography*, Vol. 13, Issue 6, November 2013, pp. 889-928.

<sup>467</sup> *Ibid.* p. 902.

<sup>468</sup> See “Britain’s spatially unbalanced economy is both wasteful and unstable. The solution requires more than small-scale measures”, LSE Blogs, November 4<sup>th</sup> 2013, <http://blogs.lse.ac.uk/politicsandpolicy/britains-spatially-unbalanced-economy/>.

Table 7.C

**UK service sector exports by region,  
per capita, 2015 (£)**

<b>Region</b>	<b>Exports per capita</b>
Total	4271.9
London	14210.4
South East	4713.1
Scotland	3565.8
North West	3052.3
East of England	2392.0
South West	2131.5
Wales	1793.6
North East	1638.2
West Midlands	1627.6
Yorkshire and The Humber	1563.2
Northern Ireland	1553.4
East Midlands	1427.8

*Note: using population figures*

*Source: Office for National Statistics*

Table 7.D

**Share of UK service sector exports, 2015  
(%)**

<b>Region</b>	<b>Share (%)</b>
Total	100.0
London	45.8
South East	15.5
North West	8.0
Scotland	7.2
East of England	5.4
South West	4.4
West Midlands	3.4
Yorkshire and The Humber	3.1
East Midlands	2.5
Wales	2.1
North East	1.6
Northern Ireland	1.0

*Source: Office for National Statistics*

In sum, a more even dispersion of clusters would produce significant benefits, including increased productivity and a higher level of exports. Various papers have confirmed the potential gains, characterised as “significant agglomeration externalities”.<sup>469</sup>

In the UK, clusters in the creative industry have stimulated innovation in other industries.<sup>470</sup> Clusters of motor racing firms have yielded expertise in other fields, including energy.<sup>471</sup> Nevertheless, without a more effective regional policy, the benefits of clusters will be unevenly distributed. In the UK, de facto support of clustering in the Golden Triangle (without sufficient attention paid to the potential for clusters elsewhere) has resulted in damaging regional imbalances. This needs to be corrected.

#### An unambitious approach to clusters

The Government acknowledged the importance of clusters in its 2017 industrial strategy.<sup>472</sup> Universities are critical to developing “world class innovation clusters”.<sup>473</sup> Examples include Cambridge, Exeter, Glasgow and Oxford. The Government also announced a £115 million Strength in Places Fund to encourage regions “to build on their science and innovation strengths and develop stronger local networks.”<sup>474</sup>

This fund would “support collaborative programmes based on research and innovation excellence in places right across the UK which can demonstrate a strong impact on local productivity and enhance collaboration between universities, research organisations, businesses, local government and Local Enterprise Partnerships in England and relevant agencies in the devolved nations.”<sup>475</sup>

The Government identified key clusters through a series of Science and Innovation Audits.<sup>476</sup> It committed the British Business Bank to run a commercial investment programme to support the development of clusters outside of London.<sup>477</sup> It referenced ceramics in Stoke-on-Trent<sup>478</sup> and other creative industries.

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<sup>469</sup> See “Identifying Agglomeration Spillovers: Evidence from Winners and Losers of Large Plant Openings”, Michael Greenstone, Richard Hornbeck, and Enrico Moretti, *Journal of Political Economy*, Vol. 118, No. 3, June 2010, pp. 536–598.

<sup>470</sup> See “Creative Clusters and Innovation: Putting Creativity on the Map”, Caroline Chapain, Phil Cooke, Lisa De Propris, Stewart MacNeill, and Juan Mateos-Garcia, NESTA, November 2010, p. 42, [https://media.nesta.org.uk/documents/creative\\_clusters\\_and\\_innovation.pdf](https://media.nesta.org.uk/documents/creative_clusters_and_innovation.pdf).

<sup>471</sup> A good example is Anakata Wind Power Resources Limited with expert skills in aerodynamics, honed in Formula 1, and now in use for high performance blades in wind turbines.

<sup>472</sup> See “Industrial Strategy: Building a Britain fit for the future”, HM Government, November 27<sup>th</sup> 2017, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/664572/industrial-strategy-white-paper-print-ready-version.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/664572/industrial-strategy-white-paper-print-ready-version.pdf).

<sup>473</sup> *Ibid.* p. 84.

<sup>474</sup> *Ibid.* p. 85.

<sup>475</sup> *Ibid.*

<sup>476</sup> *Ibid.* pp. 86-87.

<sup>477</sup> *Ibid.* p. 180.

<sup>478</sup> *Ibid.* p. 224.

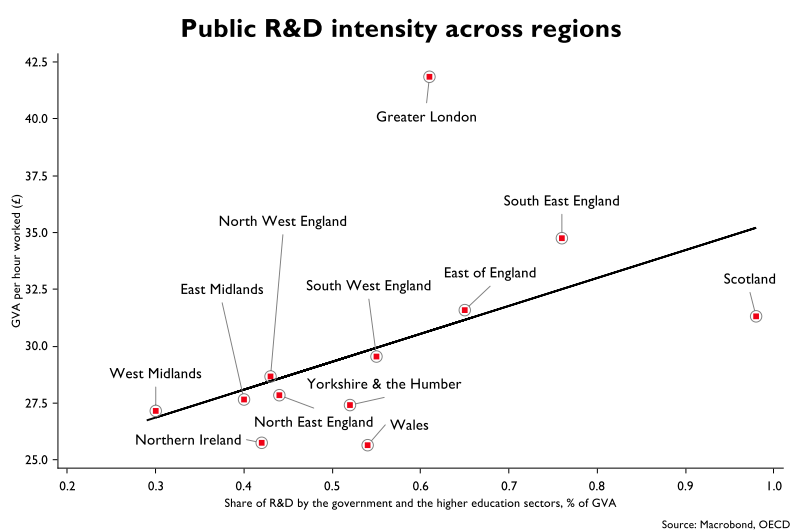
These are small steps in the right direction. However, the resourcing of ‘cluster policy’ is limited. There is a lack of vision about how clusters fit into the start-up and scale-up of businesses. The absence of ambition should prompt a fresh look at how clusters can be created and developed.

### Successful cluster policy: what more is needed?

Regional public research & development (R&D) expenditures display a strong positive correlation with productivity (Chart 7.3).<sup>479</sup> Areas where productivity has lagged have received a much smaller share of public R&D. According to the OECD, R&D can “help the absorption of knowledge and business practices”.<sup>480</sup> As such, “the least productive regions should have priority in applied R&D, while support for basic research should be directed to the centres of excellence.”<sup>481</sup>

The gap in regional research & development (R&D) spending is striking.<sup>482</sup> The South East, the East and London are by far the biggest recipients of R&D, accounting for 52.0% of the total in 2016 (Table 7.E).<sup>483</sup> This covers government, higher education and business sector spending. London and the South East receive the largest share of government funds for R&D (Table 7.F).<sup>484</sup>

Chart 7.3



<sup>479</sup> Source: Macrobond, OECD.

<sup>480</sup> See “OECD Economic Surveys: United Kingdom”, OECD, October 2017, p. 35, <http://www.oecd.org/eco/surveys/United-Kingdom-2017-OECD-economic-survey-overview.pdf>

<sup>481</sup> Ibid.

<sup>482</sup> See “UK gross domestic expenditure on research and development: 2016”, Office for National Statistics, March 15<sup>th</sup> 2018, <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukgrossdomesticexpenditureonresearchanddevelopment/2016>.

<sup>483</sup> Source: Office for National Statistics.

<sup>484</sup> Ibid.

Table 7.E  
**Share of UK R&D expenditure by region,  
 2016 (%)**

<b>Region</b>	<b>Share (%)</b>
<b>England</b>	<b>88.85</b>
South East	20.12
East of England	17.09
London	14.79
North West	9.55
West Midlands	8.40
South West	6.52
East Midlands	6.26
Yorkshire and the Humber	4.23
North East	1.90
<b>Scotland</b>	<b>7.04</b>
<b>Wales</b>	<b>2.16</b>
<b>Northern Ireland</b>	<b>1.95</b>

Source: Office for National Statistics

Table 7.F  
**Share of government R&D expenditure by  
 region, 2016 (%)**

<b>Region</b>	<b>Share (%)</b>
<b>England</b>	<b>91.16</b>
South East	27.90
London	20.76
South West	10.54
East of England	10.27
North West	7.55
East Midlands & West Midlands*	6.63
Yorkshire and the Humber	5.34
North East	2.16
<b>Scotland</b>	<b>7.50</b>
<b>Wales</b>	<b>0.69</b>
<b>Northern Ireland</b>	<b>0.64</b>

\* Regional data have been combined due to confidentiality.

Source: Office for National Statistics



Unsurprisingly, London has enjoyed far more success with scale-ups. Access to finance and a deeper pool of skilled workers has been critical. According to the ScaleUp Institute's 2017 review, the City of London alone had 124 scale-ups; Westminster was home to 145 scale-ups between 2011 and 2017. This compares to 68 in Leeds and 50 in Birmingham over this period.<sup>485</sup>

#### Joint government and private funding of clusters

Current levels of R&D support for the regions are inadequate. A more coordinated approach to regional development is needed. The proposal for an "economic policy" hub in Birmingham will help drive such an agenda.<sup>486</sup>

Regional offices for the Royal Bank of Scotland/National Investment Bank, Applied Sciences Investment Fund and Bank of England will aid the growth of clusters. The addition of specialist Royal Bank of Scotland SME branches across the country will further facilitate coordination.

The Royal Bank of Scotland/National Investment Bank and the Applied Sciences Investment Fund will need to work with the Bank of England, to encourage venture capital firms to locate across the regions.

#### Upskilling and capacity-building of local authorities

Properly funded Local Enterprise Partnerships (LEPs) should work alongside the regional offices of the Applied Sciences Investment Fund and the Royal Bank of Scotland/National Investment Bank. Local authorities have come under severe budget constraints.<sup>487</sup>

Economic development is being sacrificed as local authorities struggle to meet their statutory requirements.<sup>488</sup> Local Enterprise Partnerships are left understaffed and underequipped, a point made by the National Audit Office:

"To oversee and deliver Growth Deal projects effectively, LEPs need access to staff with expertise in complex areas such as forecasting, economic modelling, and monitoring and evaluation. Only 5% of LEPs considered the resources available to them to be sufficient to meet the expectations placed on them by government."<sup>489</sup>

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<sup>485</sup> See "Annual ScaleUp Review 2017", ScaleUp Institute, November 2017, p. 29,

[http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute\\_Annual\\_ScaleUp\\_Review\\_2017.pdf](http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute_Annual_ScaleUp_Review_2017.pdf).

<sup>486</sup> See *Financing Investment: Interim Report*, GFC Economics Ltd & Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, <http://labour.org.uk/wp-content/uploads/2017/12/Financing-Investment-Interim-Report.pdf>.

<sup>487</sup> Local Enterprise Partnerships are voluntary partnerships between local authorities and local private sector businesses.

<sup>488</sup> See "Local Enterprise Partnerships", National Audit Office, March 23<sup>rd</sup> 2016, p. 8, <https://www.nao.org.uk/wp-content/uploads/2016/03/Local-Enterprise-Partnerships.pdf>.

<sup>489</sup> *Ibid.*

There is an over-arching need for skills development. Local Enterprise Partnerships need to be supported by the Royal Bank of Scotland/National Investment Bank and the Applied Sciences Investment Fund.

The National Audit Office has highlighted the lack of evidence detailing the impact of funds provided by the government.<sup>490</sup> Funding will need to be matched by a relentless focus on data in order to measure the effective rate of return. This can build upon the work undertaken by the ScaleUp Institute in developing a 'ScaleUp Map' and 'ScaleUp Index'.<sup>491</sup>

The ScaleUp Institute's report underlines the need for more timely data to track how businesses are developing across the country.<sup>492</sup> The excellent 2017 report uses year 2015 data from the Office for National Statistics for its longitudinal assessment of regional 'local scaleup ecosystems'.<sup>493</sup>

More accurate data should be sourced at the Local Enterprise Partnership level with UK Research and Innovation, the Applied Sciences Investment Fund and the Royal Bank of Scotland/National Investment Bank all playing a role.

The 2017 Annual Review by the ScaleUp Institute<sup>494</sup> suggests that investment in educational institutions – as well as proximity to university centres – is the key to business growth.

A lack of patient, long-term capital remains an issue in the UK. There has been more success in the early stage phase of a company. Funding for the scale-up stage is proving more difficult. The number and size of financing rounds is often insufficient.

As the ScaleUp Institute noted, "the UK must continue to expand its overall pool of investors, notably institutional investors, willing and able to provide ongoing rounds of follow-on or scaleup finance to ensure there is a connected funding environment from seed through to IPO."<sup>495</sup> Venture Capital Trust financing tends to exit early in the investment cycle.<sup>496</sup>

This in part reflects a lack of depth in domestic capital markets. A further push is needed to crowd-in institutional investment. The Enterprise Capital Funds (ECF) programme of the British Business Bank

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<sup>490</sup> Ibid.

<sup>491</sup> See "Annual ScaleUp Review 2017", ScaleUp Institute, November 2017, p. 130, [http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute\\_Annual\\_ScaleUp\\_Review\\_2017.pdf](http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute_Annual_ScaleUp_Review_2017.pdf).

<sup>492</sup> Ibid. p. 13.

<sup>493</sup> Ibid. pp. 83-124.

<sup>494</sup> See "Annual ScaleUp Review 2017", ScaleUp Institute, November 2017, [http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute\\_Annual\\_ScaleUp\\_Review\\_2017.pdf](http://www.scaleupinstitute.org.uk/wp-content/uploads/2017/11/ScaleUpInstitute_Annual_ScaleUp_Review_2017.pdf).

<sup>495</sup> Ibid. p. 147.

<sup>496</sup> See "The Size Conundrum – Why are UK Startups Failing to Scale", Forbes, May 15<sup>th</sup> 2017, <https://www.forbes.com/sites/trevorclawson/2017/05/15/the-size-conundrum-why-are-uk-startups-failing-to-scale/#45ebeeel3b59>.

has made a start. Including third-party funding, the ECF has committed over £1 billion.<sup>497</sup> The venture capital catalyst programme established in 2013 has, as of March 31<sup>st</sup> 2017, invested £56.5 million. This is supportive, but not enough. Foreign investment into high growth companies in 2017 accounted for £5.87 billion out of a total of £8.27 billion for all venture capital financing.<sup>498</sup> Foreign direct investment is preferable to a significant funding gap. Nevertheless, it is a reminder of the lack of depth to UK capital markets.

In the US, \$21.1 billion was invested in venture capital backed start-ups in Q1.<sup>499</sup> North America and Asia are becoming the centres for ‘mega-rounds’ (deals over \$100 million) and unicorns (firms with valuations of \$1 billion or more).<sup>500</sup> Artificial intelligence funding in the US during Q1 2018 was \$1.9 billion.<sup>501</sup> In all of 2017, artificial intelligence investment in the UK was £415 million.<sup>502</sup>

Many of the start-ups in the UK are adopting foreign technologies rather than developing their own core capabilities. The UK needs to strengthen its domestic venture capital markets to stay competitive globally. Equity financing to the regions should be a priority. This would itself improve business and financial management skills for firms seeking capital to scale up.

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<sup>497</sup> See “The Enterprise Capital Funds programme”, British Business Bank, <https://british-business-bank.co.uk/ourpartners/enterprise-capital-funds/>.

<sup>498</sup> See “The Scaleup Index 2017”, ScaleUp Institute and Beauhurst, 2017, p. 21, [https://about.beauhurst.com/wp-content/uploads/documents/The-Deal-2017-Web.pdf?utm\\_medium=email&hsenc=p2ANqtz-8jxEtqO\\_sPXSzAQ7Cmf5t2xt9hPqfB6QJHgC3cKweZil0aB0gE4cetqt9CfNbg\\_8\\_R-Gr5hWBFXxCfnaoRQLRftOdGIA&hsmi=57921629&utm\\_content=57921629&utm\\_source=hs\\_automation&hsCtaTracking=a33e9f69-404d-409c-be2a-f19ec979b64a%7Ca8a4098c-c5e3-41a3-86c6-43409fa8dd30](https://about.beauhurst.com/wp-content/uploads/documents/The-Deal-2017-Web.pdf?utm_medium=email&hsenc=p2ANqtz-8jxEtqO_sPXSzAQ7Cmf5t2xt9hPqfB6QJHgC3cKweZil0aB0gE4cetqt9CfNbg_8_R-Gr5hWBFXxCfnaoRQLRftOdGIA&hsmi=57921629&utm_content=57921629&utm_source=hs_automation&hsCtaTracking=a33e9f69-404d-409c-be2a-f19ec979b64a%7Ca8a4098c-c5e3-41a3-86c6-43409fa8dd30).

<sup>499</sup> See “MoneyTree Report Q1 2018”, PwC/CB Insights, Q1 2018, p. 6, [https://www.pwc.com/us/en/technology/assets/MoneyTree\\_Report\\_2018\\_Q1\\_FINAL.pdf](https://www.pwc.com/us/en/technology/assets/MoneyTree_Report_2018_Q1_FINAL.pdf).

<sup>500</sup> Ibid.

<sup>501</sup> Ibid. p. 16.

<sup>502</sup> See “The Scaleup Index 2017”, ScaleUp Institute and Beauhurst, 2017, p. 31, [https://about.beauhurst.com/wp-content/uploads/documents/The-Deal-2017-Web.pdf?utm\\_medium=email&hsenc=p2ANqtz-8jxEtqO\\_sPXSzAQ7Cmf5t2xt9hPqfB6QJHgC3cKweZil0aB0gE4cetqt9CfNbg\\_8\\_R-Gr5hWBFXxCfnaoRQLRftOdGIA&hsmi=57921629&utm\\_content=57921629&utm\\_source=hs\\_automation&hsCtaTracking=a33e9f69-404d-409c-be2a-f19ec979b64a%7Ca8a4098c-c5e3-41a3-86c6-43409fa8dd30](https://about.beauhurst.com/wp-content/uploads/documents/The-Deal-2017-Web.pdf?utm_medium=email&hsenc=p2ANqtz-8jxEtqO_sPXSzAQ7Cmf5t2xt9hPqfB6QJHgC3cKweZil0aB0gE4cetqt9CfNbg_8_R-Gr5hWBFXxCfnaoRQLRftOdGIA&hsmi=57921629&utm_content=57921629&utm_source=hs_automation&hsCtaTracking=a33e9f69-404d-409c-be2a-f19ec979b64a%7Ca8a4098c-c5e3-41a3-86c6-43409fa8dd30).

## Appendix I

### Two opposing ways of conceiving successful clusters

There are a variety of ways to develop successful clusters. However, it is helpful to draw a distinction between two opposing views. Special Economic Zones (with low or no rates of tax) and deregulated regions can invite business clustering and produce innovation and growth. There is a related, hands-off view that governments should not act in any way to encourage or discourage clusters.<sup>503</sup>

An alternative view believes that the development of clusters requires more intervention by government and other stakeholders. Government decisions in the realm of infrastructure, education, housing, technology, and other policy areas can shape the formation of clusters. Governments can develop clusters through local and national strategies.<sup>504</sup> The development of clusters might be part of a mission-oriented role for government.<sup>505</sup> Government may also have to play a role to monitor, and minimise, the effects of clustering on inequality.<sup>506</sup> This is the ‘hands-on’ view of clusters.

The industrial policy proposals in Chapter 5 adopt a hands-on approach. The hands-off approach – in particular the effectiveness of Special Economic Zones – has been widely criticised.<sup>507</sup>

### Proposals from the North East Automotive Alliance

Paul Butler of the North East Automotive Alliance submitted a proposal following the release of the Government’s industrial strategy green paper. Of the £2.4 billion spent in the UK on research & development in the car industry, just £22 million was spent in the North East. However, the North East accounts for 30% of UK car production.<sup>508</sup>

The Government’s industrial strategy has been welcomed, but, Mr Butler warns, there are gaps that need addressing. The North East Automotive Alliance argues for a high level of coordination between all levels of business support to ensure a “cohesive strategy at regional and sub regional levels.”<sup>509</sup> This

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<sup>503</sup> See “Clusters of Entrepreneurship and Innovation”, Aaron Chatterjee, Edward Glaeser and William Kerr, April 2013, Harvard Business School, p. 26, [http://www.hbs.edu/faculty/Publication%20Files/130424-CGK-IPE\\_45be2057-0f20-4dc2-98d4-e422198bd55c.pdf](http://www.hbs.edu/faculty/Publication%20Files/130424-CGK-IPE_45be2057-0f20-4dc2-98d4-e422198bd55c.pdf): “...it is not obvious that government policy can create entrepreneurship”.

<sup>504</sup> See “Creative Clusters and Innovation: Putting Creativity on the Map”, Caroline Chapain, Phil Cooke, Lisa De Propris, Stewart MacNeill, and Juan Mateos-Garcia, NESTA, November 2010, pp. 43-44, [https://media.nesta.org.uk/documents/creative\\_clusters\\_and\\_innovation.pdf](https://media.nesta.org.uk/documents/creative_clusters_and_innovation.pdf).

<sup>505</sup> See “Patient strategic finance: opportunities for state investment banks in the UK”, Mariana Mazzucato and Laurie Macfarlane, UCL Institute for Innovation and Public Purpose, December 2017, p. 2, [https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/iipp\\_wp\\_2017-05\\_patient\\_strategic\\_finance\\_-\\_opportunities\\_for\\_state\\_investment\\_banks\\_in\\_the\\_uk.pdf](https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/iipp_wp_2017-05_patient_strategic_finance_-_opportunities_for_state_investment_banks_in_the_uk.pdf).

<sup>506</sup> The possibility of clusters creating inequality, especially where there is a boom in so-called creative industries, is raised in “The Winners and Losers of Economic Clustering”, CityLab, January 6<sup>th</sup> 2016, <https://www.citylab.com/life/2016/01/creativity-clustering-us-cities/422718/>.

<sup>507</sup> See, in particular, *Beating the Odds: Jump-Starting Developing Economies*, Justin Yifu Lin and Celeste Monga, 2017, Princeton University Press.

<sup>508</sup> See “Written evidence submitted by the North East Automotive Alliance”, NEAA, October 2017, <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/science-budget-and-industrial-strategy/written/72256.html>.

<sup>509</sup> Ibid.

would help to provide a more integrated level of business support, which can adjust for regional and individual company nuances.

The North East Automotive Alliance proposed a framework for this business support network. The Sector Deals and National Trade Associations would lay out the strategies for that sector (in this example, automotive). This would be delivered by Local Enterprise Partnerships (LEPs). LEPs would be responsible for directing resources to the needs of the regions. The LEPs would also develop cross-sector engagement (in this example, automotive and chemicals).

Mr Butler suggests that there must be a high level of coordination between funding mechanisms, so that the budgets of companies are focussed on activities that provide the greatest opportunities for the country. The integration of the Applied Sciences Investment Fund with UK Research and Innovation will improve the focus on start-ups and commercialisation. This will be a separate fund from any government support for foundational research and development.

Mr Butler states that funding in early stage research and through the so-called ‘valley of death’<sup>510</sup> is vital. The distribution of funds must also take into account the potential returns for industry.

Financial support must be available to “take research and innovation through to a fully commercial level”.<sup>511</sup> Mr Butler points out that in the manufacturing sector, solutions are not tested to industry standards: this prevents adoption of the latest technologies and processes.

Mr Butler also highlights the need for more ‘risky’ research, particularly in manufacturing. In this sector, firms operate at technological readiness levels (TRL) of 8 and 9, the highest two rankings. Companies look to solutions that are proven to industry standards and offer relatively quick payback (1-1.5 years). Mr Butler argues that this undermines the competitiveness of UK companies, as well as having a detrimental effect on productivity.

Mr Butler touts the benefits of CESAM’s (Centre of Excellence in Sustainable Advanced Manufacturing) framework for a more open innovation model. Regional centres would act as conduits through which companies can gain access to national expertise. Solution (research) providers “get access to industry led challenges to information research and innovation.” Examples of solution providers include Catapult Centres, universities and Innovate UK. This model is similar to the framework proposed in this report.

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<sup>510</sup> This is a term used to describe the gap between research and its successful (i.e. commercial) innovation.

<sup>511</sup> See “Written evidence submitted by the North East Automotive Alliance”, NEAA, October 2017, <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/science-budget-and-industrial-strategy/written/72256.html>.

Mr Butler claims that there needs to be greater focus on *manufacturing* research & innovation, as opposed to *product* research & innovation. The UK has tended to focus on the latter.

Last but not least, Mr Butler also warns that the North East has a poor track-record in attracting public sector funding. According to the Office for National Statistics figures on R&D expenditure across the country, the UK government spent £47 million in the North East in 2016.<sup>512</sup> This was a paltry 2.2% of overall government R&D expenditure across the UK. Only Wales (0.7%) and Northern Ireland (0.6%) had lower shares (Table 7.F).<sup>513</sup>

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<sup>512</sup> See “UK gross domestic expenditure on research and development: 2016”, Office for National Statistics, March 15<sup>th</sup> 2018, <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukgrossdomesticexpenditureonresearchanddevelopment/2016>.

<sup>513</sup> Ibid. p. 20.

## Appendix 2 – UK trade balance by good

Table 7.G

<b>Trade balance by good, Q4 2017</b>	
<b>Good</b>	<b>£ bn, 4-quarter moving total</b>
Total	-135.58
Agriculture, forestry & fishing	-7.90
Mining & quarrying	-6.05
Coal & lignite	-0.84
Crude petroleum & natural gas	-2.61
Natural gas	-6.64
Metal ores	-1.64
Other mining & quarrying products	-0.96
Manufactured products	-127.88
Food products	-16.32
Beverages	1.23
Distilled alcoholic beverages	5.09
Wine	-3.40
Other beverages	-0.11
Tobacco products	-1.56
Textiles	-2.93
Clothing	-12.55
Leather & related products	-5.31
Wood & prod of wood, cork, straw & plaiting mat	-4.07
Paper & paper products	-4.23
Printing & recording services	0.01
Coke & refined petroleum products	-7.07
Chemical & chemical products	-0.95
Pharmaceutical products & preparations	-2.69
Rubber & plastic products	-4.80
Rubber products	-2.01
Plastic products	-2.79
Other non-metallic mineral products	-2.50
Glass & glass products	-0.96
Other	-1.24
Basic metals	-5.86
Basic iron steel & ferro-alloys	-0.94
Non-cast steel tubes, pipes & hollow profiles	-0.77
Other products of the first processing of steel	-0.25
Basic precious & other non-ferrous metals	-3.88
Cast iron & steel tubes & pipes	-0.03
Fabricated metal products	-4.32
Structural metal products	-0.72
Steam generators & nuclear reactors	-0.62
Tanks, reservoirs & containers of metal	-0.08
Weapons & ammunition	0.33
Cutlery, tools & general hardware	-1.71

Other fabricated metal products	-1.52
Computer, electronic & optical products	-23.95
Electronic components & boards	-1.80
Computers & peripherals	-8.40
Communication equipment	-10.47
Consumer electronics	-4.42
Measuring, testing & navigating equip; watches & clocks	0.93
Irradiation, electromedical & electrotherapeutic	0.31
Optical instruments & photographic equipment	-0.13
Magnetic & optical media	0.02
Electrical equipment	-9.18
Electric motors, & electricity distrib & control	-1.08
Batteries & accumulators	-0.83
Wiring & wiring devices	-1.64
Electric lighting equipment	-1.73
Domestic appliances	-4.03
Other electrical equipment	0.12
Machinery & equipment N.E.C	-3.08
General-purpose machinery	-2.10
Other general-purpose machinery	-1.89
Agriculture & forestry machinery	-0.15
Metal forming machinery & machine tools	-0.24
Other special-purpose machinery	1.28
Motor vehicles, trailers & semi-trailers	-13.96
Motor vehicles	-4.62
Bodies for motor vehicles, trailers & semi-trailers	-0.60
Parts & accessories for motor vehicles	-8.74
Other transport equipment	5.53
Ships, boats & floating structures	-1.10
Railway locomotives & rolling stock	-1.45
Air & spacecraft & related machinery	9.30
Military fighting vehicles	0.01
Transport equipment N.E.C	-1.24
Furniture	-5.17
Other manufactured goods	-4.16
Jewellery, bijouterie & related articles	1.08
Musical instruments	-0.17
Sports goods	-0.55
Games & toys	-1.57
Medical & dental instruments & supplies	-2.03
Manufactured goods N.E.C	-0.93
Electricity, gas, steam & air conditioning	-0.68
Waste	2.70
Information & communication services	1.09
Professional, scientific & technical services	0.08
Arts, entertainment & recreation services	3.06

Source: Office for National Statistics



### Appendix 3 – UK trade deficit to be revised lower?

The Office for National Statistics has released provisional estimates of substantial revisions to the trade balance for goods and for services, for 1997 to 2016 (Table 7.H).<sup>514</sup> The deficit for goods & services has (provisionally) been cut by £9.8 billion. These changes will be introduced formally into the balance of payments (BoP) on June 29<sup>th</sup> 2018.

The Office for National Statistics has “made improvements to methods used to estimate net spread earnings, which feed into exports of services”.<sup>515</sup> This was the main driver of the revision to the deficit for 2016:

“Some companies make a return by trading in financial assets. They buy assets at a price that is typically lower than the prevailing market price and sell them at a price that is typically above the market price. These margins together are referred to as net spread earnings. The majority of trading that generate net spread earnings is with the rest of the world sector”.<sup>516</sup>

The revisions to the data also reflect the first phase of developments related to the new trade in goods system adopted by the Office for National Statistics. This relies on the delivery of new data from Her Majesty’s Revenue and Customs.<sup>517</sup>

It should be stressed: these revisions are positive, as they will reinforce a recent improvement in the UK current account deficit. However, it is worth noting: the nature of these revisions – heavily weighted to the service sector – underlines the problem of regional imbalances.

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<sup>514</sup> See “National Accounts articles: UK trade data impact assessment from new developments, 1997 to 2016”, Office for National Statistics, May 8<sup>th</sup> 2018, <https://www.ons.gov.uk/releases/nationalaccountsarticlesuktradedataimpactassessmentfromnewdevelopments1998to2016>.

<sup>515</sup> Ibid. p. 2.

<sup>516</sup> Ibid. p. 12.

<sup>517</sup> Ibid. pp. 7-8. “HM Revenue and Customs (HMRC) is the main source for our trade in goods data, delivering administrative data each month collected on an overseas trade statistics (OTS) basis; this measures the physical movement of goods in and out of the UK. Balance of payments (BoP) adjustments are then applied to the data so that they are on a change of economic ownership basis. In some instances, goods change economic ownership but do not leave or enter the UK, while not all goods that leave or enter the UK represent a change of economic ownership.

One source of improvements to our trade in goods data is a new delivery of data from HMRC covering the period 1998 to the present. Prior to a change in legislation on 1 May 2016, HMRC provided OTS data on a general trade basis, which includes all merchandise crossing the national boundary of the UK, including goods imported into and exported from customs warehouses and free zones. Imported goods are recorded whether or not at the time of importation they are intended for use in the UK or for re-export.

For UK trade data to be published on a BoP basis, adjustments were applied to adjust the data onto a special trade basis, where goods imported into customs warehouses and free zones are only recorded once they are removed and enter free circulation or certain customs procedures. Delivery of new data from HMRC that includes actual data for this adjustment enables us to remove our estimates; providing a better estimation of special trade data”.

Table 7.H

**Provisional revisions to current price  
total trade balance (£ bn)**

Year	Trade balance	Goods	Services
1997	0.8	0.8	0.0
1998	1.1	1.1	0.0
1999	1.2	1.2	0.0
2000	-0.6	-0.7	0.0
2001	-1.2	-1.3	0.2
2002	-0.3	-0.4	0.1
2003	0.0	0.1	0.0
2004	0.8	0.6	0.2
2005	0.6	0.5	0.1
2006	0.9	0.9	0.0
2007	3.0	1.3	1.8
2008	6.1	2.7	3.3
2009	5.1	1.1	4.0
2010	6.1	1.6	4.5
2011	6.7	0.4	6.3
2012	7.8	2.0	5.8
2013	6.3	0.8	5.5
2014	7.2	1.1	6.1
2015	5.4	0.8	4.6
2016	9.8	2.8	6.9

Source: Office for National Statistics

## Appendix 4

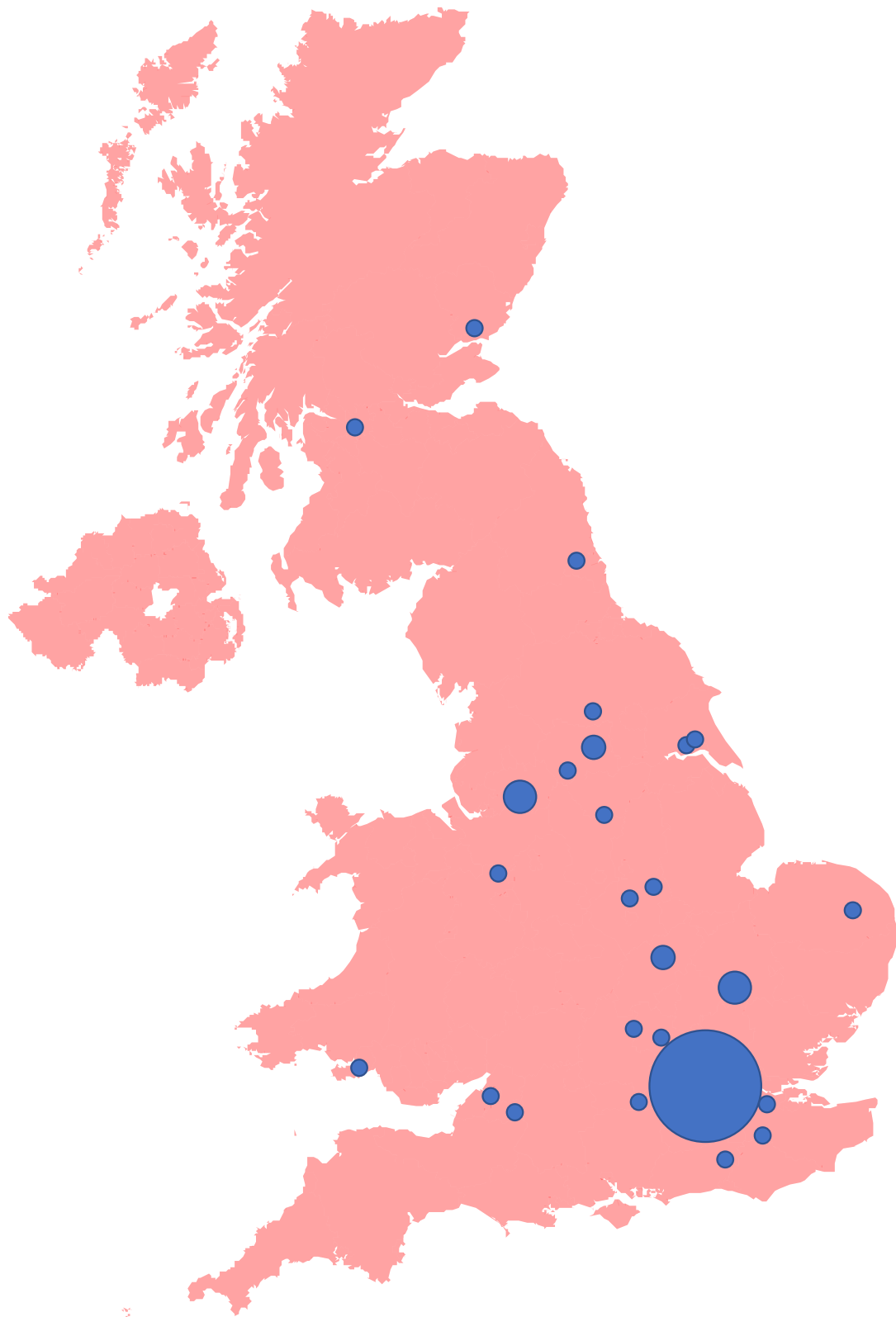
The following are a series of cluster maps that highlight the concentration of technology companies around London and the South East.

The first set of maps (in red) are based on the results of the Deloitte Technology Fast500 EMEA 2017 report.<sup>518</sup> The maps show the location of the UK companies included in the top 500 fastest growing companies across the EMEA region, broken down by sector.

The second set of maps (in blue) are based on a series of rankings compiled by GFC Economics from a range of sources.

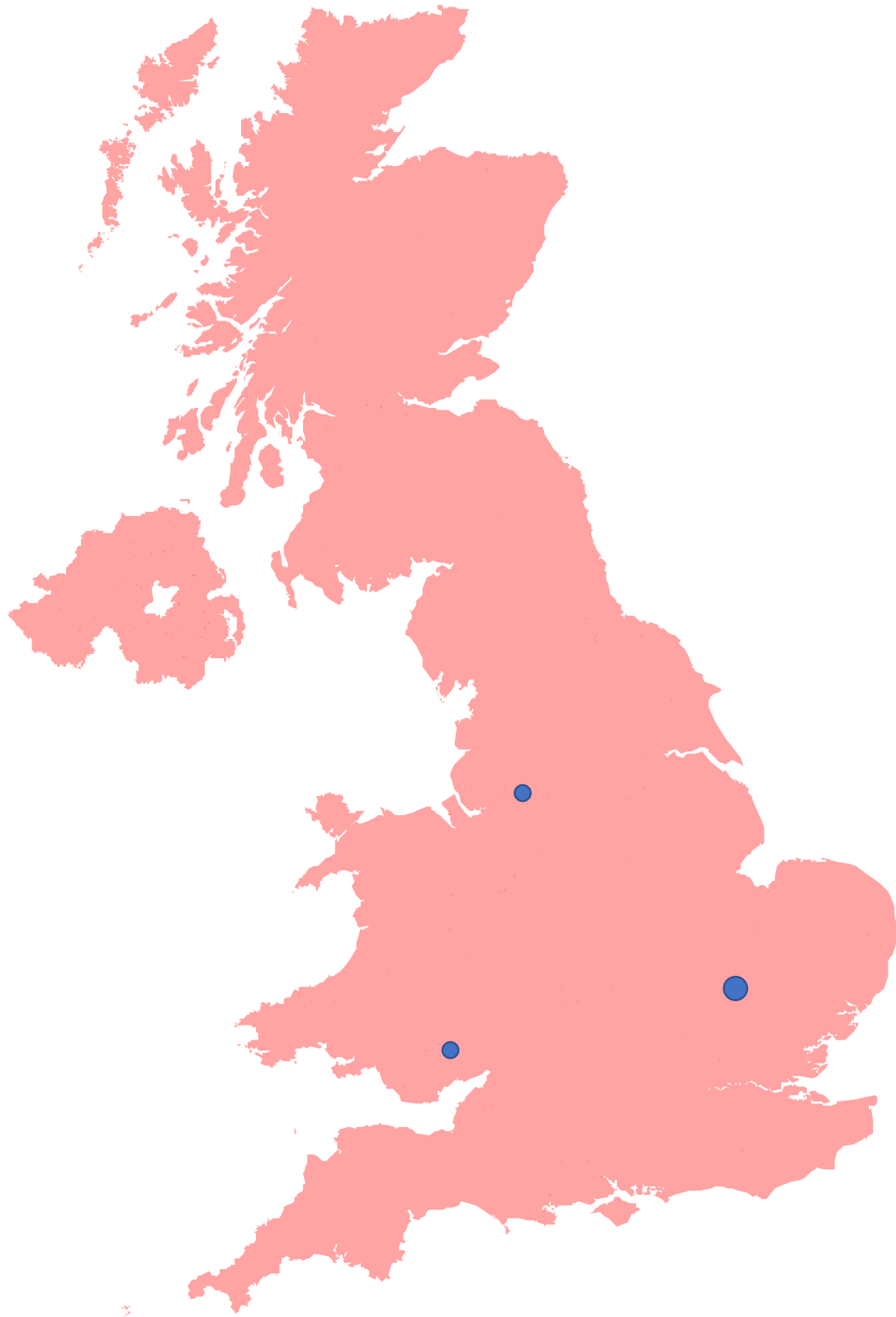
<sup>518</sup> See “Fast 500 EMEA: 2017 UK winners”, Deloitte, 2017, <http://www.deloitte.co.uk/fast50/winner/2017/fast-500-emea/>.

Figure 7.1: UK software companies in the Deloitte fast 500 EMEA, 2017<sup>519</sup>



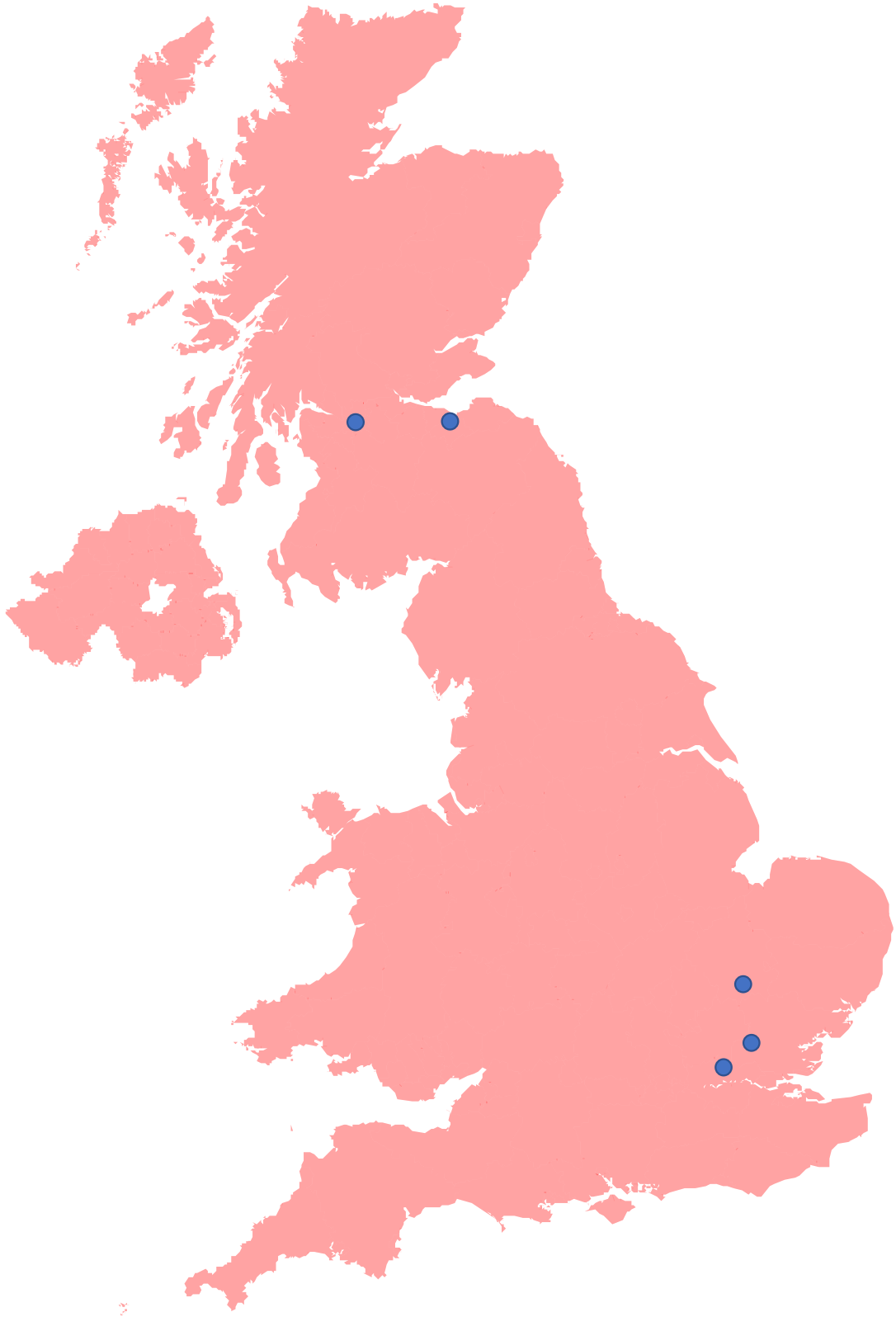
<sup>519</sup> See “Fast 500 EMEA: 2017 UK winners”, Deloitte, 2017, <http://www.deloitte.co.uk/fast50/winners/2017/fast-500-emea/>.

Figure 7.2: UK communications companies in the Deloitte fast 500 EMEA, 2017<sup>520</sup>



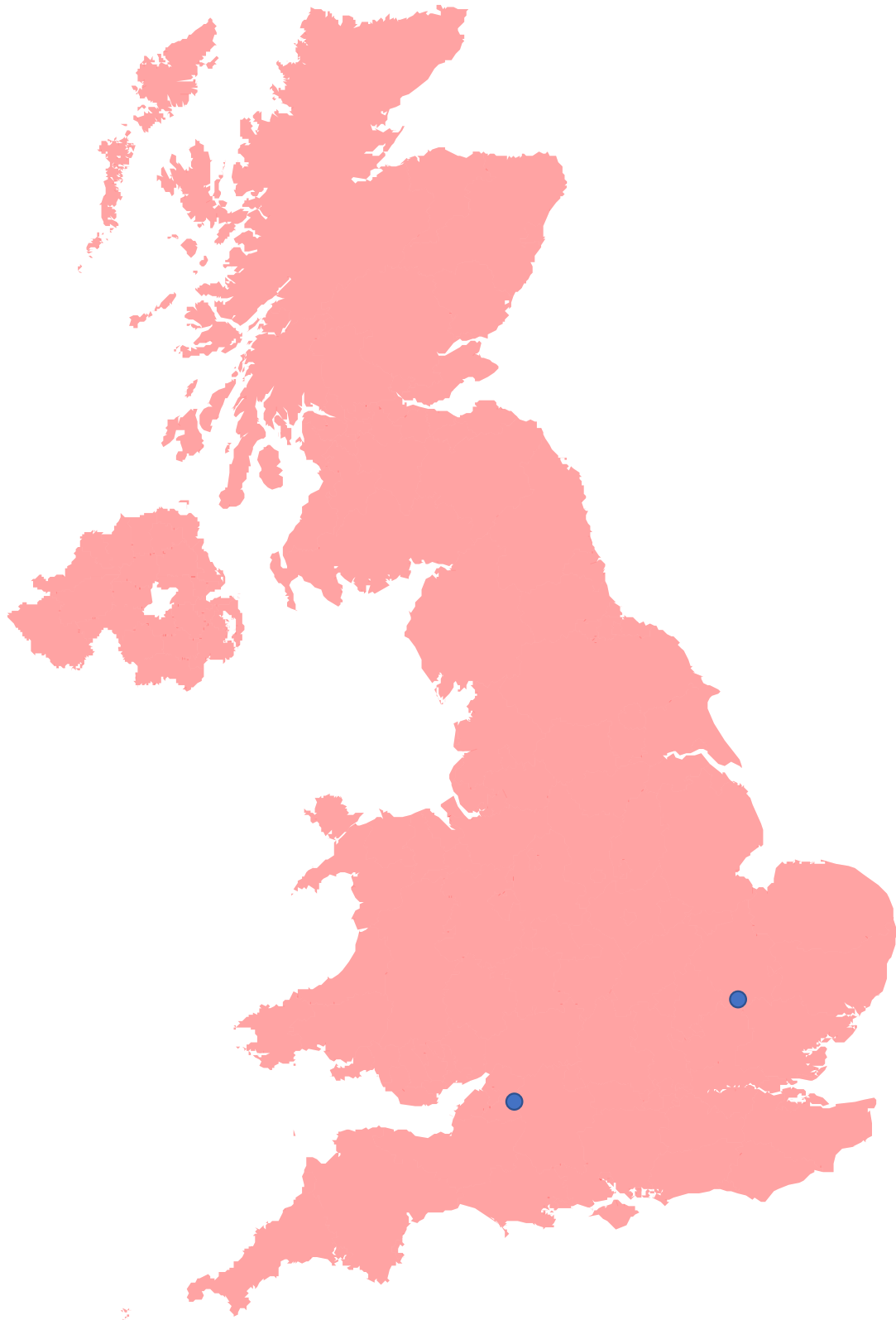
<sup>520</sup> See “Fast 500 EMEA: 2017 UK winners”, Deloitte, 2017, <http://www.deloitte.co.uk/fast50/winners/2017/fast-500-emea/>.

Figure 7.3: UK hardware companies in the Deloitte fast 500 EMEA, 2017<sup>521</sup>



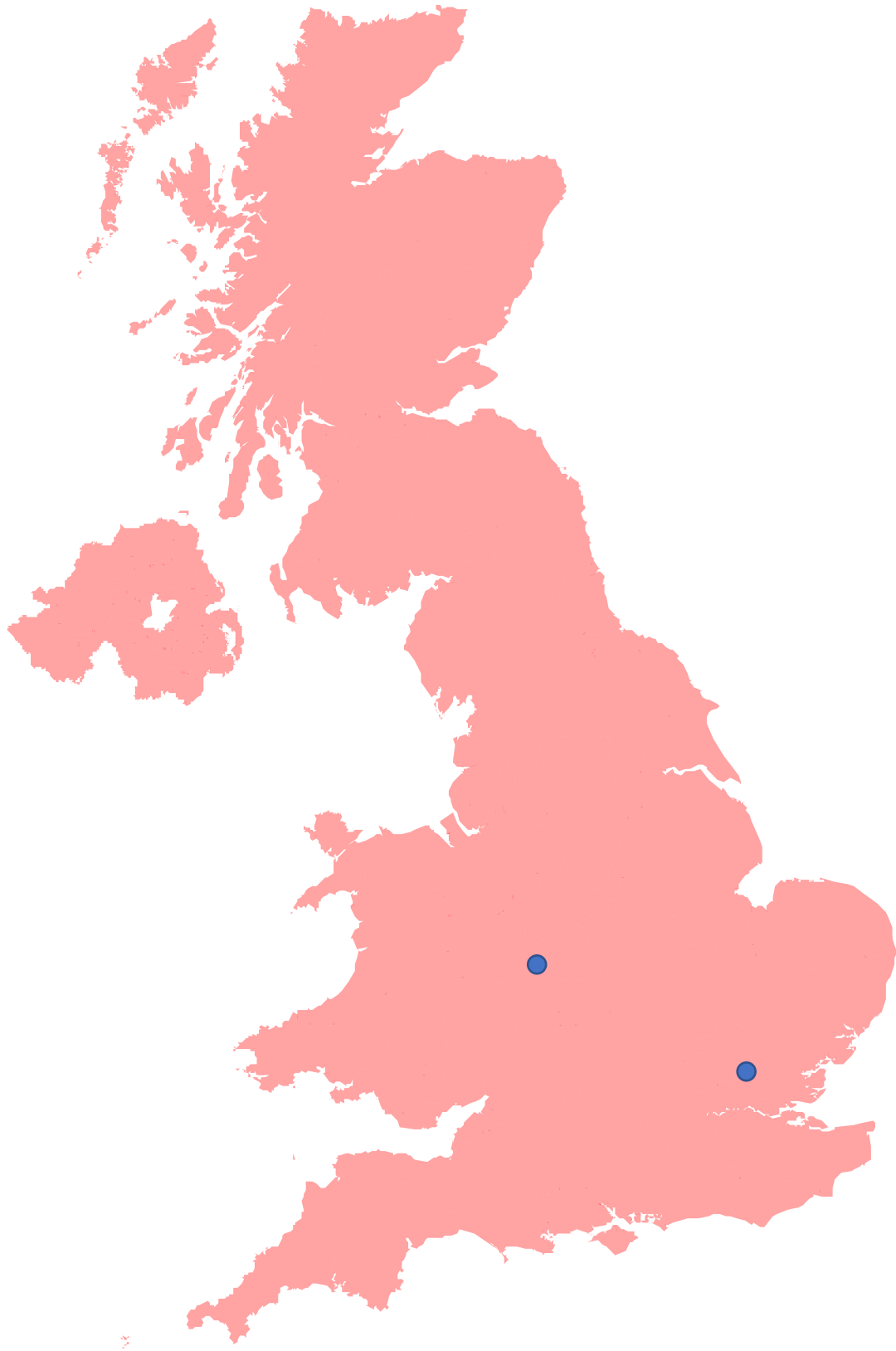
<sup>521</sup> See “Fast 500 EMEA: 2017 UK winners”, Deloitte, 2017, <http://www.deloitte.co.uk/fast50/winners/2017/fast-500-emea/>.

Figure 7.4: UK life sciences companies in the fast 500 EMEA, 2017<sup>522</sup>



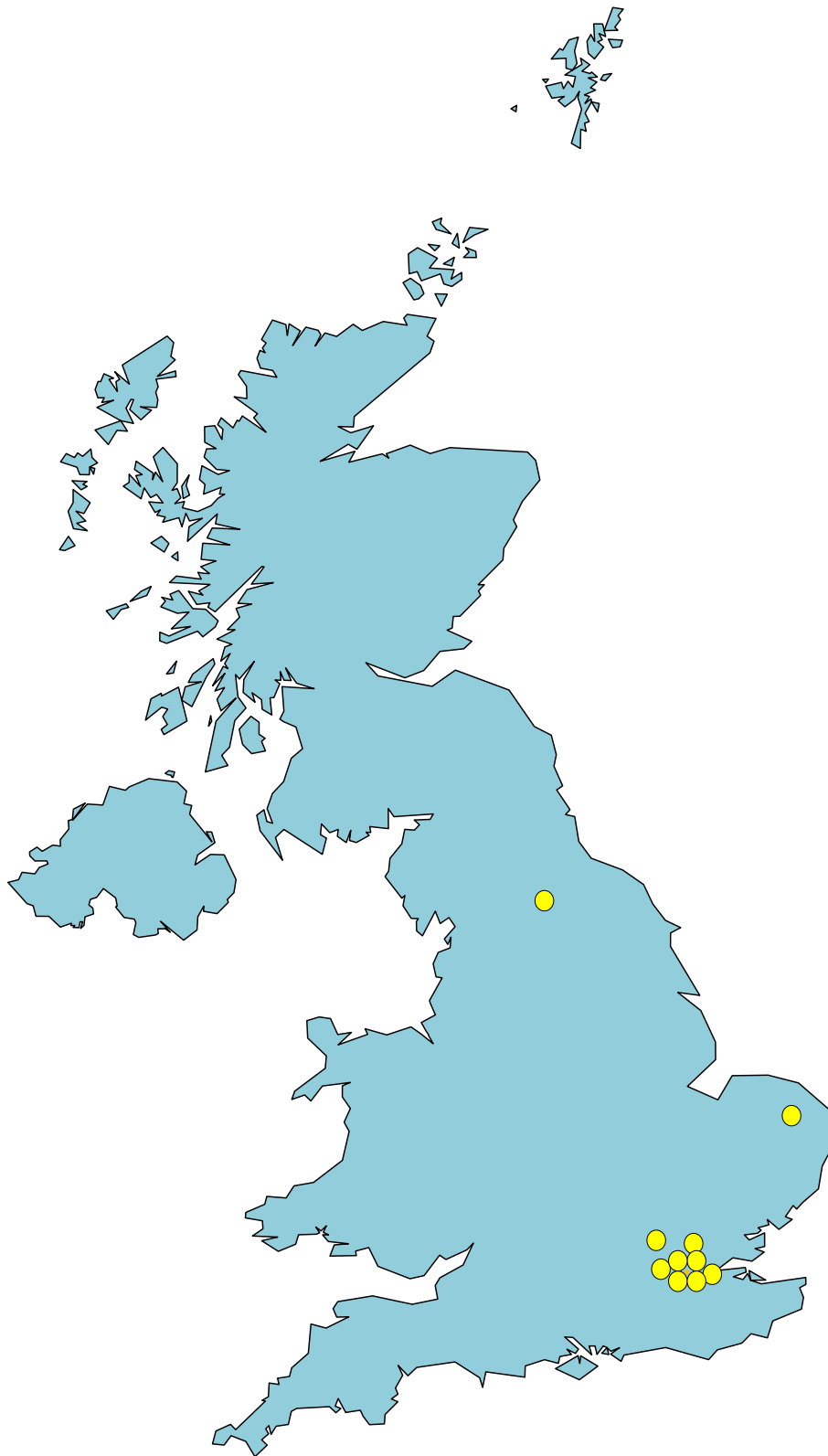
<sup>522</sup> See “Fast 500 EMEA: 2017 UK winners”, Deloitte, 2017, <http://www.deloitte.co.uk/fast50/winners/2017/fast-500-emea/>.

Figure 7.5: UK media companies in the Deloitte fast 500 EMEA, 2017<sup>523</sup>



<sup>523</sup> See “Fast 500 EMEA: 2017 UK winners”, Deloitte, 2017, <http://www.deloitte.co.uk/fast50/winners/2017/fast-500-emea/>.

Figure 7.6: Ten British AI companies to look out for in 2016<sup>524</sup>



<sup>524</sup> See “10 British AI companies to look out for in 2016”, Business Insider, January 5<sup>th</sup> 2016, <http://uk.businessinsider.com/10-british-ai-companies-to-look-out-for-in-2016-2015-12/#deepmind--on-a-mission-to-solve-general-intelligence-1>.



Figure 7.7: Top ten most innovative 3D printing companies in 2017<sup>525</sup>



<sup>525</sup> See “Best 3D Printing Companies 2017 – The 40 Most Innovative”, All3DP, June 26<sup>th</sup> 2017, <https://all3dp.com/1/top-3d-printing-companies-3d-printer-manufacturers/>.

Figure 7.8: Leading software companies in the UK<sup>526</sup>



<sup>526</sup> See “Top 75 UK software development firms”, Clutch, September 25<sup>th</sup> 2017, <https://clutch.co/uk/developers?page=3>.

Figure 7.9: Top ten big data companies in the UK<sup>527</sup>



<sup>527</sup> See “43 of the top big data companies to work for, by J.P. Morgan”, efinancialcareers, June 1<sup>st</sup> 2017, <https://news.efinancialcareers.com/uk-en/285462/the-top-big-data-companies-to-work-for-by-j-p-morgan>. See also “10 Big Data Technologies To Watch in The UK in 2017”, TechBullion, October 29<sup>th</sup> 2016, <https://www.techbullion.com/10-big-data-technologies-watch-uk-2017/>. See also “19 innovative UK companies

Figure 7.10: Top robotics start-ups in the UK<sup>528</sup>



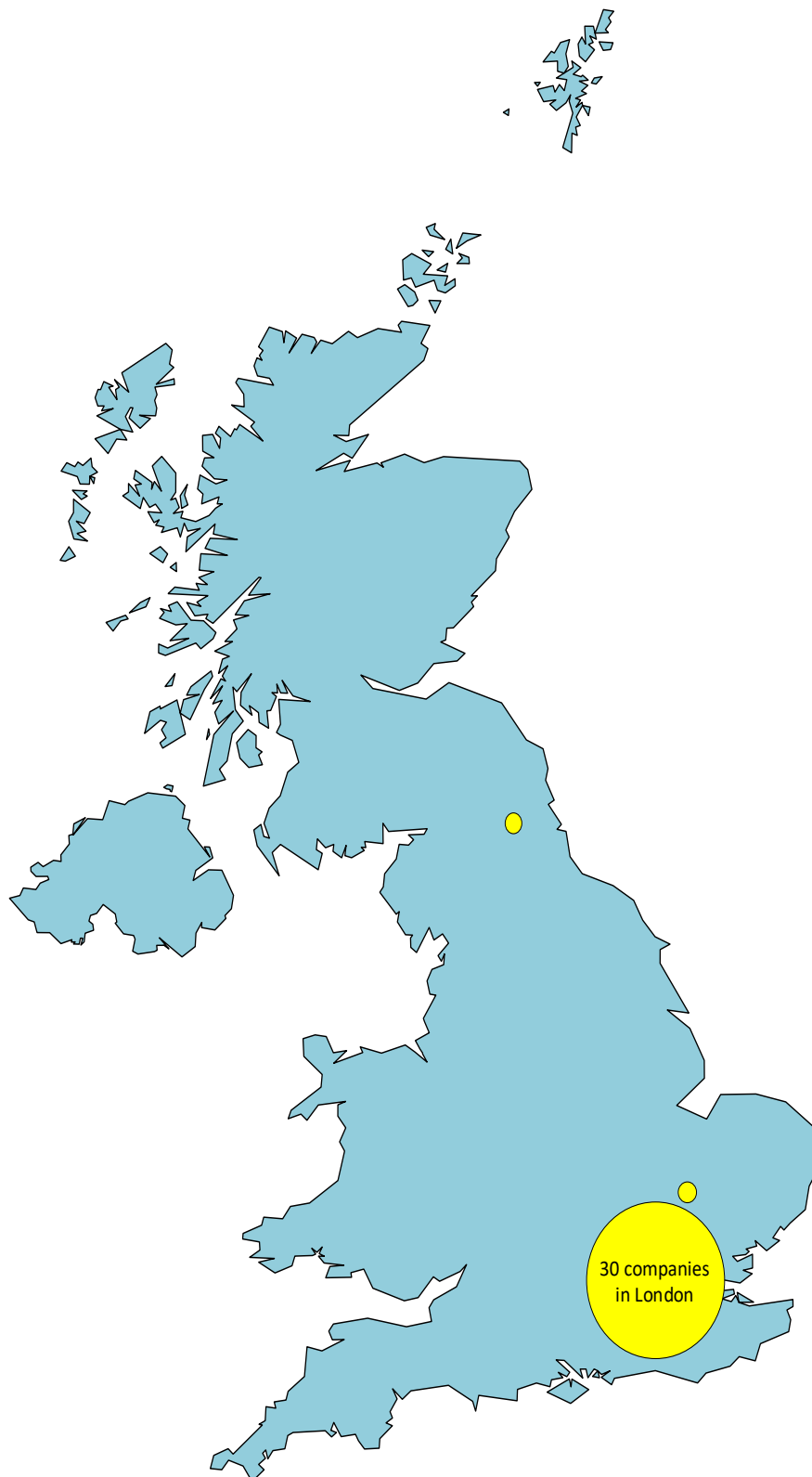
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using open data | UK open data businesses”, techworld, November 1<sup>st</sup> 2016,

<https://www.techworld.com/picture-gallery/startups/-innovative-uk-companies-using-open-data-3613884/>.

<sup>528</sup> See “Who are the hottest robotics startups in the UK? Meet 15 of the country's best”, techworld, October 3<sup>rd</sup> 2017, <https://www.techworld.com/picture-gallery/startups/15-of-best-robotics-startups-in-uk-3654908/>.

Figure 7.11: UK fintech firms in the FinTechCity top 50 global rankings 2017<sup>529</sup>



<sup>529</sup> See “The FinTech50 2017”, FinTechCity, June 6<sup>th</sup> 2017, <https://thefintech50.com/>.

Figure 7.12: Top ten insurtech companies in the UK<sup>530</sup>



<sup>530</sup> See "15 UK insurtech startups to watch", Techworld, August 2<sup>nd</sup> 2017, <https://www.techworld.com/picture-gallery/startups/uk-insurtech-startups-watch-3645315/>.

Figure 7.13: Major UK semiconductor companies<sup>531</sup>



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<sup>531</sup> These companies have been sourced from newspaper articles.





# Chapter 8: Challenger banks

## Challenger banks

The original impetus for challenger banks was to increase competition.<sup>532</sup> Reducing the market share of large banks would (in theory) limit potential systemic losses and protect the taxpayer from the cost of future government bailouts.

The current players in the digital challenger sphere provide speed, convenience and an intuitive (and aesthetically pleasing) interface between lender and customer. All these features have a place and should be encouraged.

However, the challenger banks have replicated the same flawed model of incumbent banks, contributing to a renewed erosion of lending standards. Through access to the Term Funding Scheme, the Bank of England has facilitated this decline.

There needs to be greater scrutiny of the underlying lending model of banks. A new set of challenger banks needs to emerge, focussing on the credit analysis of businesses by harnessing the power of machine learning and artificial intelligence.

Very little consideration is given by the Bank of England to the lending models proposed by prospective new entrants. Instead, the Bank of England focusses exclusively on capital levels, the adequacy of the institution's technical platform and the independence (and existing expertise) of the directors.

## Rationale for challenger banks

Challenger banks have been key to the Government's efforts to boost lending to small & medium-sized enterprises (SMEs).<sup>533</sup> In truth, however, the structure of the Capital Requirements Regulation (CRR) rules and Basel III have pushed banks to prioritise buy-to-let loans. The risk weightings required for bank lending to SMEs is typically 75%, but only 35% for buy-to-let mortgages.<sup>534</sup> The 'SME Support Factor' has reduced borrowing costs, but the volume of lending has not improved meaningfully.<sup>535</sup>

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<sup>532</sup> The Independent Commission on Banking, originally set up to devise recommendations on how best to reform the banking sector, published its final report in September 2011. See "Final Report: Recommendations", Independent Commission on Banking, September 2011, <http://webarchive.nationalarchives.gov.uk/20131003105424/https://hmt-sanctions.s3.amazonaws.com/ICB%20final%20report/ICB%2520Final%2520Report%5B1%5D.pdf>. The report made a host of recommendations to the government, including opening up the banking sector for competition. This marked the start of an ongoing process of 'challengers' entering the sector in competition with established players. Since then, more than 25 new challengers have been granted banking licences. This trend of granting banking licences has accelerated significantly since 2015.

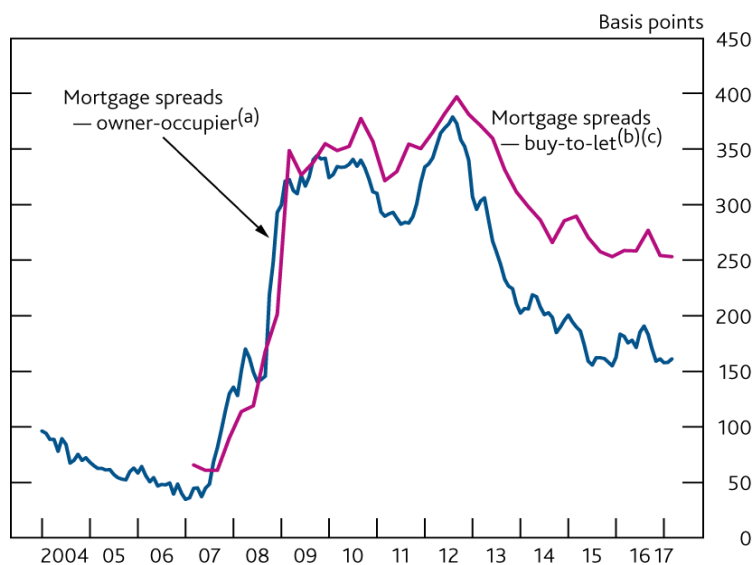
<sup>533</sup> Other elements are the establishment of the British Business Bank (BBB) and the promotion of alternative finance.

<sup>534</sup> See Articles 123 & 124 of Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex%3A32013R0575>.

<sup>535</sup> The SME support factor is a measure to reduce the risk weighting for SME lending that meet the requirements of Article 147(8) and Article 502(2) of the Capital Requirements Regulation.

Bank of England data show that the stock of outstanding loans (sterling & foreign currency) to small & medium-sized enterprises (SMEs) fell by 18.5% between April 2011 and the low of March 2016 (to £161.2 billion).<sup>536</sup> Outstanding loans have since risen to £166.1 billion, but this is still 16.0% below the April 2011 figure. The y/y rate for lending to non-financial SMEs was just 0.2% in March. There remains a significant ‘funding gap’. Indeed, 80% of SMEs reportedly confine their business plans to what they can afford internally.<sup>537</sup>

Chart 8.1: Mortgage rates on owner-occupied and buy-to-let lending relative to risk-free rates



Source: Bank of England

Nevertheless, competitive pressures have intensified in the housing market, contributing to the fall in underwriting standards and a decline in net lending margins.<sup>538</sup> Bank of England data highlight a progressive fall in lending margins for both owner-occupied and buy-to-let mortgages since 2012, a year after the Independent Commission on Banking recommended that the Government and regulators open the sector up to new competitors (Chart 8.1). This trend accelerated in 2017 (Chart 8.2).<sup>539,540</sup> The decline in mortgage spreads undoubtedly contributed to the recovery in the housing

<sup>536</sup> See “Money and Credit – March 2018”, Bank of England, May 1<sup>st</sup> 2018, p. 10, <https://www.bankofengland.co.uk/-/media/boe/files/statistics/money-and-credit/2018/march-2018.pdf?la=en&hash=C8715F8D39D5D18ADA53EFE91EB19FE948EE28AE>.

<sup>537</sup> See “Access to Finance: First Report of Session 2016-17”, Business, Energy and Industrial Strategy Committee, October 31<sup>st</sup> 2016, p. 5, <https://publications.parliament.uk/pa/cm201617/cmselect/cmbeis/84/84.pdf>.

<sup>538</sup> See “UK challenger bank warns of ‘crazy’ loans battle”, Financial Times, January 15<sup>th</sup> 2017, <https://www.ft.com/content/5c7c16ae-d9b4-11e6-944b-e7eb37a6aa8e>.

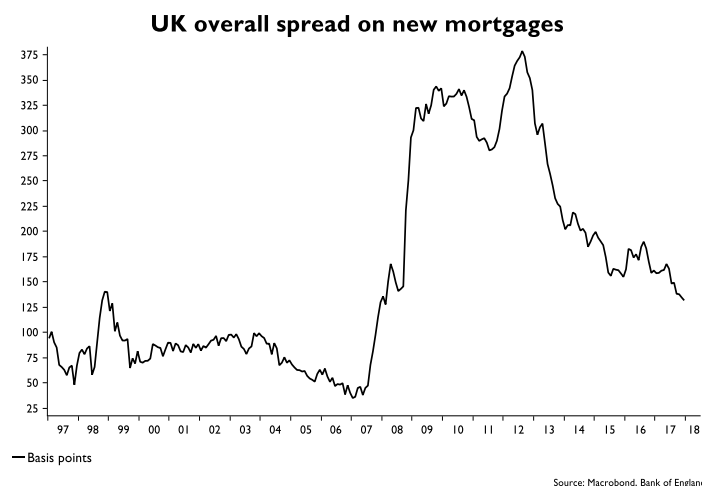
<sup>539</sup> See Financial Stability Report June 2017, p. 6, chart A.11 <https://www.bankofengland.co.uk/financial-stability-report/2017/june-2017>.

<sup>540</sup> Sources: Bank of England, Bloomberg, Council of Mortgage Lenders, FCA Product Sales Database, Moneyfacts and Bank calculations.

a. The overall spread on residential mortgage lending is a weighted average of quoted mortgage rates over risk-free rates, using 90% LTV two-year fixed-rate mortgages and 75% LTV tracker, two and

market. However, placing retail banking at the heart of reforms has done little to support the government's new industrial strategy.<sup>541</sup> The government's initiative aimed at simply 'more competition'<sup>542</sup> has been misconstrued.<sup>543</sup>

Chart 8.2



The increased competition has spilled over into consumer credit too. Some challenger banks have noted the risks and are retreating. Secure Trust, for example, pulled out of unsecured consumer credit for new customers, warning that pricing had become “very aggressive”.<sup>544</sup> The higher credit risks taken

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five-year fixed-rate mortgages. Spreads are taken relative to gilt yields of matching maturity for fixed-rate products. Spreads are taken relative to Bank Rate for the tracker product. Weights are based on relative volumes of new lending. The Product Sales Database includes regulated mortgages only.

- b. The spread on new buy-to-let mortgages is the weighted average effective spread charged on new floating and fixed-rate non-regulated mortgages over risk-free rates. Spreads are taken relative to Bank Rate for the floating-rate products. The risk-free rate for fixed-rate mortgages is calculated by weighting two-year, three-year and five-year gilts by the number of buy-to-let fixed-rate mortgage products offered at these maturities.

<sup>541</sup> See “Building Our Industrial Strategy Green Paper”, January 2017, p. 11, [https://beisgovuk.citizenspace.com/strategy/industrial-strategy/supporting\\_documents/buildingourindustrialstrategygreenpaper.pdf](https://beisgovuk.citizenspace.com/strategy/industrial-strategy/supporting_documents/buildingourindustrialstrategygreenpaper.pdf). The ten policy pillars include: (1) investing in science, research and innovation; (2) developing skills; (3) upgrading infrastructure; (4) supporting businesses to start and grow; (5) improving procurement; (6) encouraging trade and inward investment; (7) delivering affordable energy and clean growth; (8) cultivating world-leading sectors; (9) driving growth across the whole country; (10) creating the right institutions to bring together sectors and places.

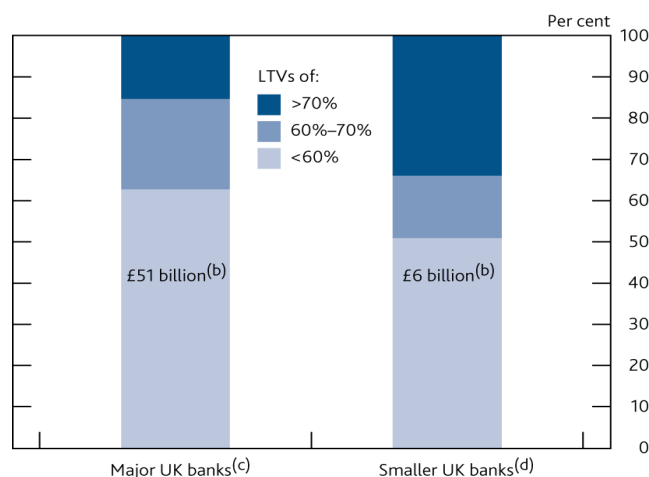
<sup>542</sup> Reiterated in Section B(i) of the Annex to the Treasury's Recommendation Letter to the Governor of the Bank of England. See <http://www.bankofengland.co.uk/prd/Documents/chancellorletter080317.pdf>.

<sup>543</sup> It is important to note that the distinction between ‘good’ and ‘bad’ competition was highlighted early on in the process of opening the UK banking sector for challengers. The Independent Commission on Banking itself remarked that: “a distinction is needed between ‘good competition’ to serve customers well, and ‘bad competition’ that exploits customer unawareness or, for example, creates a race to the bottom on lending standards.” See “Final Report: Recommendations”, Independent Commission on Banking, September 2011, p. 153, [http://webarchive.nationalarchives.gov.uk/20131003105424/https://hmt-sanctions.s3.amazonaws.com/ICB%20final%20report/ICB%20Final%20Report\[1\].pdf](http://webarchive.nationalarchives.gov.uk/20131003105424/https://hmt-sanctions.s3.amazonaws.com/ICB%20final%20report/ICB%20Final%20Report[1].pdf).

<sup>544</sup> See “UK's challenger banks face fresh headwinds”, Financial Times, August 6<sup>th</sup> 2017, <https://www.ft.com/content/f95d552a-7921-11e7-90c0-90a9d1bc9691>. See also “UK challenger bank warns of ‘crazy’ loans battle”, Financial Times, January 15<sup>th</sup> 2017, <https://www.ft.com/content/5c7c16ae-d9b4-11e6-944b-e7eb37a6aa8e>.

by challenger banks are reflected in the disproportionate exposure of smaller UK banks to commercial real estate loans with high loan-to-value ratios (Chart 8.3).<sup>545,546</sup>

Chart 8.3: LTV distributions for the stock of UK lenders' commercial real estate (CRE) loans at end-2015 (ex-residential and development loans)



Source: Bank of England

Challenger banks have been big users of the Term Funding Scheme (see Table 8.A).<sup>547</sup> They have been less focussed on retail deposits: many have weak customer relationships, compounded by using third party brokers to route lending.

### Challenger bank models

Challenger banks talk up their lending to small & medium-sized enterprises (SMEs). However, when facing the wider public (including potential shareholders), there is a shift in emphasis. In a KPMG report on challenger banks published last year (July 2017), 12 challenger bank CEOs were interviewed to explore the “threats and opportunities” facing the sector.<sup>548</sup> SMEs and small businesses were mentioned only twice.<sup>549</sup>

<sup>545</sup> See Financial Stability Report July 2016, p. 9, <https://www.bankofengland.co.uk/financial-stability-report/2016/july-2016>.

<sup>546</sup> Sources: Bank of England, Investment Property Databank (IPD UK), PRA and Bank calculations.

- For major UK banks, the LTV distribution is estimated using a stratified sample of loan-level data on banks' CRE portfolios at the end of 2013, loan-level data on their gross CRE lending in 2014–15, and CRE price indices. For smaller UK banks, the LTV distribution is from portfolio-level data as of end-2015.
- Value of total outstanding CRE loans (excluding development and residential loans).
- 'Major UK banks' covers Barclays, HSBC, Lloyds Banking Group, RBS and Santander UK, the largest UK CRE lenders within the major UK banks peer group.
- 'Smaller UK banks' includes banks and building societies with total assets under £50 billion.

<sup>547</sup> For Term Funding Scheme usage and lending data, see “Quantitative easing and the Asset Purchase Facility”, Bank of England, <https://www.bankofengland.co.uk/markets/quantitative-easing-and-the-asset-purchase-facility>.

<sup>548</sup> See “Challenging perspectives: In conversation with challenger bank CEOs”, KPMG, July 2017, p. 2, [https://assets.kpmg.com/content/dam/kpmg/uk/pdf/2017/07/challenging\\_perspectives.pdf](https://assets.kpmg.com/content/dam/kpmg/uk/pdf/2017/07/challenging_perspectives.pdf).

<sup>549</sup> Ibid. pp. 4-8.

Table 8.A

Term funding scheme drawings and lending by selected challenger banks						
TFS Group	Certified base stock of loans as at 30/06/16 (£ million)	Cumulative net lending to UK households, PNFCs and NBCPs since 30/06/16 (£ million)	Percentage change in lending since 30/06/16, relative to base stock of loans (%)	Aggregate outstanding TFS drawings as at 31/03/2018 (£ million)	TFS drawings relative to cumulative net lending (%)	TFS drawings relative to Base Stock of loans (%)
Total (all banks)	1,518,075	68,059	4.5%	127,016	187%	8%
Aldermore	6,764	1,721	25.4%	1,671	97%	25%
Atom Bank	-	1,018	-	355	35%	-
Charter Court Financial Services	2,799	2,795	99.9%	1,148	41%	41%
Close Brothers	4,916	392	8.0%	500	128%	10%
Investec Bank	3,640	454	12.5%	635	140%	17%
Metro Bank	4,576	3,982	87.0%	3,801	95%	83%
OneSavings Bank	4,923	1,920	39.0%	1,500	78%	30%
Secure Trust Bank	1,103	479	43.5%	263	55%	24%
Shawbrook Bank	3,458	847	24.5%	875	103%	25%
Tandem Bank	188	44	23.2%	50	114%	27%
Virgin Money	29,598	6,865	23.2%	6,387	93%	22%

Source: Bank of England

In a recent interview, Anne Boden – CEO of Starling Bank – outlined their business model:

“You have balances sitting on an account. You’re paying around 0.5%. It’s low single digits. You’re lending out the money as overdrafts, you can, say, lend half of it. You lend that out at between 12-19%. [...] At the moment that’s the range depending on an individual’s credit rating. It’s a reasonable interest rate. I’m saying the number because it’s not high.”<sup>550</sup>

The interview continues: “The difference between us and the big banks is we don’t eat up that difference with all the cost of infrastructure. We’ve built everything from scratch. Unlike all the other new banks who are using someone else’s infrastructure, we can deliver this cost effectively.”

Innovation in the challenger bank sector has instead centred on improving the client-bank interface: “Challengers are not merely investing in digital for the sake of digital,” stresses Richard Iferenta, KPMG Partner and Head of Challenger Banking. “They are investing in digital to provide good customer experience.”<sup>551</sup>

Indeed, some of the challengers have concluded that “tech alone is not that big a differentiator”.<sup>552</sup> The use of artificial intelligence and larger sets of data to assess and price credit risk remains

<sup>550</sup> See “Big Banks want to come see us every week’: Starling CEO Anne Boden on building a bank from scratch”, Business Insider, April 23<sup>rd</sup> 2017, <http://uk.businessinsider.com/interview-starling-bank-ceo-anne-boden-fintech-neobanks-2017-4>.

<sup>551</sup> See “Challenging perspectives: In conversation with challenger bank CEOs”, KPMG, July 2017, p. 8, [https://assets.kpmg.com/content/dam/kpmg/uk/pdf/2017/07/challenging\\_perspectives.pdf](https://assets.kpmg.com/content/dam/kpmg/uk/pdf/2017/07/challenging_perspectives.pdf).

<sup>552</sup> *Ibid.* p. 6.

underexplored. However, this is a necessary step if these banks are to remain competitive and play their part in raising the potential growth path of the economy.

Challenger banks can be grouped into the following four categories: mid-sized full-service banks, specialist banks, digital-only banks and non-bank brands (see Table 8.B).

Table 8.B: Analysing the challenger bank sector<sup>553</sup>

Challenger banks		
Type	Description	Examples
Mid-sized full-service banks	These are well-known brands, with single-digit millions of customers and between 2,000 and 9,000 employees. They have been moving to digital channels, but believe that physical presence remains important and serve customers with a physical network of up to 600 branches.	The Co-operative Bank, TSB, CYBG
Specialist banks	Active in specialist lending and saving for customers who they believe are underserved by others in the market, such as certain types of small- and medium-sized enterprises and the buy-to-let market. They generally have very limited physical presence, placing more emphasis on call centres, third-party distribution channels, some regional offices and increasingly digital channels.	Secure Trust, Aldermore, Shawbrook
Digital-only banks	Relying on innovative technology platforms that promise exceptional customer experience and engagement, primarily through mobile apps.	Starling, Monzo, Tandem, Atom
Non-bank brands	Non-bank brands have parent companies that are strong players in other industries, such as major supermarket chains. They have strong and trusted brands, and generally seek to serve the needs of customers loyal to the parent group as a whole.	Tesco bank, Sainsbury's Bank, Virgin Money

Source: PricewaterhouseCoopers

Mid-sized full-service challenger banks are characterised by disproportionately large exposure to real estate and mortgage lending, as the breakdown of Metro's lending book demonstrates (see Chart 8.4). Due to its rapid expansion, Metro Bank could "fall below its minimum capital targets unless it raises £200m-£300m more equity before the end of this year."<sup>554</sup> Metro Bank's CET1 ratio has dropped from 18.1% in March 2017 to 13.6% in March 2018.<sup>555</sup>

Aldermore's lending profile reveals a similar focus on buy-to-let and residential mortgages (see Chart 8.5). Virgin Money has also identified mortgage lending as a key growth sector. In an interview last year with the Financial Times<sup>556</sup>, the CEO Jayne-Anne Gadhia, despite recognising "areas of weakness

<sup>553</sup> See "Who are you calling a challenger bank?", PricewaterhouseCoopers, <https://www.pwc.co.uk/industries/banking-capital-markets/insights/challenger-banks.html>.

<sup>554</sup> See "Metro Bank drops 10% on capital concerns", Financial Times, April 25<sup>th</sup> 2018, <https://www.ft.com/content/4ced38de-4872-11e8-8ee8-cae73aab7ccb>.

<sup>555</sup> Ibid.

<sup>556</sup> See "UK's challenger banks face fresh headwinds", Financial Times, August 6<sup>th</sup> 2017, <https://www.ft.com/content/f95d552a-7921-11e7-90c0-90a9d1bc9691>.

to be navigated” in the UK housing market in the near-term, still expressed confidence in ‘a strong mortgage market’ over the longer term.

Ernst & Young’s challenger bank catalogue (data collected and verified over a period spanning 2015 and 2016) supports the view that challenger banks have failed to support businesses (see Appendix I, Table 8.C).

Chart 8.4

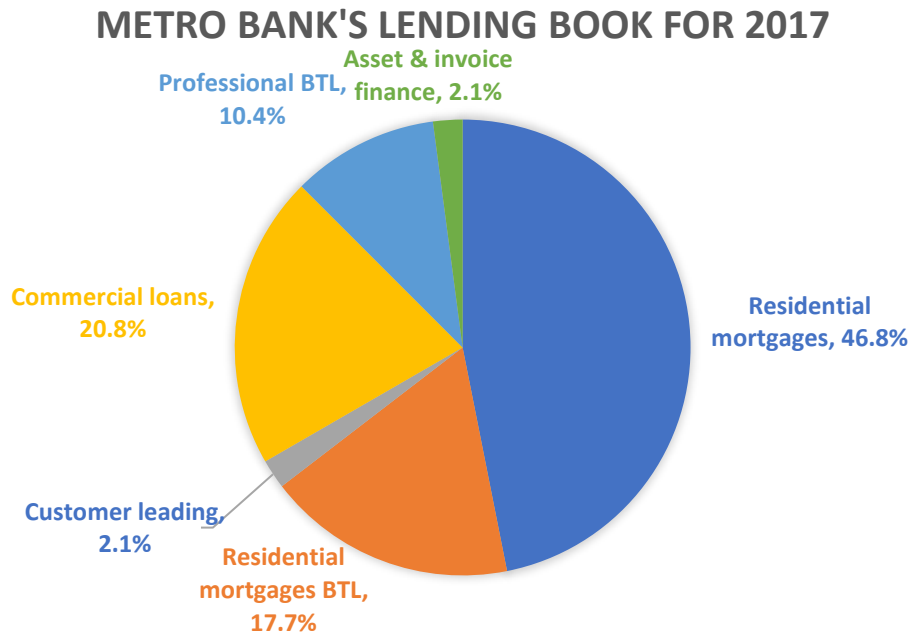
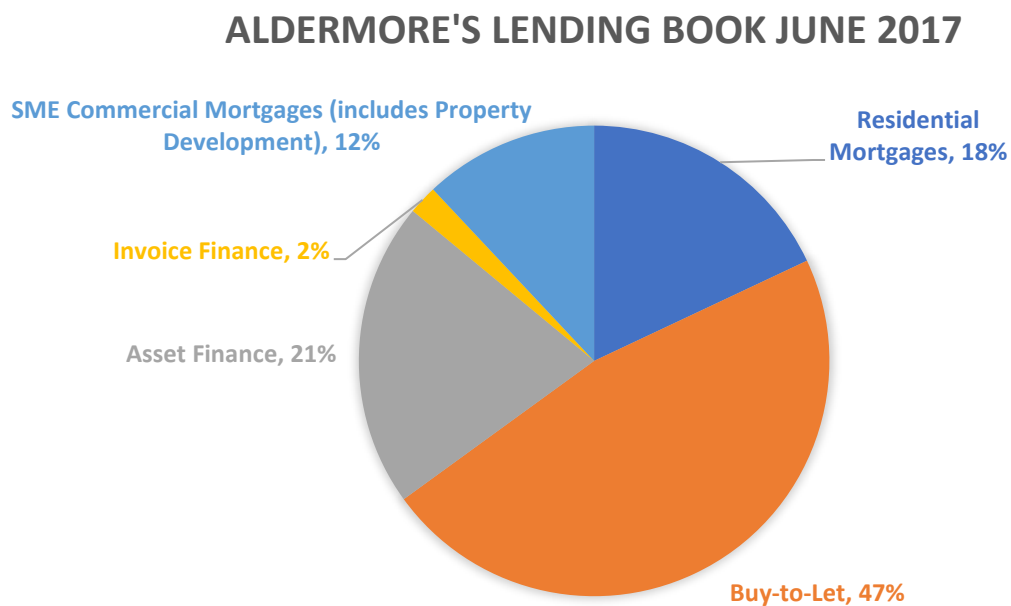


Chart 8.5





## Other digital-only challengers

Atom and Monzo are two digital-only challengers.

### Atom

Atom offers services through your smartphone on iOS and Android operating systems. It operates the basic banking model.

As of April 2018, it offered fixed-term savings accounts and mortgages via brokers.<sup>557</sup> Its website does not appear to provide services to small business customers.

Atom had hoped that “By the end of 2016, customers will have access to fixed savings, current accounts, overdrafts, debit and credit cards, instant access savings and residential mortgages, all serviced via the app.”<sup>558</sup>

### Monzo

Monzo offers a current account with no interest, an overdraft facility and debit card for payments. It emphasises the customer experience with easier ways of viewing spending, making payments and different ways of saving for purchases.<sup>559</sup>

Monzo is intending to expand its services by acting as a ‘hub’ through which customers are put in touch with other providers – these parties are charged with providing the added value for the customer.

Monzo is not using a typical banking model. It provides services to customers (controlling their money) using a ‘platform for third party services aggregation’.

## Appendix

This appendix summarises key aspects of the challenger bank sector (based on the Ernst & Young (E&Y) report ‘Challenger bank catalogue’).<sup>560</sup> Both the E&Y report and the Challenger Bank Letter were published in 2016. This makes the claims and figures included in them directly comparable. The estimates of the challenger bank contribution to lending for small & medium-sized enterprises are based on the E&Y figures (see Table 8.C).

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<sup>557</sup> See <https://www.atombank.co.uk/> and <https://www.atombank.co.uk/fixed-saver>.

<sup>558</sup> See “Atom Bank launches app-only savings account for iPhones”, The Telegraph, April 6<sup>th</sup> 2016, <https://www.telegraph.co.uk/business/2016/04/06/atom-bank-launches-app-only-savings-account-for-iphones/>.

<sup>559</sup> See <https://monzo.com/>.

<sup>560</sup> Published in 2016, see “Challenger bank catalogue”, Ernst & Young, 2016, [https://www.bba.org.uk/wp-content/uploads/2017/01/BBA-Challenger-Bank-Catalogue\\_Dec-2016.pdf](https://www.bba.org.uk/wp-content/uploads/2017/01/BBA-Challenger-Bank-Catalogue_Dec-2016.pdf). E&Y appears to treat all entrants into the banking sector as ‘challengers’, which have been granted licences after the 2011 publication of the report by the Independent Commission on Banking (even if these new ‘entrants’ are established international banks).

Table 8.C

## Challenger bank catalogue

Name	Assets (£m)	Loans (£m)	Lending profile (£m)	Description
Aldermore Bank	5,565	4,801	Business finance: 1,225 Commercial mortgages: 552 Residential mortgages: 980 Buy-to-let mortgages: 2,044	"Aldermore is a specialist lender, supporting UK SMEs, homeowners and landlords."
Charity Bank	114	54	Residential: 0 Commercial: 54 (some of the bank's lending is secured against residential premises)	"Charity Bank is a savings and loans bank with a mission to use money for good. Since it was established in 2002, Charity Bank has lent over £150 million to more than 800 charities and social enterprises."
Charter Court	774	727	Residential buy to let: 304 Residential homeowner: 423	"Charter Court Financial Services (Charter Court) is a specialist bank which serves retail savings customers through Charter Savings Bank, mortgage customers and intermediaries through Precise Mortgages and institutional clients through Exact Mortgage Experts."
Close Brothers	7,957	5,738	Retail: 2,266 Commercial: 2,173 Property: 1,299	"Close Brothers provide a range of specialist lending products to UK SMEs, as well as specialist instalment payment solutions to UK retail borrowers."
Crown Agents Bank	833	814	Cash with central banks: 509 Deposits with other banks: 214 Debt securities: 90	"Crown Agents is a wholesale bank based on deep relationships with central banks, commercial banks, exporters and non-government organisations."
Investec	17,944	7,036	Lending collateralised by property: 2,184 High net worth and other private clients: 1,192 Corporate and other: 3,660	"Investec is an international specialist bank and asset manager that provides a diverse range of financial products and services to a niche client base."
Kingdom Bank	50	30	Commercial/SME mortgages: 29 Personal residential: 1	"The principal business of the Bank is secured lending to churches and charities, which helps them to deliver their mission to their local communities."
Metro Bank	3,664	1,596	Retail: 881 Commercial: 715	"Metro Bank is a retail and commercial bank, which offers banking focused on the customer".
OneSavings Bank (OSB)	4,937	3,945	BTL/SME mortgages: 2,065 Residential mortgages: 1,763 Personal loans: 117	OneSavings Bank plc "focuses on selected sub-sectors of the lending market." These "include Buy-to-Let/SME, Residential Mortgages ... and Personal Loans."
Secure Trust Bank	782	623	Personal Lending: 181 Motor Finance: 138 Retail Finance: 156 Business Finance: 143 Debt Collection and Other: 3.2	Consumer Finance (Personal Lending, Retail Finance, Motor Finance, Current Accounts), Business Finance (Asset Finance, Real Estate Finance, Commercial Finance), Savings, Debt Collection.
Shawbrook Bank	2,754	2,285	Commercial mortgages: 969 Asset finance: 518 Business credit: 170 Secured lending: 401 Consumer lending: 227	Shawbrook Bank "serves both SMEs and consumers in the UK with a range of lending and savings products. It focuses its activities on specific markets - including commercial mortgages, consumer loans, secured lending, asset-based lending and invoice finance services".

Excludes Triodos Bank and Jordan International Bank

Source: Ernst & Young

# Chapter 9: Alternative lenders

## Alternative lenders

Established industries are being disrupted by the global technology giants. The banking sector is not immune. The growth in cloud computing has allowed banks and companies to store more data. Alphabet (parent of Google), Baidu, Alibaba, Tencent and Amazon possess a critical edge: they have access to larger data sets and superior analytic capability.

Alphabet captures around 70% of the credit and debit card transactions in the US from third parties.<sup>561</sup> Chinese fintech company Ant Financial (the associated finance arm of Alibaba) offers fund management, online banking and mobile payments services, and has over 600 million users.<sup>562</sup> It has developed advanced facial recognition software to identify users and approve payments.<sup>563</sup> WeChat Pay (Tencent) allows for seamless payments for users buying goods and services through WeChat (a 'lifestyle' platform used by 1 billion people). WeChat Pay also offers consumer credit.<sup>564</sup>

Technology firms have the advantage of fully integrated data systems and are becoming more efficient and cost effective. By maximising the value of their data, they hold a distinct advantage over incumbent banks. Baidu, Alibaba, Tencent and Amazon are now lending money, and are targeting small & medium-sized enterprises.

The larger technology firms can make superior credit judgments over banks. Advances in information technology may – if used appropriately – lead to improved credit scoring by banks too. Improved data analytics allow lenders to build more effective relationships with their businesses. This in turn could reduce the risks of big write-offs that have damaged UK banks in the past.

Nevertheless, UK banks have lagged in data analytics – partly because of IT legacy issues. They have created information 'silos', which are proving difficult to resolve. In today's 'information age', this is a fundamental competitive weakness.

In addition, the improvement in UK bank capital ratios has been largely met by borrowing, not as a result of a strong rise in retained earnings.<sup>565</sup> This is indicative of an uncompetitive business model. Cross-country comparisons show that on several profitability metrics, UK banks are laggards (see Appendix I).

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<sup>561</sup> See "Google plans to track credit card spending", BBC News, May 26<sup>th</sup> 2017, <http://www.bbc.co.uk/news/technology-40027706>.

<sup>562</sup> See "Ant Financial extends dominance in Chinese online finance", Financial Times, May 17<sup>th</sup> 2018, <https://www.ft.com/content/fde8fe0c-5830-11e8-b8b2-d6ceb45fa9d0>.

<sup>563</sup> See "How Alibaba Is Innovating To Drive Alipay Usage", Forbes, September 5<sup>th</sup> 2017, <https://www.forbes.com/sites/greatspeculations/2017/09/05/how-alibaba-is-innovating-to-drive-alipay-usage/#532df4b9379d>.

<sup>564</sup> See "Blurring the lines of banking in China", Financial Times, May 29<sup>th</sup> 2018, <https://www.ft.com/content/ef39e678-632f-11e8-90c2-9563a0613e56>.

<sup>565</sup> See *Financing Investment: Interim Report*, GFC Economics Ltd & Clearpoint Corporation Management Ltd, December 11<sup>th</sup> 2017, p. 52.

The Bank of England has been overly focussed on bank ‘resolution’ in the event of another crisis. While necessary, they have not worked closely enough with the banks to help them to adapt, raise productivity and support the real economy.

An alternative lending model is needed, based around lending institutions that are prepared to develop core capabilities (in data analytics) to support the growth of new enterprises. The Government has taken some tentative steps in this direction, with the promotion of open banking platforms and the Revised Payments Services Directive, but this tends to speak only to the retail market.

Existing banks are *more* likely to fail if they do not embrace technology. The Government should encourage banks to adapt and evolve. If they cannot compete against new entrants, their balance sheets will inevitably shrink. This could pose a systemic risk to the UK economy.

The Bank of England is waking up to the risks. According to the November 2017 Financial Stability Report:

“The Bank of England’s Financial Policy Committee (FPC) and the Prudential Regulation Committee (PRC) have completed an exploratory exercise examining major UK banks’ long-term strategic responses to an extended low growth, low interest rate environment with increasing competitive pressures from FinTech [see Box 1]. Although banks suggest they could, by reducing costs, adapt without major strategic change or taking on more risk, there are clear risks to this:

- Competitive pressures fuelled by the growth of FinTech may cause greater and faster disruption to banks’ business models than banks currently project.
- The cost of maintaining and acquiring customers in a more competitive environment may result in greater loss of market share.
- The cost of equity for banks may be higher than the 8% level the Financial Policy Committee and the Prudential Regulation Authority expect in their scenario. In a low growth, low interest rate environment, investors may perceive downside economic risks to be greater, raising the equity risk premium.
- Supervisors will now discuss the results of the exercise with banks, including the potential implications of these risks.”<sup>566</sup>

The dominance of big technology companies will raise critical antitrust and privacy questions if they challenge existing banks. Their knowledge and breadth of skills is unrivalled. Central banks hold an important card: the Bank of England, through the Prudential Regulatory Authority (PRA), grants

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<sup>566</sup> See Financial Stability Report, November 2017, Bank of England, p. 40, <https://www.bankofengland.co.uk/financial-stability-report/2017/november-2017>.

banking licenses.<sup>567</sup> It can set the terms of entry into this market. We propose that the Bank of England prioritises banking licenses for lenders that not only meet the strict criteria required under the PRA and Financial Conduct Authority rulebooks, but also demonstrate:

- 1) Data analytics capabilities;
- 2) Enhanced monitoring of credit risks based on data analytics;
- 3) A focus on small & medium-sized enterprises (SMEs); and
- 4) A proven ability to use data and algorithms to lend more effectively to SMEs.

The Bank of England could also invite technology companies into a partnership with existing lenders to develop an indigenous ‘third banking’ model. Technology companies could transfer their core competences and ideas to existing banks or share them. Of course, technology companies will jealously guard their critical advantage in data and data analytics.<sup>568</sup>

#### **Box I. Fintech and RegTech**

“Fintech” refers to the wider, deeper use of innovative technology to deliver banking services.<sup>569</sup> There are several sectors within fintech, including payments, insurance, regtech and data analytics.<sup>570</sup> Innovation is accelerating in all of these areas.<sup>571</sup> It is important to distinguish between the operational elements of banking and the truly disruptive innovations.

The most transformative areas for banks are in data analytics, AI and machine learning used in credit analysis for lending and regulatory technology (‘RegTech’). RegTech offers established banks and new entrants the opportunity to reduce their regulatory costs, ensure better compliance with financial regulations and target market manipulation by traders.

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<sup>567</sup> See “New firm authorisation”, Bank of England, <https://www.bankofengland.co.uk/prudential-regulation/authorisations/new-firm-authorisation>. The PRA also wants clearance from the Financial Conduct Authority prior to any approval. See “New Bank Start-up Unit”, Bank of England, <https://www.bankofengland.co.uk/prudential-regulation/new-bank-start-up-unit>.

<sup>568</sup> Data protection laws are an important consideration. It may be necessary to further enhance GDPR with regards to AI and machine learning decision systems.

<sup>569</sup> See “The Evolution of FinTech: A New Post-Crisis Paradigm?”, Douglas Arner, Janos Barberis and Ross Buckley, SSRN, October 20<sup>th</sup> 2015, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2676553](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2676553).

<sup>570</sup> See “2017 Fintech 100: Leading Global Fintech Innovators” KPMG/H2 Ventures, November 15<sup>th</sup> 2017, <https://s3-ap-southeast-2.amazonaws.com/h2vc/static/reports/innovators/2017/H2-Fintech-Innovators-2017.pdf>. KPMG/H2 Ventures break down the financial services industry into eight sectors: lending, payments, transaction & capital markets, insurance, wealth, regtech & cyber security, blockchain & digital currencies, and data & analytics. In reality, there is a lot of overlap between the different sectors.

<sup>571</sup> Ibid.

## Payments, lending, funds management and trade finance

Fintech companies have rapidly improved payments processing, speeding up transactions. New forms of lending structures are also emerging, striking at the heart of the traditional banking business model. Firms are using their expertise and various data streams to improve their understanding of their business clients' needs and risks.

When small companies use e-commerce platforms (e.g. Amazon) or payments processors (e.g. Square), they generate data. This can provide a clear indication to how a business is trading and whether it needs assistance or a loan. Revenues, cash flows and profits can all be monitored closely. Risks are also more easily monitored too, through third party data exchanges that carry out credit scoring and fraud detection.<sup>572</sup>

Merchant and e-commerce finance covers new entrants disrupting the world of small business lending.<sup>573</sup> These companies have acquired large amounts of data on small & medium-sized enterprises (SMEs) through their existing business models. This provides these 'new players' with a comparative advantage in originating loans to SMEs.

Amazon Lending (founded in 2012) was set up to extend credit to small businesses (see Appendix 2). Amazon "uses internal algorithms to choose sellers based on data points, such as the frequency at which merchants run out of stock, the popularity of their products and inventory cycles."<sup>574</sup> Amazon has grown the business significantly to the point where it has tapered off business lending to manage its credit risk exposures. The e-commerce giant has now teamed up with Bank of America Merrill Lynch to access more capital and reduce risk.<sup>575</sup>

Amazon is also in discussion with JPMorgan to offer bank accounts, marking another incursion into traditional banking.<sup>576</sup> A survey by Bain Consultants found close to 60% of bank customers in the US would try a financial product from tech groups they already used.<sup>577</sup> Amazon and PayPal were the most trusted of the tech brands.

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<sup>572</sup> Examples include the XOR data exchange in the big data and business analytics sector with sectoral revenues in 2015 of \$122 billion of revenue. See "How Big Data is changing the lending industry", Lending Times, April 3<sup>rd</sup> 2017, <https://lending-times.com/2017/04/03/how-big-data-is-changing-the-lending-industry/>.

<sup>573</sup> See "The Future of FinTech: A Paradigm Shift in Small Business Finance" World Economic Forum, October 2015, [http://www3.weforum.org/docs/IP/2015/FS/GAC15\\_The\\_Future\\_of\\_FinTech\\_Paradigm\\_Shift\\_Small\\_Business\\_Finance\\_report\\_2015.pdf](http://www3.weforum.org/docs/IP/2015/FS/GAC15_The_Future_of_FinTech_Paradigm_Shift_Small_Business_Finance_report_2015.pdf).

<sup>574</sup> Ibid. p 18.

<sup>575</sup> See "Amazon has partnered with Bank of America for its lending program", CNBC, February 14<sup>th</sup> 2018, <https://www.cnbc.com/2018/02/14/amazon-and-bank-of-america-partner-for-lending-program-but-growth-has-stalled.html>.

<sup>576</sup> See "Amazon in talks with JPMorgan to offer bank accounts", Financial Times, March 5<sup>th</sup> 2018, <https://www.ft.com/content/6f89263c-209a-11e8-a895-1ba1f72c2c11>.

<sup>577</sup> Ibid.

PayPal (US), a payments processor, has also established a lending arm – PayPal Working Capital. Loan sizes are based on “PayPal sales volumes, account history, and any prior usage of PayPal Working Capital (where relevant).”<sup>578</sup>

PayPal Working Capital has supplied approximately \$3 billion in loans to more than 115,000 businesses globally.<sup>579</sup> In the UK, PayPal Working Capital has now extended over £400 million of credit to British businesses.<sup>580</sup> Square Capital has originated around \$1.5 billion to businesses globally over this period.<sup>581</sup>

PayPal’s ‘business in a box’ combines with other firms to secure data flows from its payments business with clients’ accounting data (near real-time), to lend more safely to business customers.<sup>582</sup>

The key ‘raw material’ is data. Access to data – and ownership – is critical. In this regard, Google dominates in the West. Chinese firms have been able to develop their artificial intelligence capabilities off the back of a large population, with perhaps less concerns over data privacy. Data accessibility is an area the UK Government has targeted in relation to the provision of its own services. The Government should lead on the creation of new open standards for data, to support machine learning in the UK.<sup>583</sup>

## China’s banking competitors

China’s tech companies have made giant strides in financial services. According to KPMG’s Fintech 100 Report for 2017, five of the top ten leading fintech companies are now from China, including the top three.<sup>584</sup> In 2014, China had only one company in the top 50.<sup>585</sup> In 2017, there was only one UK fintech company in the top 10.<sup>586</sup>

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<sup>578</sup> See “Working Capital”, PayPal, 2018, <https://www.paypal.com/webapps/workingcapital/>.

<sup>579</sup> See “Tech companies invade banks’ territory with customer loans”, Financial Times, June 8<sup>th</sup> 2017, <https://www.ft.com/content/b45c0008-4bc1-11e7-919a-1e14ce4af89b>.

<sup>580</sup> See “PayPal’s lending business more than doubles UK volumes”, Financial Times, June 18<sup>th</sup> 2017, <https://www.ft.com/content/71864aec-5402-11e7-9fed-c19e2700005f>.

<sup>581</sup> See “Tech companies invade banks’ territory with customer loans”, Financial Times, June 8<sup>th</sup> 2017, <https://www.ft.com/content/b45c0008-4bc1-11e7-919a-1e14ce4af89b>.

<sup>582</sup> See “Business in a Box: Paypal’s ‘One-Stop-Shop’ for Small Businesses”, PayPal Inc, May 1<sup>st</sup> 2017, <https://www.paypal.com/stories/us/business-in-a-box-paypals-one-stop-shop-for-small-businesses>.

<sup>583</sup> See “Machine Learning: the power and promise of computers that learn by example”, The Royal Society, April 2017, p. 8, <https://royalsociety.org/~media/policy/projects/machine-learning/publications/machine-learning-report.pdf>.

<sup>584</sup> See “2017 Fintech 100: Leading Global Fintech Innovators” KPMG/H2 Ventures, November 15<sup>th</sup> 2017, <https://s3-ap-southeast-2.amazonaws.com/h2vc/static/reports/innovators/2017/H2-Fintech-Innovators-2017.pdf>.

<sup>585</sup> See “‘Fintech 100’ – Announcing the world’s leading fintech innovators for 2015”, KPMG/H2 Ventures, November 14<sup>th</sup> 2015, <https://home.kpmg.com/uk/en/home/media/press-releases/2015/12/fintech-announcing-the-world-leading.html>.

<sup>586</sup> See “2017 Fintech 100: Leading Global Fintech Innovators”, KPMG/H2 Ventures, November 15<sup>th</sup> 2017, <https://s3-ap-southeast-2.amazonaws.com/h2vc/static/reports/innovators/2017/H2-Fintech-Innovators-2017.pdf>.



Chinese fintech companies have access to large volumes of data, giving them an inherent advantage in the development of artificial intelligence (AI) and machine learning systems. They are now using AI and data analytics to assess the credit ratings of borrowers (see Box 2).

The size of the Chinese market offers domestic companies the opportunity to develop skills, knowledge and products that can be exported abroad.

MYbank (Alibaba) and WeBank (Tencent) have been granted banking licenses to support small businesses.<sup>587,588</sup> MYbank and WeBank provide funds to small firms that usually have no ability to borrow from the traditional banking sector, at rates that are between 5% and 14% per annum.<sup>589</sup> This will lower costs and force incumbent banks to adopt the latest technologies more quickly. WeBank selects its customers from WeChat using its proprietary algorithms to offer loans. As of August 2017, WeBank had lent over US\$14.7 billion. Around 80% of the capital was from collaborating banks who mark the loans on their books. The non-performing loan rate stood at 0.43%.<sup>590</sup>

MYbank has approximately 3.5 million small business customers and outstanding loans of approximately \$4.9 billion.<sup>591</sup> MYbank operates at the risky end of small business lending, but it has a non-performing loan ratio of just 1.0% versus China's national average of 1.7%.<sup>592</sup> In the UK, Funding Circle recorded a bad debt rate of 2.1% for 2017.<sup>593</sup> MYbank uses advanced algorithms to manage risk and delinquencies. Both MYbank and WeBank are fully funded by private money.<sup>594</sup>

Ant Financial controls more than half of China's \$5.5 trillion mobile payments market. Ant Financial services also include its Yu'e Bao money market fund with \$345 billion under management<sup>595</sup> and approximately 370 million account holders. It is the largest consumer money market fund in the world.

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<sup>587</sup> See "Alibaba finance arm launches online bank", Financial Times, June 25<sup>th</sup> 2017, <https://www.ft.com/content/e76198d2-1b26-11e5-8201-cbdb03d71480>.

<sup>588</sup> See "Tencent launches China's first online-only bank", Financial Times, January 5<sup>th</sup> 2015, <https://www.ft.com/content/cc5a6dc-9488-11e4-82c7-00144feabdc0>.

<sup>589</sup> See "MYbank Deepens Push for Business Big Banks Won't Touch", Bloomberg News, July 2<sup>nd</sup> 2017, <https://www.bloomberg.com/news/articles/2017-07-02/jack-ma-s-bank-deepens-push-for-business-big-lenders-won-t-touch>.

<sup>590</sup> See "Wechat's Loan platform is already on-par with some of the biggest banks in China", kapronASIA, September 7<sup>th</sup> 2017, <https://www.kapronasia.com/china-banking-research-category/item/889-wechat-loan-blows-retail-banking-with-rmb100-billion-loans-in-two-years.html> and "Blurring the lines of banking in China", Financial Times, May 29<sup>th</sup> 2018, <https://www.ft.com/content/ef39e678-632f-11e8-90c2-9563a0613e56>.

<sup>591</sup> See "MYbank Deepens Push for Business Big Banks Won't Touch", Bloomberg News, July 2<sup>nd</sup> 2017, <https://www.bloomberg.com/news/articles/2017-07-02/jack-ma-s-bank-deepens-push-for-business-big-lenders-won-t-touch>.

<sup>592</sup> Ibid.

<sup>593</sup> See "Our Statistics", Funding Circle / Centre for Economics and Business Research, August 2016, <https://www.fundingcircle.com/uk/statistics/>.

<sup>594</sup> Ibid.

<sup>595</sup> See "Ant Financial extends dominance in Chinese online finance", Financial Times, May 17<sup>th</sup> 2018, <https://www.ft.com/content/fde8fe0c-5830-11e8-b8b2-d6ceb45fa9d0> and "World's Largest Money-Market Fund Slows the Flow", Wall Street Journal, December 7<sup>th</sup> 2017, <https://www.wsj.com/articles/worlds-largest-money-market-fund-caps-daily-investment-1512657978>.

Ant Financial is embedding itself into the lives of account holders with facial recognition data, and by tracking the daily spending and patterns of movement of its users.

The Chinese Government has played a critical role in the development of fintech. In 2015, the Ministry of Finance released guidelines for developing internet finance.<sup>596</sup> China had an additional advantage: it did not have the extensive physical banking infrastructure of Western countries. As a result, it was able to leapfrog advanced economies.<sup>597</sup>

China's leadership in fintech is clear: their innovations are now being replicated globally. Alipay unveiled facial recognition payments in March 2015, ahead of Mastercard.<sup>598</sup> Lending to small & medium-sized enterprises by Alibaba was introduced in 2010, using an "alternative" credit-scoring system from its e-commerce platform. This model was eventually rolled out by Amazon in the US and Japan in 2012.<sup>599</sup>

### **Box 2: Big data and artificial intelligence**

In many cases, the adoption of AI to assess credit risks has developed more quickly in the consumer sector. The online behaviour of individuals leaves a huge trail of data. Companies scan a customer's LinkedIn profile, social media posts and even look at Facebook friends to ascertain lending risks.<sup>600</sup> Social media posts and exercise habits can be used to determine individual credit ratings.

Statistical techniques (using algorithms) sift through this data, collating individual behaviours and activities, picking patterns and estimating correlations.<sup>601</sup> This improves the accuracy of credit scoring, helping peer-to-peer lenders (such as Baidu) generate loans.<sup>602</sup>

Critics claim that the extensive use of personalised data can become detrimental for a borrower: one wrong move can lower an individual's credit score, making it more difficult to acquire a loan or repay debt. Politically, this is a sensitive issue which will have to be addressed by regulations to cover the right to contest algorithmic decision making.

### **Tech-bank partnerships**

Incumbent banks are investing in fintechs to boost lending to small & medium-sized enterprises. ING, Scotiabank and Santander (InnoVentures fund) provided \$135 million for US-based Kabbage in

<sup>596</sup> See "China Sets the Rules for Internet Finance", Federal Reserve Bank of San Francisco, August 17<sup>th</sup> 2015, <http://www.frbsf.org/banking/asia-program/pacific-exchange-blog/china-sets-the-rules-for-internet-finance/>.

<sup>597</sup> See "The Evolution of FinTech: A New Post-Crisis Paradigm?", Douglas Arner, Janos Barberis and Ross Buckley, SSRN, 2015, p. 1304, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2676553](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2676553).

<sup>598</sup> Ibid. p. 1302.

<sup>599</sup> Ibid.

<sup>600</sup> See "What is Big Data Scoring?", Big Data Scoring, 2018, <http://bigdatascore.com/>.

<sup>601</sup> See "Big Data: Credit where credit's due", Financial Times, February 4<sup>th</sup> 2015, <https://www.ft.com/content/7933792e-a2e6-11e4-9c06-00144feab7de>.

<sup>602</sup> See "An AI-Fueled Credit Formula Might Help You Get a Loan", MIT Technology Review, February 14<sup>th</sup> 2017, <https://www.technologyreview.com/s/603604/an-ai-fueled-credit-formula-might-help-you-get-a-loan/>.

October 2015.<sup>603</sup> Kabbage is listed in 10<sup>th</sup> position in the FinTech100 2017 report.<sup>604</sup> InnoVentures is Santander's \$100m fund for investment in new fintechs. Banks are waking up to the opportunities and threats posed by alternative lending models. More recently, Royal Bank of Scotland purchased an accounting software firm, FreeAgent, to improve its offerings to UK micro-businesses, perhaps as a means of data collection and data analytics to better understand its customers.<sup>605</sup>

Kabbage began as a lender, but is starting to promote its 'platform' model. It is now 'partnering' with other banks and fintech start-ups, licensing its core technology (see Appendix 2). According to Kabbage, "the firm doesn't want to try to compete with the banks for their customers when it has a better chance of reaching those customers by helping the banks serve them better."<sup>606</sup>

Incumbents have large customer bases and current account data, but they are hampered by legacy technology. Fintechs have cutting-edge technology, but are struggling to scale-up and expand into new markets. Incumbents could alternatively customise the fintechs' tools to fit their own credit scoring methodologies.<sup>607</sup>

How the partnership between fintechs and banks develops remains to be seen.<sup>608</sup> Some banks are already using core technologies (big data, machine learning) to expand loans to small businesses. This is still at an early stage. Banks may eventually acquire some of the smaller fintech start-ups, or exist side-by-side, with fintechs supplying the core capabilities (i.e. back-end procedures). In this case, the banks could remain the 'face' of the relationship and supply the funds.

The real disruptors to the banking sector are Ant Financial and Amazon, with their scale and global reach.<sup>609</sup> The systemic risks to UK banks posed by companies with superior technology should not be underestimated. The Government and the Bank of England urgently needs to recognise, and address, the threat to the UK banking system. This may strengthen the case for keeping the Royal Bank of

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<sup>603</sup> See "Santander UK teams up with Kabbage to offer fast loans to SMEs", Financial Times, April 3<sup>rd</sup> 2016, <https://www.ft.com/content/9925cc9e-f9a4-11e5-8f41-df5bda8beb40>.

<sup>604</sup> See "The Fintech100 – Announcing the world's leading fintech innovators for 2017", KPMG, November 15<sup>th</sup> 2017, <https://home.kpmg.com/xx/en/home/media/press-releases/2017/11/the-fintech-100-announcing-the-worlds-leading-fintech-innovators-for-2017.html>.

<sup>605</sup> See "RBS makes first acquisition since financial crisis", Financial Times, March 27<sup>th</sup> 2018, <https://www.ft.com/content/96c5bd4a-31b7-11e8-ac48-10c6fdc22f03>.

<sup>606</sup> See "Kabbage To License Its Lending Platform", PYMNTS.com, March 24<sup>th</sup> 2015, <https://www.pymnts.com/in-depth/2015/kabbage-to-license-its-lending-platform>.

<sup>607</sup> See "Online working capital solution to give UK SMEs access to same day funding", Santander, April 4<sup>th</sup> 2016, <http://santanderinnoventures.com/online-working-capital-solution-to-give-uk-smes-access-to-same-day-funding>.

<sup>608</sup> See "The Future of Financial Services: How disruptive innovations are reshaping the way financial services are structured, provisioned and consumer", World Economic Forum, June 2015, [http://www3.weforum.org/docs/WEF\\_The\\_future\\_of\\_financial\\_services.pdf](http://www3.weforum.org/docs/WEF_The_future_of_financial_services.pdf).

<sup>609</sup> See "Chinese fintech's global future is arriving now", Financial Times, May 21<sup>st</sup>, 2018, <https://www.ft.com/content/0f0b9b82-5ce0-11e8-9334-2218e7146b04>.

Scotland in the public realm. For other banks, the authorities will need to consider possible partnerships with technology companies to survive and help support the UK real economy.

## Appendix I – Bank profitability tables

Table 9.A

Bank profitability: return on equity								
Country	2002	2004	2006	2008	2010	2012	2014	2016
<b>Eurozone</b>	5.5	6.5	11.2	-2.8	5.5	-1.2	3.4	3.8
Belgium	11.8	15.8	22.4	-36.5	10.5	3.0	7.7	9.1
France				2.4	7.4	2.6	4.1	6.2
Germany	2.4	2.0	6.8	-7.1	2.3	2.8	2.4	2.8
Italy	7.0	9.3	11.4	3.9	2.7	-0.7	-2.1	-4.4
Luxembourg				3.2	11.8	10.5	8.1	
Netherlands				-9.0	7.7	3.9	3.7	7.5
Spain	13.4	15.0	17.2	12.2	7.2	-24.3	7.1	5.2
<b>Other Europe</b>			16.7	-5.9	6.7	3.1	5.1	3.1
Sweden			20.9	14.3	10.4	12.4	12.7	12.4
Switzerland			17.1	-16.8	9.2	3.1	3.8	3.4
United Kingdom			15.9	-4.6	5.2	1.5	4.1	1.2
<b>United States</b>	14.1	13.5	12.5	-1.0	5.6	8.8	9.0	9.3
<b>Other advanced</b>	-11.5	7.4	13.6	0.3	9.0	9.7	10.4	8.2
Australia	15.9	14.8	17.8	13.8	13.1	12.4	14.6	10.2
Canada	9.5	17.5	20.2	10.7	13.6	15.3	14.8	13.2
Japan	-16.4	4.9	11.4	-5.7	6.9	7.6	7.8	6.7
<b>Emerging markets</b>	10.2	50.1	16.0	17.0	13.0	18.0	16.1	13.1
Brazil	21.4	15.9	22.8	19.2	16.7	13.1	13.2	11.3
China	7.3	85.4	14.9	20.9	13.5	21.4	19.0	15.3
Hong Kong SAR								
India	15.8	20.7	14.2	15.2	12.9	13.4	9.5	3.2
Korea	11.6	15.2	14.6	7.2	7.2	6.8	4.0	1.8
Mexico	7.5	13.5	24.3	13.0	13.4	14.0	12.9	12.6
Singapore	8.1	11.2	14.1	10.2	9.4	12.8	11.6	9.6

Net profit as a percent of average equity

Note: Weighted averages for groups of countries, based on total lending. Euro area calculated as a weighted average of individual countries shown above.

Source: Bank for International Settlements, national data.

Table 9.B

## Bank profitability: cost-to-income ratio

Country	2001-02	2003-04	2005-06	2007-08	2009-10	2011-12	2013-14	2015-16
<b>Eurozone</b>	76.6	71.0	69.4	76.6	66.4	68.6	68.1	69.3
Belgium				72.9	70.7	68.9	61.0	58.5
France				72.6	65.0	68.0	68.9	68.6
Germany	84.4	78.2	81.2	81.3	78.3	78.5	80.7	82.7
Italy			63.2	67.3	69.4	70.0	64.5	72.4
Luxembourg	39.8	42.1	38.5	39.1	43.6	53.8	48.4	47.8
Netherlands				186.5	66.3	63.2	63.2	57.7
Spain	55.7	52.7	47.4	43.9	44.8	52.3	50.8	54.1
<b>Other Europe</b>			62.0	74.7	63.7	69.1	70.1	73.4
Sweden		57.0	53.6	52.9	53.5	53.0	49.6	46.8
Switzerland			64.0	99.2	70.1	73.8	70.6	74.4
United Kingdom			62.2	68.6	63.0	70.1	73.8	78.0
<b>United States</b>	57.2	57.5	58.0	65.3	60.3	62.3	62.4	59.7
<b>Other advanced</b>	55.5	54.1	54.6	60.2	57.0	55.7	56.3	58.4
Australia	59.9	58.0	53.4	54.9	53.1	49.2	47.6	47.6
Canada	68.1	67.2	65.6	66.4	61.1	59.3	59.0	59.7
Japan	53.8	51.9	52.9	60.3	57.2	56.8	58.8	61.6
<b>Emerging markets</b>	52.3	46.9	48.3	45.7	47.4	39.0	38.2	36.7
Brazil	69.2	63.0	57.0	56.5	52.4	52.0	54.4	52.8
China	52.5	46.3	47.6	42.6	46.3	33.3	32.3	30.9
Hong Kong SAR								
India	53.0	46.7	50.2	49.5	45.4	45.7	47.0	48.3
Korea	40.5	41.3	47.9	44.7	45.4	44.9	53.7	58.3
Mexico	80.1	67.2	57.7	66.6	67.6	69.3	68.4	68.3
Singapore	40.8	40.3	40.3	41.5	39.7	41.3	42.3	44.2

Operating expenses as a percent of revenue

Note: Weighted averages for groups of countries, based on total lending. Euro area calculated as a weighted average of individual countries shown above. Values are averages for the two-year period.

Source: Bank for International Settlements, national data

Table 9.C

Bank profitability: return on risk-weighted assets								
Country	2001-02	2003-04	2005-06	2007-08	2009-10	2011-12	2013-14	2015-16
<b>Eurozone</b>				0.5	0.4	0.0	0.4	0.7
Belgium				-3.8	0.6	0.3	1.1	1.7
France				0.6	0.8	0.5	0.8	1.1
Germany				-0.7	-0.1	0.3	0.3	0.4
Italy	0.8	1.0	1.2	0.9	0.4	-0.7	-0.9	-0.5
Luxembourg								
Netherlands					0.4	0.6	0.6	1.4
Spain	1.2	1.2	1.4	1.4	0.9	-1.6	0.9	0.9
<b>Other Europe</b>			1.6	0.7	0.8	0.7	0.8	0.8
Sweden		1.5	1.6	1.7	1.0	1.9	2.5	3.1
Switzerland						0.9	1.0	0.8
United Kingdom			1.6	0.5	0.6	0.4	0.4	0.4
<b>United States</b>	1.6	1.9	1.7	0.5	0.4	1.4	1.5	1.4
<b>Other advanced</b>	-0.7	0.4	1.2	0.6	0.9	1.2	1.3	1.2
Australia	1.3	1.6	1.7	1.5	1.5	1.8	1.9	1.7
Canada	1.2	1.8	2.1	1.8	1.9	2.4	2.4	2.2
Japan	-1.1	0.1	0.9	0.0	0.6	0.8	0.9	0.8
<b>Emerging markets</b>	1.3	1.6	2.2	1.8	2.0	2.7	1.7	1.3
Brazil	1.2	2.7	3.6	3.1	2.5	1.9	1.6	1.7
China					2.4	3.4	1.9	1.4
Hong Kong SAR								
India		1.1	1.0	1.0	1.0	1.0	1.0	0.7
Korea	0.9	0.8	1.7	1.1	0.7	0.8	0.4	0.2
Mexico	1.4	2.8	3.6	2.7	2.1	2.1	2.3	2.0
Singapore	1.0	1.1	1.5	1.4	1.3	1.4	1.2	1.2

Net profit as a percent of average risk-weighted assets

Note: Weighted averages for groups of countries, based on total lending. Euro area calculated as a weighted average of individual countries shown above. Values are averages for the two-year period.

Source: Bank for International Settlements, national data

## Appendix 2

### Amazon Lending: a closer inspection

Amazon offers a platform to match buyers and sellers of products. Small businesses can use Amazon's third-party marketplace programme to access Amazon's huge customer base, helping them to run and grow their revenues. Third-party sales account for around 52% of total sales on Amazon.<sup>610</sup> In return, Amazon charges sellers a commission on sales, as well as a fee for using Amazon's warehouses, packaging and delivery services.<sup>611</sup>

Amazon's platform provides the e-commerce giant with detailed data on customer ratings, shipping times, and orders. Amazon can build up an informed view of the underlying business model of individual SMEs.<sup>612</sup> It can also monitor business sales and revenues to forecast potential growth opportunities.

Amazon uses algorithms to identify merchants with good sales histories, offering loans ranging from \$1,000 to \$750,000, payable within a year. Amazon must approach the SME first. Amazon then receives interest on the loan, but also benefits from the commission that it charges third-party sellers. Interest rates charged vary between 6 and 17 percent.<sup>613</sup> Loan applications are particularly short, in some cases only a page long, and can be completed within minutes.<sup>614</sup>

A similar model has been adopted by transaction processing companies, including PayPal and Square. Square, for example, uses the transaction data to efficiently underwrite small business loans. The average loan size is around \$6,000. Repayment of the loan is tied to sales.<sup>615</sup>

The risks compared to traditional banking are mitigated. Firstly, Amazon lends from its cash reserves. Secondly, loan payments are deducted *automatically* from the seller's account. If payment fails, Amazon can seize the merchandise in its warehouses.<sup>616</sup> The lending is effectively collateralised.

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<sup>610</sup> See "Percentage of paid units sold by third-party sellers on Amazon platform as of 1st quarter 2018", statista, <https://www.statista.com/statistics/259782/third-party-seller-share-of-amazon-platform/>. Accessed: June 6<sup>th</sup> 2018.

<sup>611</sup> See "Amazon's Lending Business for Online Merchants Gains Momentum", Bloomberg, June 8<sup>th</sup> 2017, <https://www.bloomberg.com/news/articles/2017-06-08/amazon-s-lending-business-for-online-merchants-gains-momentum>.

<sup>612</sup> See "Tech companies invade banks' territory with customer loans", Financial Times, June 8<sup>th</sup> 2017, <https://www.ft.com/content/b45c0008-4bc1-11e7-919a-1e14ce4af89b>.

<sup>613</sup> See "Amazon to ramp up lending in challenge to big banks", Financial Times, June 8<sup>th</sup> 2017, <https://www.ft.com/content/78755202-4bb6-11e7-919a-1e14ce4af89b>.

<sup>614</sup> See "Why is Amazon loaning its sellers money?", Marketplace, July 13<sup>th</sup> 2017, <https://www.marketplace.org/2017/07/13/business/why-amazon-loaning-its-sellers-money>.

<sup>615</sup> See "The New Breed of Small Business Lenders: Amazon, Paypal and Square", Lend Academy, July 25<sup>th</sup> 2017, <http://www.lendacademy.com/new-breed-of-small-business-lenders-amazon-paypal-and-square/>.

<sup>616</sup> See "Amazon to ramp up lending in challenge to big banks", Financial Times, June 8<sup>th</sup> 2017, <https://www.ft.com/content/78755202-4bb6-11e7-919a-1e14ce4af89b>.



Amazon loan originations have surpassed the \$3 billion mark since the programme was launched in 2011.<sup>617</sup> The US company stepped up the pace of lending, originating \$1.0 billion in loans in the twelve months to June 2017<sup>618</sup>, but has since reduced this pace as part of its recent risk management measures.<sup>619</sup> Amazon is looking to expand beyond the US, UK and Japan, into Canada, France and China.<sup>620</sup>

### Kabbage

Kabbage is a fintech ‘unicorn’ advertising secure, fast, automated and customisable risk-scoring tools based on machine learning.<sup>621</sup> It has now built an automated lending platform that crunches thousands of data points to build up an accurate credit score of small businesses or individuals.<sup>622</sup> Kabbage pulls data from sources such as Google Analytics, Amazon, Facebook, and QuickBooks (accounting software), ranging from accounting records, bank accounts, e-commerce revenues and shipping data.<sup>623</sup>

The process is fully automated, including the initial decision to extend credit through to risk monitoring, payments, communications and servicing. Monitoring is available 24/7, allowing for a more accurate picture of financial health, and risk mitigation.

Kabbage also acts as a platform for other companies to extend credit. The technology is licensed to other lending businesses, including fintechs, but also more established banks.<sup>624</sup> Kabbage provides the technology platform for a licensing fee in exchange for the underwriting expertise, real-time data assessments and monitoring of the underlying business.

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<sup>617</sup> See “Amazon Loans More Than \$3 Billion to Over 20,000 Small Businesses”, Amazon, June 8<sup>th</sup> 2017, <http://phx.corporate-ir.net/phoenix.zhtml?c=176060&p=irol-newsArticle&ID=2279738>.

<sup>618</sup> See “Amazon loaned \$1 billion to merchants to boost sales on its marketplace”, CNBC, June 8<sup>th</sup> 2017, <https://www.cnbc.com/2017/06/08/amazon-loaned-1-billion-to-merchants-to-boost-sales-on-its-marketplace.html>.

<sup>619</sup> See “Amazon has partnered with Bank of America for its Lending program”, CNBC, February 14<sup>th</sup> 2018, <https://www.cnbc.com/2018/02/14/amazon-and-bank-of-america-partner-for-lending-program-but-growth-has-stalled.html>.

<sup>620</sup> See “Amazon loaned \$1 billion to merchants to boost sales on its marketplace”, CNBC, June 8<sup>th</sup> 2017, <https://www.cnbc.com/2017/06/08/amazon-loaned-1-billion-to-merchants-to-boost-sales-on-its-marketplace.html>.

<sup>621</sup> See Kabbage Inc., <https://www.kabbage.com/>.

<sup>622</sup> See “Small business loan platform Kabbage nabs \$250M from Softbank”, Techcrunch, August 3<sup>rd</sup> 2017, <https://techcrunch.com/2017/08/03/small-business-loan-platform-kabbage-nabs-250m-from-softbank/>.

<sup>623</sup> See Kabbage Inc., <https://www.kabbageplatform.com/platform-lending-technology/>. The full list of data sources that Kabbage uses is available on its webpage.

<sup>624</sup> See “Kabbage To License Its Lending Platform”, PYMNTS.com, March 24<sup>th</sup> 2015, <http://www.pymnts.com/in-depth/2015/kabbage-to-license-its-lending-platform/>.

### Appendix 3 – Fintech: compliance issues for a tech-bank

The advantage of a technology firm moving into the banking sector is the power of their data and data analytics and the ability to keep their overheads low once in operation. With their increased reliance on machine learning and algorithms for every day operations, and better capability around their communications, storage, retrieval and analytics systems, a ‘tech-bank’ already has mastery of such operations likely to set the future direction of banking. The regulators are already pushing banks to start using artificial intelligence and machine learning with the use of a regulatory ‘sandbox’ created by the Financial Conduct Authority for its ‘Project Innovate’.<sup>625</sup> It can still be a slow process with restrictions on the number of firms that can be taken on board.<sup>626</sup>

The Financial Conduct Authority provides direct support through their Innovation Hub for:

- A dedicated team and contact for innovator businesses;
- Help for these businesses to understand the regulatory framework and how it applies to them;
- Assistance in preparing and making an application for authorisation, to ensure the business understands our regulatory regime and what it means for them; and
- a dedicated contact for up to a year after an innovator business is authorised.

Regulatory requirements and technology (RegTech) are areas that tech-banks could excel at to drive down costs and ensure better compliance with regulations than the big banks do. This also adds to their competitiveness in consumer sectors and SME sectors in the delivery of wholesale type products, such as foreign exchange services.

Cost reductions in interactions with consumers may also help in reducing the retail costs of bank products. The Financial Conduct Authority is still focussed on the retail sector and the provision of digital and mobile solutions for convenience for consumers, but with limited emphasis on small & medium-sized enterprises (SMEs). Banks are working on business-to-business (B2B) services for SMEs. This was only initiated by EU regulatory changes to ensure compliance with market manipulation rules. It has had a positive effect on foreign exchange pricing, for example for small and medium-sized enterprises. It will, if properly adopted, bring cost reductions in relation to compliance oversight.

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<sup>625</sup> See FCA Innovate, Financial Conduct Authority, <https://www.fca.org.uk/firms/fca-innovate>.

<sup>626</sup> See “FCA reveals next round of successful firms in its regulatory sandbox”, Financial Conduct Authority, December 5<sup>th</sup> 2017, <https://www.fca.org.uk/news/press-releases/fca-reveals-next-round-successful-firms-its-regulatory-sandbox>.