C. Unit labour costs, productivity and international competitiveness[1]

1. Introduction

The presentation and use of measures of labour productivity and unit labour cost has become an important part of the KILM. In previous editions of the KILM, attention has focused on productivity as an important contributor to the improvement in living standards, the creation of decent jobs and social development.[2] Productivity measures are also useful for studies of international competitiveness. Countries with rapid productivity growth rates are better positioned to sell their products and services at lower prices. However, competitiveness is not determined only by productivity, but also by the cost of inputs in the production process. A well-known measure of international competitiveness combines labour cost and productivity into a single measure of labour cost per unit output. Unit labour cost measures have been widely used for international comparisons of cost competitiveness, but have been mainly compared in terms of unit labour cost trends or real effective exchange rates. The focus of this section will be on relative levels of unit labour costs, which is a rather unique measure used in the KILM, and not widely used elsewhere.[3]

In part 2, the unit labour cost measure is defined and its usefulness and limitations for a study of competitiveness are discussed. Part 3 provides an international comparison of productivity and unit labour cost measures for a group of mainly developed and middle-income economies which are included in the KILM database (see also KILM 18). Part 4 includes a discussion of unit labour cost measures for some major developing economies. Finally, part 5 summarizes the main findings and considers the implications for the creation and remuneration of jobs in developed and low-income economies.

2. Definition of unit labour cost, applications and limitations

Unit labour cost is defined as the cost of labour required to produce one unit of output in a particular industry, sector or the total economy. Unit labour cost indices can be directly compared between countries. For example, the United States Bureau of Labor Statistics (BLS) provides international comparisons of manufacturing productivity and unit labour cost trends for 25 developed and five developing economies (see KILM 17).[4] The unit labour cost series are expressed both in terms of the national currency basis as well as in US dollars, based on the currency exchange rate. The BLS also constructs a trade-weighted index of the unit labour cost trends for all major trading partners of the United States using weights that take account of both bilateral trade and the relative importance of

---

1. This section was prepared by Bart van Ark, Edwin Stuivenwold and Gerard Ypma of the Groningen Growth and Development Centre (GGDC) of the University of Groningen, Netherlands.

2. See also ILO: *World Employment Report 2004-05: Employment, Productivity and Poverty Reduction* (Geneva, 2004); website: www.ilo.org/trends.

3. Material from this section is derived from B. van Ark: "Manufacturing prices, productivity and labor costs in five economies", in *Monthly Labor Review* (Washington, DC, BLS), June 1995, pp. 56-72; website: http://www.bls.gov/opub/mlr/1995/07/art5exc.htm; B. van Ark, "Productivity and competitiveness in manufacturing: A comparison of Europe, Japan and the United States", in K. Wagner and B. van Ark, eds.: *International Productivity Differences: Measurement and Explanations*, Contributions to Economic Analysis, 233 (North Holland, 1996); and B. van Ark and E.J. Monnikhof: "Productivity

and unit labour cost comparisons: A data base", Employment Paper, No. 5 (Geneva, ILO, 2000); website: http://www.ilo.org/public/english/employment/strat/publ/ep00-5.htm.

4. See United States Bureau of Labor Statistics (BLS) website for the report of "International comparisons of hourly compensation costs" at http://www.bls.gov/fls/home.htm.

"third country" markets. The Organisation for Economic Co-operation and Development (OECD) publishes trade-weighted unit labour cost indices for each OECD country using the trading structure relative to 41 trading partners.[5] Some organizations, such as the International Monetary Fund (IMF), publish real effective exchange rates, which are obtained by deflating each countries' (trade-) weighted index of the bilateral nominal exchange rate by a similarly weighted index of unit labour costs of other countries relative to unit labour costs at home.[6]

In this section we focus on a comparison of relative *levels* of unit labour costs, which allows comparisons of cost competitiveness in absolute terms not just in relative terms.[7] Such comparisons of levels shed light on several key debates in the area of international competitiveness. For example, high-wage economies are often concerned about their relatively high level of labour costs in producing particular goods and services compared to low-wage economies, in particular to the extent that such lower labour costs are the result of lower taxation, smaller social security payments, lower expenses on high-skilled labour for R&D and innovation and, in some cases, lower labour standards. On the other hand, low-wage economies are concerned with protectionist tariff and non-tariff measures implemented by high-wage economies that hinder exports of the goods and services in which low-income economies have a

comparative advantage. Such protectionist measures not only directly impact exports, but also limit technology transfer to developing economies through restricting imports.

The unit labour cost measure is a ratio that is constructed from a numerator reflecting the major cost category in the production process (labour compensation) and a denominator reflecting the output from the production process (GDP or value added). Countries with a low level of unit labour costs relative to other countries may be regarded as cost competitive.

The meaning of the unit labour cost concept might be even better understood when expressed in terms of the ratio of labour compensation per unit of labour (for example, the wage or the total labour cost per employed person or per hour worked) and the productivity of labour (measured as output per employed person or per hour). The ratio shows that a country can improve its cost competitiveness either by decreasing its labour cost per person employed (the numerator) or raising the productivity performance (the denominator), which implies that cost competitiveness is not only based on wage growth, but can be improved through raising productivity to create more output..

A specific characteristic of unit labour cost measures is that the numerator, which reflects the labour cost component of the equation, is typically expressed in nominal terms, whereas the denominator, which is output or productivity, is measured in real or volume terms. This implies that, when comparing unit labour cost levels across countries, the level of wages or labour compensation is converted at the official exchange rate, it represents the cost element of the arbitrage across countries. In contrast, output or productivity relates to a volume measure as it resembles a quantity unit of output. Hence, for level comparisons, output needs to be converted to a common currency using purchasing power parity instead of the exchange rate, so that comparative output levels are adjusted for differences in relative prices across countries. Therefore, the unit labour cost measure represents the current cost of labour per "quantity unit" of output

5. See "Sources and Methods" of the *OECD Economic Outlook* (Paris, 2004); website: http://www.oecd.org/eco/sources-and-methods. See also M. Durand, C. Madaschi and F. Terribile: "Trends in OECD countries' international competitiveness: The influence of emerging market economies", Economics Department Working Papers (Paris, 1998).

6. See IMF: *World Economic Outlook*, Statistical Appendix (Washington, DC), various years; website: http://www.imf.org/external/pubs/ft/weo/weorepts.htm. See also A.G. Turner and S. Golub: "Towards a system of multilateral unit labor cost-based competitiveness indicators for advanced, developing, and transition countries", IMF Working Papers, No. 151 (Washington, DC, IMF, 1997).

7. For a comprehensive overview of price and cost competitiveness measures see, for example, P. Turner and J. Van 't dack: "Measuring international price and cost competitiveness", Bank for International Settlements (BIS) Economic Papers, No. 39 (Basel, 1993); and Turner and Golub, op. cit.

produced. For an analysis in terms of comparative levels between countries A and B this implies:[8]

(1) $\quad ULC^{AB} = [(LC^A/ER^{AB})/LC^B] / (Y^A/PPP^{AB})/Y^B]$

where ULC stands for unit labour cost, LC for total labour compensation, Y for total output (or value added), ER^{AB} for the official nominal exchange rate between countries A and B, and PPP^{AB} for the purchasing power parity for output in country A relative to country B.

Dividing labour compensation and output by total employment or total hours worked, gives the labour cost per labour unit (lc) and labour productivity (y):

(2) $\quad ULC^{AB} = [(lc^A/ER^{AB})/lc^B] / (y^A/PPP^{AB})/y^B]$

Equation (2) can be rewritten to decompose the difference in unit labour cost between country A and country B into three components, i.e. the difference in nominal labour cost per person, the difference in nominal labour productivity (unadjusted for differences in price levels) and the differences in relative price levels:

(3) $\quad \log(ULC^A - ULC^B) = \log(lc^A/ER^{AB} - lc^B)$
$\quad - \log(y^A/ER^{AB} - y^B) - \log(ER^{AB} - PPP^{AB})$

All these components contribute in their own way to differences in cost competitiveness between the two countries and will be discussed in more detail below.

Unit labour costs are most easily measured and best understood for trade-related sectors of the economy, in particular for the manufacturing sector that produces most internationally tradable products. Nonetheless,

the ULC measure is also useful for analysis at the level of the total economy as it measures the capacity of the economy to accommodate for an increase or decrease in labour compensation in relation to its output creation. However, the precise interpretation of a change in ULC or a difference in ULC levels across countries always depends on the source from which the change originates. For example, an increase in labour cost can either result from upward wage pressure or from a slowdown in productivity growth. The upward wage pressure may be largely an external phenomenon triggered by, for example, an appreciation of a country's currency, or it may have a domestic cause due to, for example, a shortage of labour. A productivity slowdown may be caused by a rise in the sectoral share of the services sector, as seen in many developed economies. Productivity in services usually grows more slowly than manufacturing productivity, whereas the development of labour cost is often less diverse across sectors. Slow productivity growth, however, may also be due to lack of technological progress or slow reforms in product and labour markets. The causes of the changes in ULCs, therefore, have important implications for labour and product market policies, technologies and innovation policies as well as foreign trade policies.

Before returning to the more direct use of ULC measures for tradable sectors, it should be stressed that a change in ULC in the non-tradable sectors also impacts the tradable sectors, in particular when non-tradable products or services are used as an input by the tradable sectors. Moreover, many service industries are becoming more tradable themselves, which is an indication that the distinction between tradable and non-tradable sectors of the economy is becoming increasingly anachronistic. An exclusive focus on ULC in the manufacturing industry may, therefore, be a too restrictive approach to study competitiveness.

Even for tradable sectors, the ULC index should not be interpreted as a comprehensive measure of competitiveness for several reasons. Firstly, ULC measures deal exclusively with the cost of labour. Even though labour costs

---

8. In this section and in KILM 18 (labour productivity and unit labour costs) levels are compared for each individual economy against the United States only. Countries may be compared between each other through their comparison vis-à-vis the United States. The use of trade-weighted ULC levels indices is an issue for future work. In terms of growth rates, the change in unit labour cost can be written as $\Delta ULC = \Delta LC / [\Delta Y/\Delta P]$ where P stands for the price of output and the symbol Δ indicates the change over time.

account for the major share of inputs, the cost of capital and intermediate inputs can also be crucial factors for comparisons of cost competitiveness between countries.[9] Secondly, the measure reflects only cost competitiveness. In the case of durable consumer and investment goods, competitiveness is also determined by other factors, notably by technological and social capabilities and by demand factors. Improvements in product quality, customization or improved after-sales services are not necessarily reflected in lower ULCs. In the literature on competitiveness inspired by Michael Porter, attention is given not only to factor inputs, but also to demand conditions, the presence of local suppliers and clusters, and an environment that encourages investment, innovation and competition.[10] Thirdly, measures of cost competitiveness may be distorted by the effects from, for example, bilateral market access trade agreements, direct and indirect export subsidies and tariff protection.

ULC measures also do not have the same coverage as some of the broader composite competitiveness indicators that have gained popularity in recent years. These broader indicators also take into consideration measures of economic performance, innovative capacity, structural change, improved living standards and social conditions. Selections of such indicators are taken on board in composite indicators such as, for example, the "World Competitiveness Index" of the International Institute for Management Development (IMD), the "Growth and Business Competitiveness Indexes" of the World Economic Forum (WEF), the "Structural Indicators" of the European Union and the "Human Development Index" of the United Nations. Individual countries, such as Ireland, Japan, the United Kingdom and the United States have also developed their own competitiveness indicators. Although such indicators are more comprehensive than the ULC measures used here, the individual components address very different aspects of the competitiveness process and an aggregation into one composite indicator may, therefore, be very sensitive to the underlying components used in the index.

3. Unit labour cost measures in the KILM

In the KILM the ULC series are based on measures of GDP, value added and labour compensation from the national accounts, in combination with aggregate measures of employment and working hours from the labour force or employment statistics. There are several advantages to using national accounts-based measures instead of measures from, for example, industry statistics, wage cost surveys, etc. The first advantage is that the national accounts-based measures are comprehensive in terms of their coverage of activities since national accounts are intended to cover all firms in an industry. Secondly, the output and labour compensation measures (and in some cases also the employment and hours worked measures) are consistently measured in the framework of the national accounts, covering the same activities by industry or sector.[11] This is particularly important for comparisons of levels of productivity and labour costs. Thirdly, when based on national accounts, the measures obtained for the manufacturing sector can be directly compared to those for the total economy.

Total labour compensation in the national accounts include, not only gross wages and salaries of employees payable in cash or in kind, but also other costs of labour that are paid

---

9. One might argue that with greater international tradability of capital and intermediate inputs, labour input is the key determinant of cost competitiveness as it is much less mobile across countries.

10. See M. Porter: *The Competitive Advantage of Nations* (New York, The Free Press, 1990). See also J. Fagerberg, M. Knell and M. Scholec: "The competitiveness of nations", Paper presented at 10th Anniversary DRUID Summer Conference, Copenhagen, Denmark, 27-29 June 2005; website: http://www.druid.dk/ocs/viewpaper.php?id=538&cf=3 (published in abbreviate format as Chapter 2 of the UNECE: *Economic Survey of Europe* (Geneva, 2004); website: http://www.unece.org/ead/pub/042/042c2.pdf).

11. Following one of the key recommendations in the 1993 System of National Accounts, many countries are presently integrating measures of labour input in the framework of national accounts, which will further improve the accuracy of unit labour cost measures.

by employers, including employers' contributions to social security and pension schemes (whether public or private) including imputed social contributions providing unfunded social benefits.[12] An important disadvantage of the national accounts measure of labour compensation is that it refers to compensation of wage and salaried workers (employees) only. It does not include the compensation of self-employed persons, which is, by definition, included in "other income" in the national accounts along with income on capital, profits, etc. To obtain a measure of total labour compensation per unit of output, the labour income for self-employed persons is, therefore, imputed assuming the same labour compensation for a self-employed person as for an employee. This adjustment can, of course, only be made when the number of self-employed persons is known separately from wage and salaried workers, an important constraint determining the number of countries for which such measures can be included.

Figures C1 to C6 present the comparative measures of labour productivity, labour compensation per hour worked and ULC relative to the United States for the manufacturing sector for the period 1980 to 2003. As mentioned before, ULC comparisons in manufacturing have a more straightforward interpretation from the perspective of international competitiveness, because the manufacturing sector mainly consists of goods that are – at least in principle – internationally tradable. These numbers are only available for OECD countries, but include some of the new Member States, including the Czech Republic, Hungary, Mexico and Poland, and also the Republic of Korea.[13]

Strikingly, all charts show that the relative levels of labour productivity exhibit a much greater stability than the series of US dollar-converted labour compensation (and, as a result, also of ULC). The reason for this is

obvious as the productivity measures are compared in terms of volume measures, using a specific PPP for manufacturing products.[14] In contrast, labour compensation is expressed in nominal terms, and converted into US dollars with the nominal exchange rate. In each chart the index of the nominal exchange rate for each country or group of countries relative to the US dollar is benchmarked on 1980.[15]

Indeed, the development of the relative levels of labour compensation is generally strongly related to the nominal exchange rate. For example, the nominal exchange rate of the EU-15 countries in figure C1, representing the pre-2004 membership of the European Union, showed a strong depreciation of the European currencies to the US dollar during the first half of the 1980s, which went together with a rapid decline in labour compensation and ULCs in EU manufacturing relative to the United States. During the mid-1980s the rapid depreciation of the US dollar worsened the competitive position of European countries. Despite much higher income taxes and social security contributions, relative labour cost in the EU-15 mostly remained below the US level until the mid-1990s. However, as labour productivity also remained below the US level by between 15 and 20 percentage points, ULC remained above the US level for most of the period. Hence, it is not so much high labour cost, but lower productivity that has threatened the competitive position of the EU-15 since the end of the 1990s.

Since the mid-1990s, and in particular since 2000, the manufacturing productivity gap between EU-15 and the United States has widened. Due to the rather strong depreciation of most European currencies (and since 1999 also the euro) relative to the US dollar, the lower compensation levels in terms of US dollars more than offset Europe's lower productivity levels. But, since 2001 the

12. For more information concerning the definition of labour compensation and its components, see section B of Chapter 1.

13. See part 4 of this section for a more detailed discussion of unit labour cost measures for low-income economies outside the OECD area.

14. The manufacturing PPPs are benchmarked on the year 1997 and are the same as those used for KILM table 18b. For more details on the derivation of the PPP for manufacturing products, see the "Sources and definition" of KILM manuscript 18.

15. For groups of countries the nominal exchange rate is weighted at the yearly PPP-converted GDP of each economy in the group.

combined increase in the EU-US manufacturing productivity gap and the appreciation of the euro, has led to a significant worsening of the ULC position in Europe, which was roughly the same as in the United States in 2002.[16]

Figure C2 shows the average comparative performance of three of the ten new Member States of the European Union (Czech Republic, Hungary and Poland). Relative levels of productivity and labour compensation are much lower than in the United States and the EU-15. As the comparative wage levels are even lower than comparative productivity levels, the new Member States show a significant advantage in terms of ULC levels at approximately 70 per cent of the US level. The depreciation of the currencies of these countries relative to the US dollar has further benefited the competitive position of these countries, although the latter trend has reversed somewhat since 2000.

Figure C3 compares the Japanese performance relative to the US manufacturing sector. Strikingly, the manufacturing ULC level in Japan is not only high relative to the United States, but also in comparison with that of the EU-15 (figure C1). There are several reasons for this. First, productivity levels in Japanese manufacturing were considerably lower than in Europe for the whole period. Second, during the early 1990s, ULC levels (converted to US dollars) strongly increased as a result of a rise in relative labour cost. Third, this rise in ULC was, to a large extent, due to the appreciation of the Japanese yen relative to the US dollar. Since the mid-1990s, the manufacturing ULC gap has fallen considerably due to a moderation

in wage growth in Japan, a stabilization of the yen-US$ exchange rate and an improvement in the comparative productivity performance of Japanese manufacturing. It should be stressed that the high ULC levels in Japanese manufacturing does not imply that all manufacturing were uncompetitive relative to the other advanced countries. Indeed, there is a large variation in relative ULC levels between industries, with strong cost advantages for machinery and equipment and electronic equipment industries. Other manufacturing industries, notably food and other nondurable consumer products, were much less tradable and, therefore, depended less on comparative ULC levels.[17]

The estimates in figure C4 focus on the comparative performance of two OECD Member States which are not part of the European Union, namely Australia and Canada. The average performance of these two countries has been much closer to that of the United States than were Europe and Japan, although ULC levels have remained somewhat below the US level for most of the period.

Figures C5 (Republic of Korea) and C6 (Mexico) show the results for two countries that have only recently become members of the OECD. Both Mexico and the Republic of Korea started from much lower productivity levels than the United States, but the two countries exhibited quite different trends. In Korean manufacturing the trends in comparative productivity and relative labour cost levels have moved strongly together. Already by the end of the 1980s, the Republic of Korea's ULC level in manufacturing had reached the US level, and it moved even beyond the United States during the early 1990s. The economic collapse of the Asian countries, as a result of the financial crisis, led to a strong depreciation of the Korean won, improving its ULC position relative to US manufacturing at the end of the 1990s.

---

16. As all measures presented here are in terms of levels relative to the United States, keeping the United States level constant over time, the growth performance of the United States itself is hidden from these charts. Figure C13 at the back of this section shows that unit labour cost in US manufacturing rose only slightly by about 10 per cent between 1980 and 2003 (with a peak around 1990), which was the combined result of an increase in nominal labour cost in manufacturing by about 275 per cent and an increase in manufacturing labour productivity of 250 per cent. Hence, in most cases the declines in labour cost and productivity of other countries relative to the United States do not represent absolute declines but only accelerations or decelerations relative to the US performance in manufacturing.

17. See R.C. Inklaar, H.X. Wu and B. van Ark: "'Losing ground', Japanese labour productivity and unit labour cost in manufacturing in comparison to the US", Research Memorandum GD-64, Groningen Growth and Development Centre, July 2003.
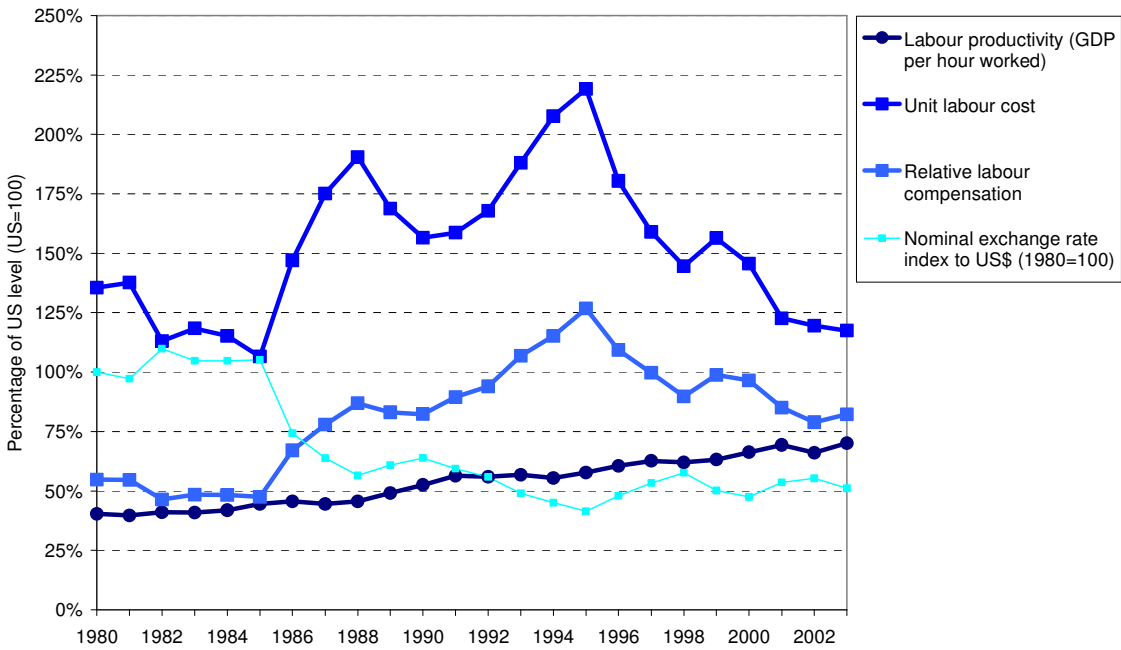
Figure C1. Average labour compensation, labour productivity and unit labour cost, manufacturing, EU-15, 1980-2003 (US=100)
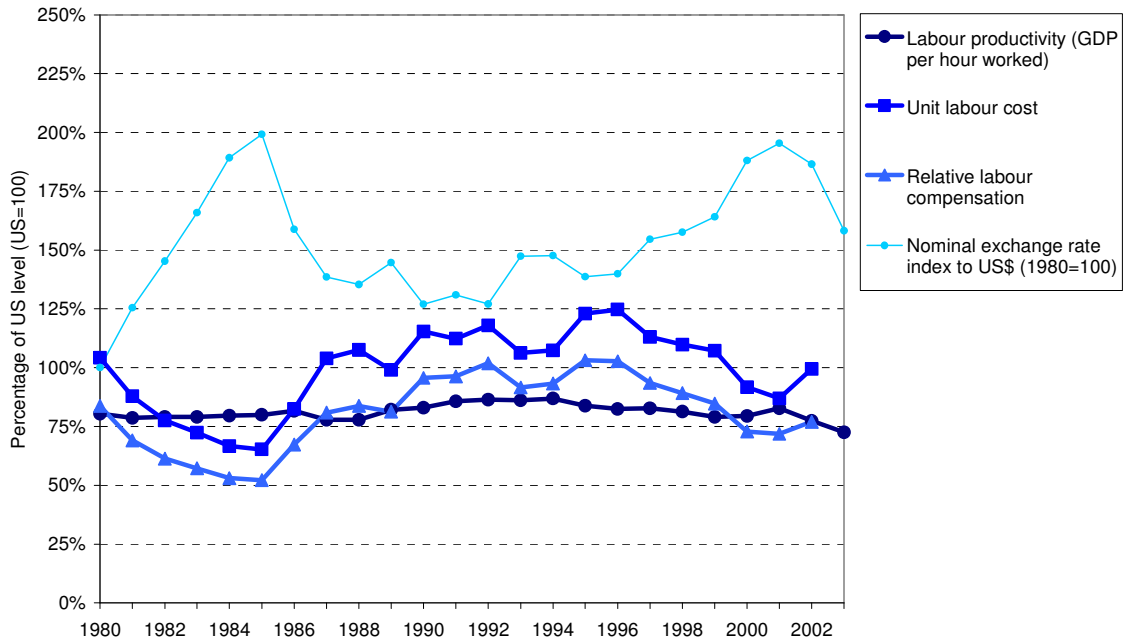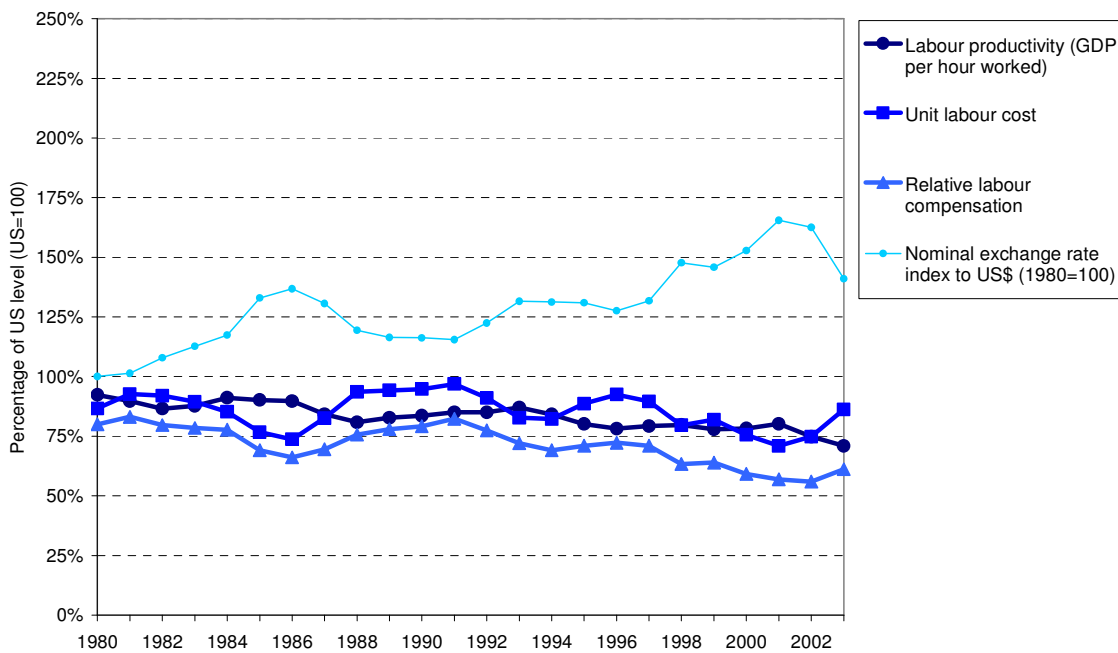

Figure C2. Average labour compensation, labour productivity and unit labour cost, manufacturing, new EU Member States (Czech Republic, Hungary, Poland), 1995-2002 (US=100)
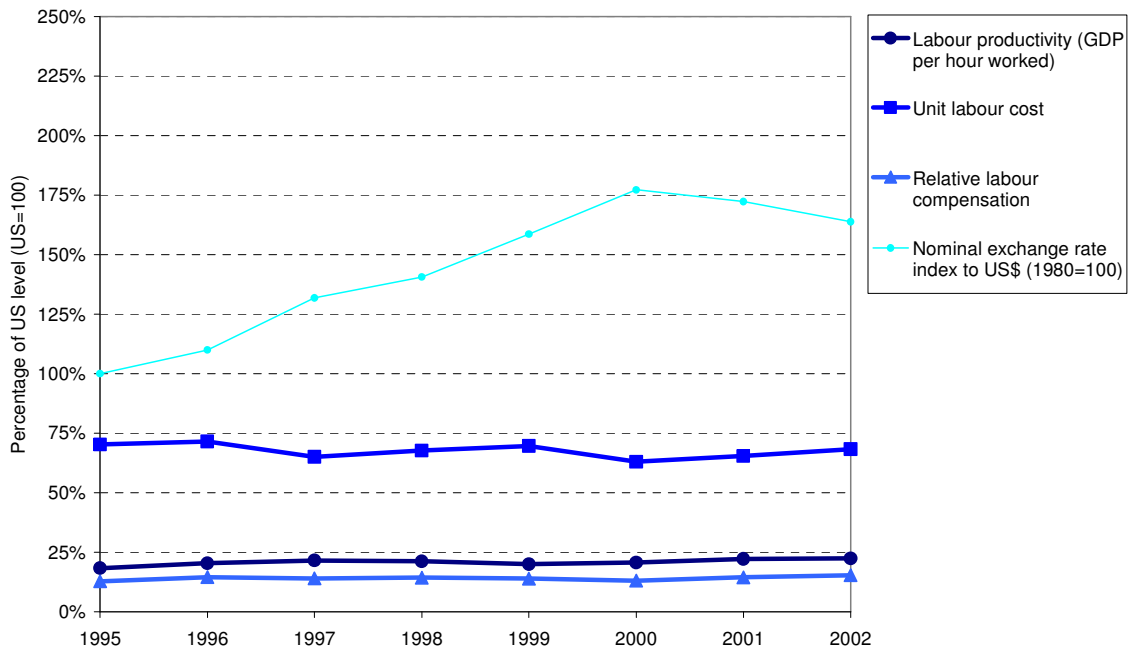
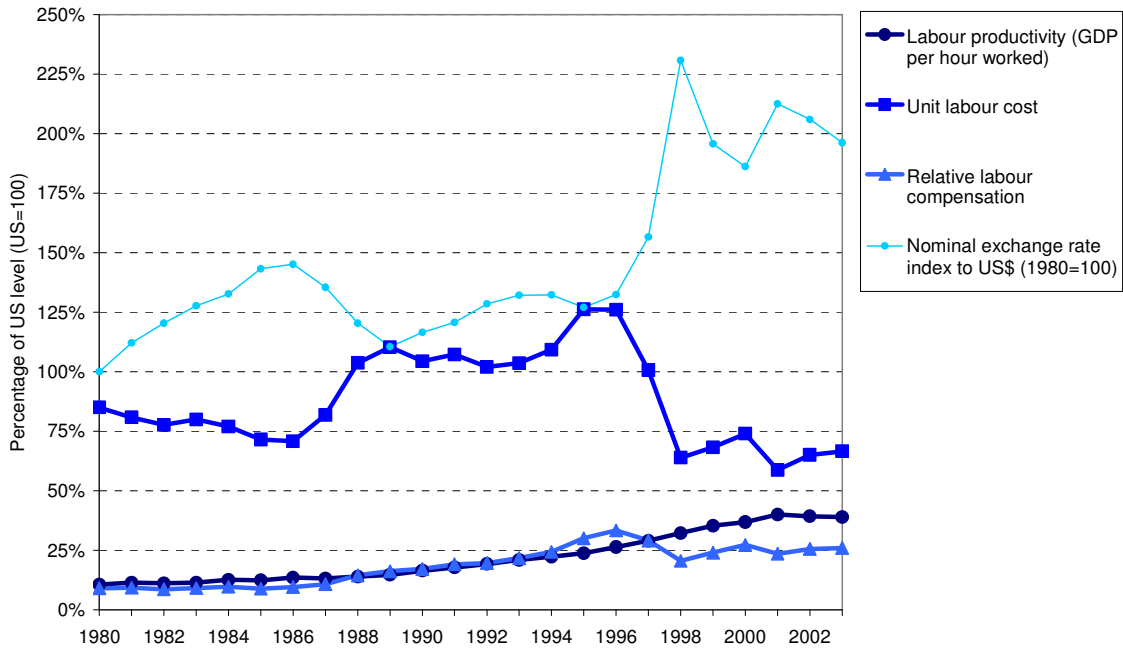# Figure C3. Labour compensation, labour productivity and unit labour cost, manufacturing, Japan, 1980-2003 (US=100)

Figure C4. Average labour compensation, labour productivity and unit labour cost, manufacturing, Australia and Canada, 1980-2003 (US=100)
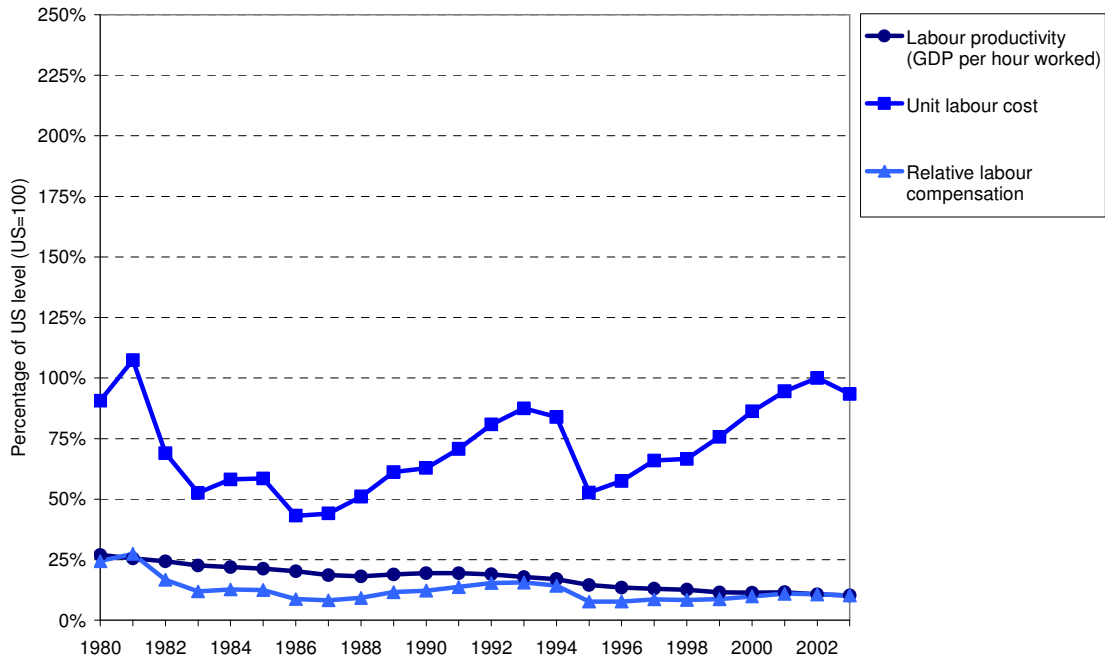
Figure C5. Labour compensation, labour productivity and unit labour cost, manufacturing, Republic of Korea, 1980-2003 (US=100)

Figure C6. Labour compensation, labour productivity and unit labour cost, manufacturing, Mexico, 1980-2003 (US=100)[18]

Meanwhile, Korean manufacturing productivity has continued to catch up with the US level. Although the manufacturing productivity level in the Republic of Korea remains considerably lower than that of the United States, the gap in productivity has been reduced from 90 percentage points in 1980 to only 60 points in 2003.

In Mexico (figure C6), manufacturing labour productivity and labour compensation has continuously deteriorated relative to the United States. Comparative productivity levels in manufacturing fell from about 25 per cent of the US level in 1980 to only 10 per cent in 2002. Part of the widening in the productivity gap was due to the rapid acceleration in US productivity growth, but labour productivity in Mexican manufacturing also declined slightly in absolute terms. The ULC level in Mexican manufacturing has remained below the US level virtually throughout the period 1980-2002, but recently it approached the US level as the relative decline in productivity went together with a slight rise in labour cost levels relative to US manufacturing.[18]

As discussed above, productivity, labour compensation and ULCs can also be measured for the total economy. Figures C7 to C12 show the series for the total economy, which may be compared to those for manufacturing in figures C1 to C6. On the whole, labour productivity levels relative to the United States are higher for the total economy than for manufacturing. This indicates that productivity levels in non-manufacturing industries – in particular in service industries – are generally closer to the US level than in manufacturing.[19] In the EU-15 (figure C7), productivity in the total economy improved to more than 90 per cent of the US level in 1995 (although the total productivity level has declined somewhat since 1995). This implies that the productivity gap between manufacturing (which stayed at approximately 80 per cent of the US productivity level) and non-manufacturing has significantly increased since 1980. In Japan (figure C9), the differences between manufacturing and non-manufacturing productivity levels relative to the United States has declined, as manufacturing has caught up more rapidly with the United States than productivity in the total economy.

Relative levels of labour compensation for the total economy have also generally been closer to the US level than labour compensation levels in manufacturing. However, there are differences between the various countries or groups of countries with important implications for the ULC position. For example, manufacturing ULC levels in the EU-15 have increased more, relative to the United States, than those for the total economy. This implies that the manufacturing sector in Europe has become less competitive in terms of labour cost per unit of output compared to the rest of the economy's sectors. In contrast, the competitiveness position in Japanese manufacturing has improved relative to the total economy. In the Republic of Korea, the ULC level in manufacturing worsened considerably during the early 1990s, but since the financial crisis at the end of the 1990s, it recovered faster than for the total economy (figure C11). Despite relatively low productivity levels in Mexican manufacturing, the sector is much more competitive relative to the United States than the non-tradable sectors of the total economy (figure C12).

---

18. Figures C6 and C12 for Mexico do not show the exchange rate because of the difficulty in matching the scale to that of the other indicators shown. Due to high inflation years, the Mexican exchange rate depreciated sharply – by 470 per cent – since 1980.

19. In this light it is also useful to compare the change in US labour productivity, labour compensation and unit labour cost between the total economy and manufacturing. Figure C14, at the end of this section, shows that unit labour cost for the total US economy has increased much faster (at almost 90 per cent between 1980 and 2002) than in manufacturing (at only 10 per cent). This is mainly due to the much slower increase in labour productivity in the total US economy (about 50 per cent

between 1980 and 2003) compared to manufacturing (an increase of 250 per cent in labour productivity).
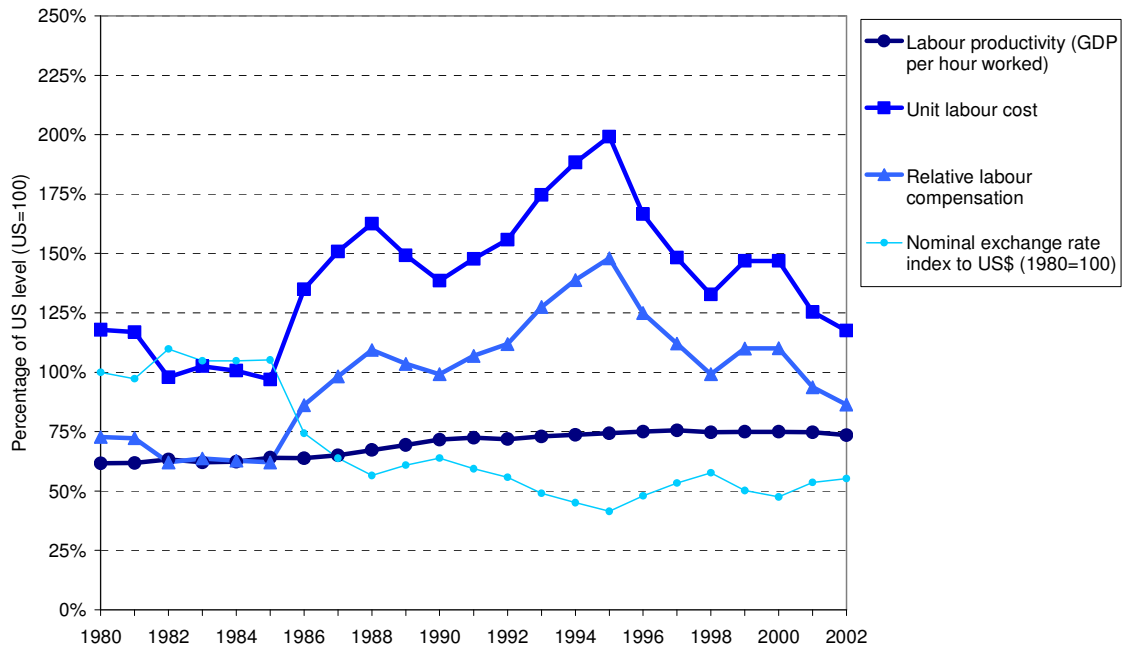
Figure C7. Average labour compensation, labour productivity and unit labour cost, total economy, EU-15, 1980-2003 (US=100)
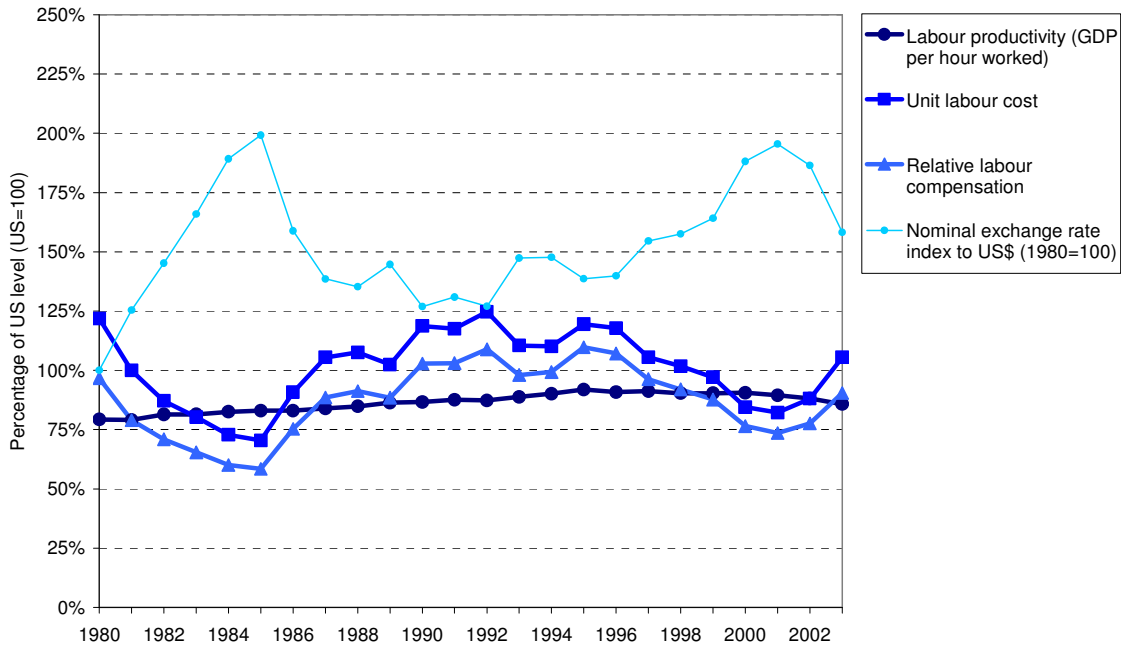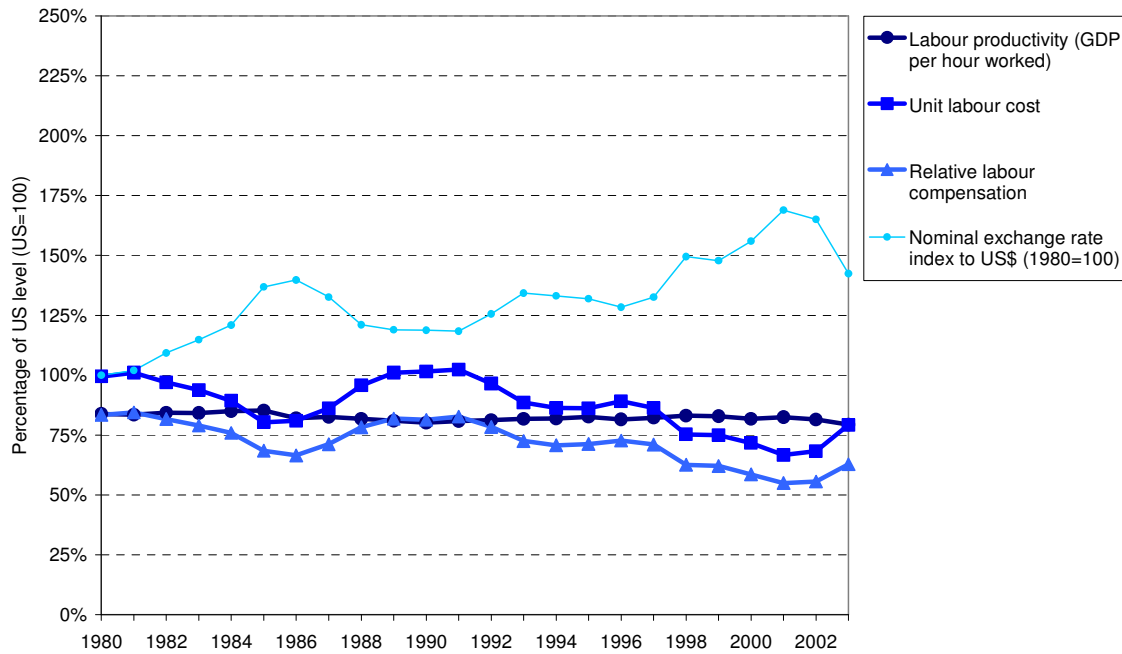

Figure C8. Average labour compensation, labour productivity and unit labour cost, total economy, new EU Member States (Czech Republic, Hungary, Poland, Slovakia), 1995-2003 (US=100)
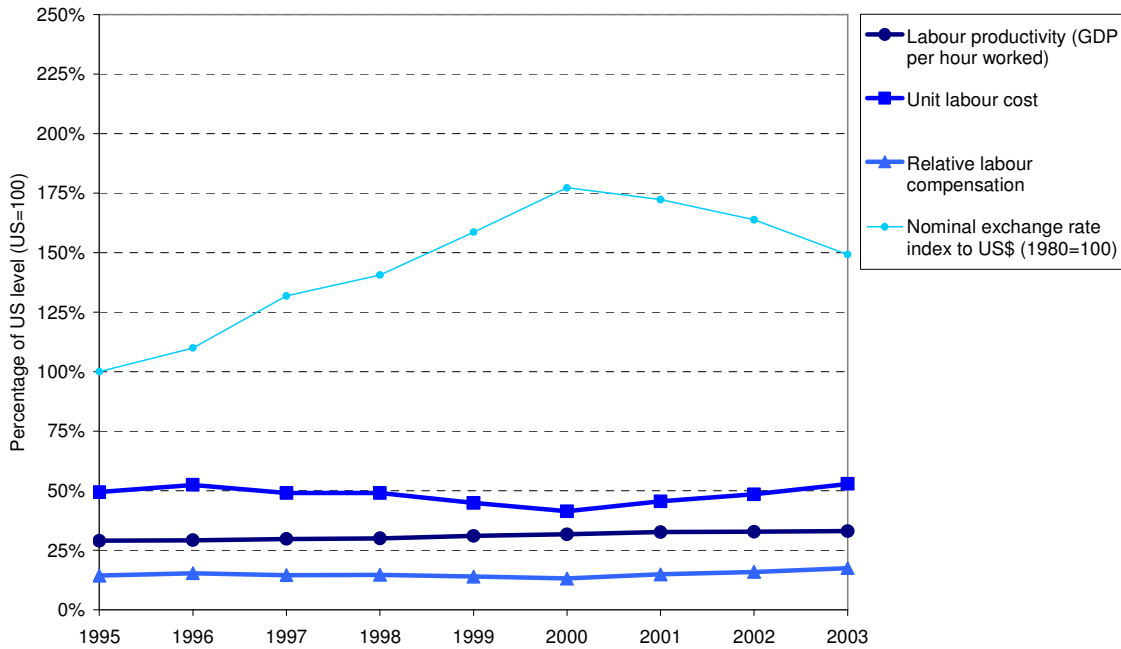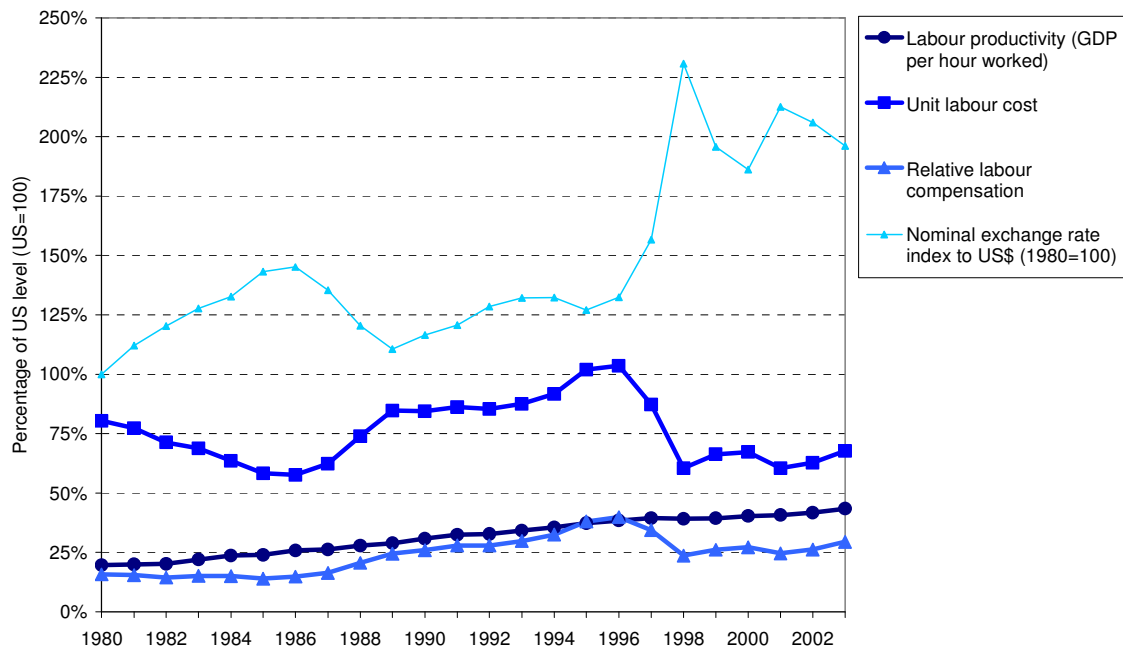
Figure C9. Labour compensation, labour productivity and unit labour cost, total economy, Japan, 1980-2002 (US=100)


Figure C10. Average labour compensation, labour productivity and unit labour cost, total economy, Australia, Canada, New Zealand, 1980-2003 (US=100)

Figure C11. Labour compensation, labour productivity and unit labour cost, total economy, Republic of Korea, 1980-2003 (US=100)

Figure C12. Labour compensation, labour productivity and unit labour cost, total economy, Mexico, 1980-2002 (US=100)[18]
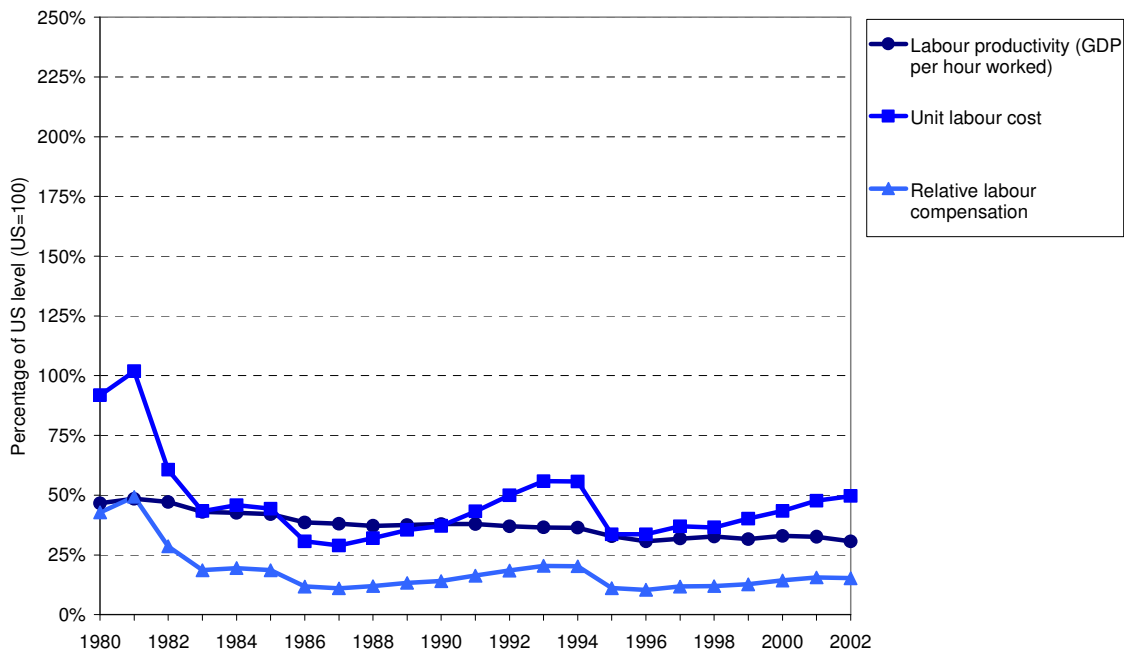
In summary, the analysis in this section has shown that even within the group of the most developed members of the OECD, there are significant differences between countries and groups of countries in the comparative performance of labour productivity, labour compensation and ULCs. In general, there is a greater stability in relative levels of labour productivity than in relative levels of labour compensation after conversion to US dollars. Still, even when taking account of the impact of short-term changes in the nominal exchange rates, labour compensation levels tend to move in tandem with productivity levels, so that the absolute differences in ULCs between countries are smaller than the differences in labour cost and productivity.

Still, there remain significant differences in ULC levels, even in a tradable sector such as manufacturing. In addition to the short-term exchange rate movements, such differences may be partly related to differences in industrial structure. They may also be caused by remaining measurement issues. For example, even though the measure of labour compensation in the national accounts is the most comprehensive, including income taxes and social security contributions, the precise administration of such administrative costs may lead to differences in measurement between countries. Moreover, the imputation of labour cost for the self-employed on the basis of compensation of wage and salaried workers can introduce significant errors in the estimation. Such problems may increase when low-income economies are included in the comparison, as discussed in more detail in the following section.

4. The unit labour cost position of developing economies

The ULC comparisons included in the KILM are mainly for developed economies, which (except for Taiwan, China) are all members of the OECD. The main reason for this focus on developed economies is the lack of adequate information on labour compensation from the national accounts of low-income economies. Labour compensation measures need to include employers' costs, such as social security contributions, etc., which are often not well registered in developing economies. In addition, the relatively large share of self-employed persons (in the informal economy), even in manufacturing, complicates the analysis of ULC for developing economies. Finally, the lack of detailed industry-level PPPs inhibits the calculation of comparative levels of productivity.

Various national and international organizations, however, have produced studies of ULCs in non-OECD countries, including estimates for Central and Eastern European countries (UN Economic Commission for Europe) and Latin American countries (Inter-American Development Bank). The measures, however, are not always easy to compare, particularly because the labour cost measures may or may not include income-related factors such as remuneration for time not worked, bonuses and gratuities, housing allowances and payments in kind.[20]

In recent years, there has been considerable interest in measuring the level of ULCs in the manufacturing sector of China, given China's increased share in the world trade of manufacturing products. A detailed study commissioned by the BLS has investigated the possibility of constructing ULC measures for China, which is one of the major US trading partners not presently included in the BLS database.[21] The study

---

20. One may, of course, argue that such contributions are generally quite low in low-income economies so that the bias would be limited when using only gross salaries received by wage and salaried workers. On the other hand, employers' contributions to social security may often be paid in kind which is often immeasurable anyway. There is also some evidence that bonuses on regular wages are quite frequent in low-income economies, for example in China.

21. See J. Banister: "Manufacturing employment and compensation in China" (Washington, DC, BLS, 2005); website: http://www.bls.gov/fls/chinareport.pdf. See also, J. Banister: "Manufacturing employment in China", in *Monthly Labor Review* (Washington, DC, BLS), 2005, Vol. 128, No. 7, pp. 11-29; and J. Banister: "Manufacturing earnings and compensation in China", in

identifies the great difficulty in obtaining estimates for manufacturing employment and labour compensation, especially outside urban areas and for the growing private sector of the economy. Despite the substantive statistical uncertainties, some recent studies demonstrate a decline in trade-weighted ULC of China relative to its main competitors between the late 1980s and the mid 1990s, after which the ULC trend in China reverts to a slight increase since 1995. The latter increase is due to the actual rise in ULC in China (in national currency), a decline of ULCs of major competitors, such as the Republic of Korea, Taiwan, China and the United States, and the growing importance of Taiwan, China in Chinese trade.[22] Combining the 2002 BLS estimate on the hourly wage level for Chinese manufacturing employees (which came to 2.3 per cent of the US level of compensation for employees) with an estimate of manufacturing productivity of 4.6 per cent relative to the US, brought the Chinese ULC level in manufacturing to approximately 50 per cent of the US level.

Most studies for developing economies concentrate on trends in (trade-weighted) ULCs and real effective exchange rates. One of the few studies that also provide comparative level estimates of productivity and ULC is by Golub (1999).[23] The Golub study included 14 countries, including the G5 (France, Germany, Japan, United Kingdom, United States), seven major Asian countries (India, Indonesia, Malaysia, Philippines, the Republic of Korea, Singapore and Thailand) and two Latin American countries (Chile and Mexico).

Despite the advantage of including several middle-income economies, Golub's dataset is not directly comparable to KILM 18. Whereas the latter measures are almost entirely based on national accounts, Golub's measure of labour compensation relates to employee wages obtained from the United Nations Industrial Development Organization (UNIDO), which do not include employer contributions to social insurance. Golub's estimates are only for manufacturing, and for productivity he does not provide estimates of output per hour worked, but only output per person employed. It is also unclear whether the Golub study includes an adjustment for labour compensation of the self-employed. In converting manufacturing productivity to a common currency, Golub makes use of purchasing power parity for producer durables obtained from the Penn World Tables.[24]

Despite these differences, Golub's results may be compared with those for the developed economies discussed in section 3. As stressed earlier, Golub also emphasizes that relative levels of ULC are much closer between countries than those of labour productivity and compensation separately, as differences in the relative levels of both indicators more or less offset each other. Still, there are differences among countries. By the early 1990s, relative ULC levels in Malaysia and Thailand had converged to about the same level as those in the United States, whereas those in the Philippines were at between 70-80 per cent of the US level and, those for Indonesia, at only 20-30 per cent of the US level. All these Asian countries, however, experienced large depreciations of their currencies during the late 1990s, which will have led to much lower ULC levels in recent years. In India, ULC levels were well above those of the United States until the end of the 1980s, as relative productivity levels were lower than relative labour cost. This situation changed markedly during the 1990s, also as a result of the depreciation of the rupee since the late 1980s and the acceleration in manufacturing productivity growth in India.

Monthly Labor Review (Washington, DC, BLS), 2005, Vol. 128, No. 8, pp. 22-40.

22. See, for example, S. Dullien: "China's changing competitive position: Lessons from a unit-labor- cost-based REER" (2005); downloadable from EconWPA at http://econwpa.wustl.edu:80/eps/it/papers/0502/0502016.pdf; W. Hiumin and R. Ruoen: "Multilateral unit labor cost-based competitiveness indicator for China", International Seminar on Economic Indicators and Business Cycle: Where Do We Stand? Singapore Department of Statistics and The Conference Board, Singapore, 26-27 May 2004; website: http://www.singstat.gov.sg/conferences/business/ulc.pdf.

23. S.S. Golub: *Labour Costs and International Trade*, AEI Studies on Understanding Economic Inequality (Washington, DC, American Enterprise Institute for Economic Research, 1999).

24. See R. Summers and A. Heston: "The Penn World Table (Mark 5): An expanded set of international comparisons, 1950-1988", in *Quarterly Journal of Economics*, 106(2), May 1991, pp. 327-68.

5. Summary and conclusions

The main message from this section is that at least three ingredients are required for an analysis of international competitiveness, namely: (1) the nominal labour cost per worker or per hour worked; (2) the output volume per worker or per hour worked; and (3) the ratio of the purchasing power parity for output relative to the nominal exchange rate. An important observation from the comparisons shown here is that relative productivity levels tend to move more or less in tandem with relative labour cost levels so that ULC levels are closer between countries than labour cost levels per se. The competitiveness of a high-wage economy is, therefore, not, by definition, immediately threatened by lower labour cost elsewhere, as countries with low labour costs are usually also characterized by lower productivity levels. In addition, for example, in the case of the EU-15, we found that it was not so much high labour cost but lower productivity that threatened the competitive position of the region.

However, ULC levels are certainly not identical between countries, as there are important deviations due to short-term movements in relative prices (related to fluctuation in the nominal exchange rate) and differences in industrial structure. Whereas some of the differences cancel out at the aggregate level, differences in industry and product composition are quite important at a more detailed industrial level. Due to the difficulty in obtaining all the data necessary to make level comparisons, the analysis in this section was largely restricted to OECD countries. A brief analysis of some complementary evidence for other middle- and low-income economies, including China and India, showed that ULC levels also had a fair amount of variation for a wider range of countries at different income levels. But, again, both labour cost and productivity are important factors determining cost competitiveness. For example, the Republic of Korea has shown rapid improvement in labour productivity relative to the United States, but its ULC level has been threatened by rapid wage increases during the early 1990s. In contrast, Mexico has shown deterioration in productivity, but its ULC level has remained much lower than in the United States because compensation levels have also fallen.

It should be stressed that an exclusive focus on productivity, labour cost and ULC measurement cannot, of course, fully explain (changes in) trade patterns and differences in economic performance between countries. Firstly, at the country level, it is difficult to speak of "competitiveness" as, strictly speaking, one should always distinguish between industries with and without a comparative advantage relative to other countries. A focus on industry-level detail is therefore very important.

Secondly, as indicated in this section, competitiveness covers a broader range of aspects than just relative cost and productivity, particularly in the longer run. In its broadest interpretation it may include various aspects of economic performance and efficiency, such as improvements in product quality and a firm's capacity to innovate and to adapt to consumer preferences, but also the functioning of the macroeconomic, institutional and policy environment, the quality of financial intermediation, the flexibility of factor markets, etc. While competitive gains are primarily realized at the level of individual firms producing goods and services, governments have an important role to play to facilitate the process. In this light, policies with regard to a country's trade regime cannot be seen in isolation of other policy measures, such as labour and product market reforms, education and innovation policies.

Despite its limitations, the monitoring of ULC is a useful tool to track a country's competitive performance in the short and medium run – i.e. to take the external sector's temperature and look for possible solutions if ULCs increase. The ULC measure is particularly useful when decomposed into the effects of productivity, labour cost and relative price performance. Future work in the area of ULC studies should include the extension towards trade-weighted measures and developing economies. A greater emphasis on
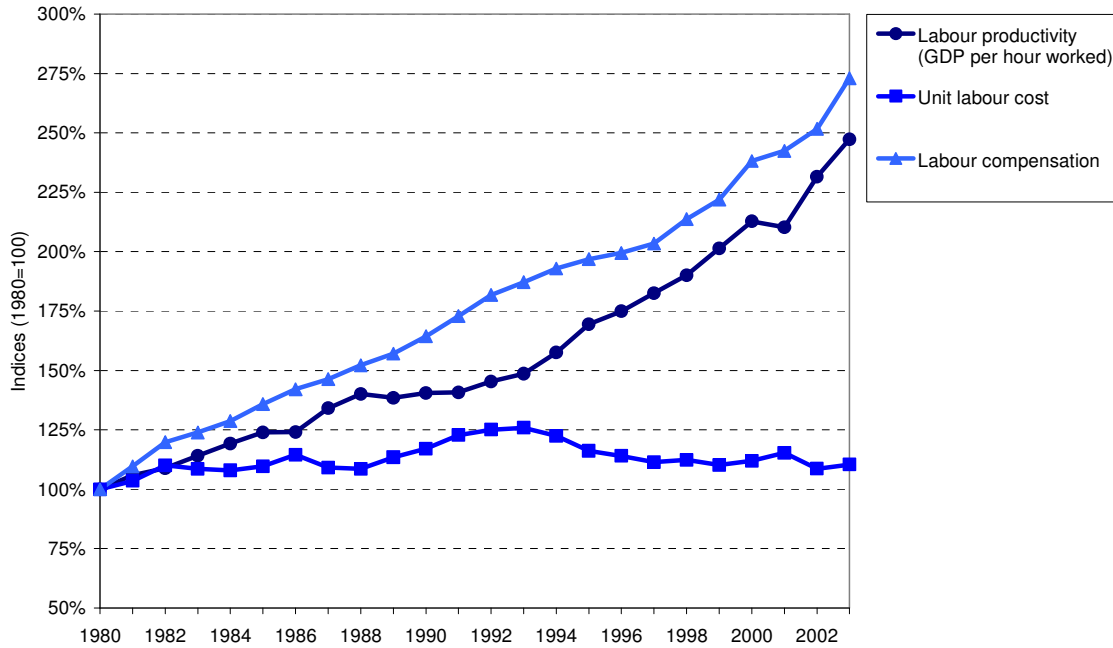
industry measures in the tradable sector, but also on what was traditionally seen as non-tradable industries (such as services), will also require more attention.

Figure C13. Indices of labour compensation, labour productivity and unit labour cost, manufacturing, United States, 1980-2003 (1980=100)

Figure C14. Indices of labour compensation, labour productivity and unit labour cost, total economy, United States, 1980-2003 (1980=100)