

E-Finance in Emerging Markets: Is Leapfrogging Possible?

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Summary

The state of play

Electronic financial services, whether delivered online or through other remote mechanisms, have spread quickly in recent years. Despite differences among countries—including factors such as the readiness of the telecommunications infrastructure and the quality of the regulatory framework—there is much commonality and significant convergence in the spread of e-finance. Penetration rates vary by type of service. Most affected are brokerage markets, where online trading is becoming the norm. Increased connectivity has accelerated the migration of securities trading and capital raising from emerging markets to a few global financial centers, with capital raised offshore by emerging markets increasing almost 10-fold in the past 10 years. This shift has resulted in far greater integration and intermarket links. Consolidation is not limited to trading systems but is also happening in key middle and back office functions such as custody, clearing of trades and retail payments, and central securities depositories. The spread of e-finance to banking services has been more varied across countries. Spurred by the entry of new e-finance providers from outside the financial sector, however, many financial service providers are now offering e-finance services.

The potential of e-finance

By 2005 the share of online banking could rise from 8.5 percent to 50 percent in industrial countries, and from 1 to 10 percent in emerging markets. With better connectivity, online banking transactions in emerging markets could rise even further, to 20 percent by 2005. Online transactions could account for 80 percent of brokerage transactions in industrial countries by 2005, up from 28 percent today, and for 15 percent in emerging markets, up from 1.5 percent. With a better business and enabling environment in emerging markets, the share of online brokerage could even hit 40 percent by 2005. But these averages hide large differences, depending on whether a country's penetration rate has already passed a critical level. In Nordic countries, for example, e-finance in banking could reach nearly 80 percent by 2005, while U.K. and U.S. penetration would approach just 50 percent. And in brokerage, penetration rates in Nordic countries could rise to 90 percent.

The impact of e-finance

E-finance will lead to much lower costs and greater competition in financial services, through both new entry from outside today's financial sector, and greater competition among incumbent financial service providers. These developments will force banks to lower intermediation fees and commissions because providing e-finance is much cheaper than providing financial services with existing technologies. Incumbent financial institutions will likely experience a sharp decline in revenue.

- For banks in industrial countries, banking margins could drop from 2.3 percentage points in 1997 to 2.0 percentage points in 2005 and 1.7 percentage points in 2010. In Denmark, margins could fall even further, by 47 percent by 2005. In Sweden and the United States margins could fall by some 20 percent or more by 2005.
- In emerging markets margins would decline less at first, from 4.4 percentage points in 1997 to 3.9 percentage points in 2005. But over a longer period the decline would be quite sharp—to 2.5 percentage points by 2010. In some emerging markets margins could fall more than 50 percent by 2010.
- The impact on brokerage and related asset management services could be even greater because cost reductions have been larger and competition stronger. By 2005 brokerage revenues could fall by half in industrial countries and by one-third in emerging markets. By 2010 total revenues could be just one-third of what they are today.

Leapfrogging opportunities

The impact of e-finance is not limited to industrial countries and the most advanced emerging markets. For countries with underdeveloped financial systems, e-finance offers an opportunity to leapfrog. Such countries may have unsophisticated financial systems today with limited services and poor financial infrastructure. To the extent that financial services are provided, they might reach only select groups: urban customers with high net worth, state enterprises, and large agribusinesses rather than small and medium-size firms, farmers, or microenterprises. Such systems likely do a bad job of allocating resources and have high intermediation costs, problems with establishing credible and independent supervision, and possibly large fiscal

costs from the occasional (or repeated) recapitalization of banks. For such countries, e-finance can be a revolution—and anecdotal evidence indicates that this is starting to happen. In many African countries, electronic cash and multipurpose cards offer savings and payment services to customers who often do not even have formal bank accounts. Other countries—Brazil, Estonia, Republic of Korea—suggest that e-finance can be introduced quickly even where basic financial infrastructure is weak. E-finance will also allow financial services to be delivered in such countries from offshore, providing the additional benefits of international technology and oversight.

New policy issues

Realizing the gains of e-finance will require changes in public policy toward financial services.

- The most pressing policy issues involve the enabling environment for e-finance. This involves setting regulatory and other frameworks for contract enforcement, for information and privacy, and for telecommunications, security, and public infrastructure for electronic transactions. The telecommunications framework should avoid protecting incumbent providers and allow private firms to enhance connectivity for all consumers using forms from fixed lines to mobile and satellite. Internet-based transactions require their own security measures for which private solutions may not be sufficient. For example, government actions are needed to set up a framework for digital signatures and to designate agencies or processes to authenticate public keys associated with transactions. Also essential are efforts to define the privacy framework and to use technology to solve contract enforcement problems.
- If information is good enough, e-finance will extend the reach of financial institutions and capital markets. Governments will need to review their information and privacy policies in light of the new possibilities. With e-finance, contract enforcement has become more important within and across borders, but new technology may also help solve contract enforcement problems. Most rule setting will have to be at the global, not the national level.
- Managing risks will become more important at the consumer and investor levels. E-finance can

increase risks such as theft and lack of privacy. It can also create new ones such as the nondisclosure by so-called objective information providers of offline businesses and related conflicts. Such risks require more emphasis on disclosure, more efforts to educate consumers and investors, and stronger incentives for better information for consumers and investors. The Internet is starting to provide solutions, with firms acting as certification agents, aggregators, and vendors of security and privacy hardware and software on behalf of consumers and investors.

- Prudential regulation will probably become less effective, so it will be important—especially in emerging markets—to ensure that the safety net is not extended to nonfinancial firms that increasingly provide near substitutes for financial services, including deposits. Similarly, there will be a need to avoid overprotecting inefficient incumbent institutions from the competition created by e-finance; this will require better exit policies (such as frameworks for resolving failures). In terms of making financial markets and institutions work efficiently and effectively, more emphasis will need to be placed on competition policy and clear rules for markets.

Models of financial sector development

Approaches to financial sector development need to take into account the possibilities for countries to leapfrog using e-finance. E-finance can allow countries to establish a financial system without first building a fully functioning financial infrastructure. Because e-finance is much cheaper—since it lowers processing costs for providers and search and switching costs for consumers—providers can market financial services involving smaller transactions to lower-income borrowers, even in remote areas. To further this, government's main role will be to enhance the enabling environment. But developments also require a review of government's direct and indirect roles in the financial sectors of emerging markets.

The role of government

Government intervention in the financial sector has generally had poor results. Government ownership of banks retards financial sector

development and increases the risk of financial crises. Efforts to reach underserved groups often fail or are captured by special interests, and can incur large fiscal costs.

- E-finance reduces the need for government intervention because the private sector can provide financial services even when a country's financial sector is weak. Market failures will be less likely because new technology will make information more easily available and, with related reforms, of higher quality. This will permit financial services to be provided more widely and make markets to trade risks and assets more complete, reducing the need for government intervention.
- There will still be scope for government action beyond setting the enabling environment. As a start, government could improve the way it shares information (such as credit-related information, subject to privacy statutes). Existing infrastructure, such as post office networks, can provide access to e-finance services. In addition, government's role can change fundamentally in areas such as banking services, housing finance, insurance, nonbank financial services (factoring, leasing), storage finance, trade finance, small and medium-size enterprise lending, and even microlending.
- Smart cards can deliver financial services even where financial sector infrastructure is weak. Such cards can store customer information and

so extend financial services not just by banks but also by nonbanks.

- In housing, the delivery of financial services can be unbundled much more efficiently, achieving savings, lowering costs, and expanding access.
- In financing for small and medium-size enterprises, as the costs of delivering financial services fall, the size of profitable transactions will shrink, allowing access to financial services for more customers.
- Gains can be large for traditional financing such as trade finance and working capital finance.

This paper comes with provisos

First, as with any new phenomenon, e-finance faces large data problems. The data presented here on internet penetration and even that for total customers must be viewed with caution. More efforts will be needed to develop a consistent methodology for measuring concepts such as internet penetration and related basic data on e-finance. Second, the paper covers a variety of issues, each of which requires deeper analysis. Further research and analysis (often multidisciplinary) are needed on each issue. Finally, e-finance offers many opportunities—but it is no panacea. Most of the benefits, such as widening access to financial services, can be realized only if complementary reforms are made in communications infrastructure, security, contract enforcement, corporate governance, and other areas.

Recent Trends and Prospects in Financial Services

Although there has been some retrenchment in the technology sector, technology and globalization continue to transform the production and delivery of financial services. Financial services are increasingly delivered electronically, though a number of factors appear to influence the penetration of e-finance and the ability of countries to realize its potential. How has e-finance evolved, and what effect is it having on incumbent financial institutions?

Taking stock

Through various channels—computers, cell phones, kiosks—e-finance is spreading around the globe, including to emerging markets. Although there is variation by market and region—in terms of the main medium used to deliver financial services, the types of services provided, and the rate of penetration—there are significant commonalities in the development of e-finance. That trend suggests that global convergence is possible. Large and growing overseas migration of trading and capital raising complements the rapid growth in electronic delivery channels. And around the world, connectivity is increasing.

E-finance penetration

As with any new phenomenon, data on e-finance are hard to collect—and even harder to compare across countries and services¹. Thus any data should be interpreted with caution. Using various sources, Table 1 shows the extent of electronic banking and brokerage services in key industrial and emerging markets. There is significant variation, with differences not clearly related to each country's level of development. In some countries, industrial as well as developing, electronic delivery of financial services remains in its infancy. Meanwhile, other countries have seen rapid penetration of e-finance. In Sweden e-finance accounts for more than one-third of financial transactions. In some emerging markets, such as the Czech Republic, Republic of Korea, and Mexico, e-finance penetration is also high for some financial services.

There is evidence of convergence in e-finance across countries. Despite institutional disadvantages (such as weaker telecommunications infrastructure) and more adverse demand and supply factors, Internet-based services are sometimes as popular in emerging markets as in industrial countries—or even more popular. For example, online banking is nearly as widespread in Brazil as in the United States. This suggests that around the globe, e-finance is fairly easy to introduce and for customers to assimilate. It may also suggest that in countries with weak financial services, customers have a strong incentive to move to e-finance providers. Banking services may still be limited in these countries, but e-finance offers an opportunity to expand access.

Although online-only banking has been less successful than was anticipated, with several online-only banks running into difficulty, incumbent banks are starting to offer financial services electronically. The threat of new entrants has led many banks to offer e-finance ranging from basic to fully integrated Internet services. Speed and other factors influencing this shift vary by an institution's size and circumstances, but this trend has accelerated recently in the United States and Europe (Furst, Lang, and Nolle 2000; Salomon Smith Barney 1999, 2000). Thus customers of incumbent banks in other markets could soon migrate to complete e-finance as well.

E-finance has made the greatest inroads in securities markets—especially on the retail side, where online trading has quickly taken large market shares. About 28 percent of brokerage services are now provided online in industrial countries and in some emerging markets. This rapid acceptance of e-finance in securities markets partly reflects the technology-driven nature of these markets and the ease with which consumers can switch brokers. Moreover, the low costs of introducing standalone and integrated brokerage services have permitted rapid growth around the world. The rapid spread also suggests that the technology of e-brokerage is easy to introduce and market to users, and that cost reductions are quickly being passed on to consumers.

Other e-payment products, such as e-money, have seen various penetration rates. In some countries (the Netherlands, Norway) penetration, as measured by the number of terminal units at which payments can be made by cards, is quite high (see

1 No standards for the measurement of such concepts as internet penetration and related electronic financial services have been developed to date.

Table 1

E-finance penetration, end 1999

Income group/economy	Online banking (customers as percentage of bank customers)	Online brokerage (transactions as percentage of brokerage transactions)	E-money (number of merchant terminals per 100,000 people)	Business environment ranking, 2000–04
Industrial country average	8.5	28	434	8.2
Australia	4	22	10	8.1
Belgium	4	20		8.2
Denmark	6	38	1,192	8.4
Finland	20		110	8.2
France	2	18	1	8.2
Germany	12	32	73	8.3
Italy	1	16	7	7.7
Japan		32		7.4
Netherlands	15	40	1,898	8.8
Norway	8	25	1,059	8.0
Portugal	2	7	589	7.6
Spain	2	8	251	8.0
Sweden	31	55	418	8.3
United Kingdom	6	26	3	8.8
United States	6	56	35	8.7
Emerging market average	4.9	27	27	7.0
Argentina	3			7.2
Brazil	5	6	1	6.4
China		3		5.9
Czech Republic	1	90		7.0
Hong Kong, China	5	1	351	8.5
Hungary	6		1	7.1
India	11	2		6.0
Korea, Rep. of	13	65		7.3
Mexico	3	41	2	6.8
Poland	1			7.2
Singapore	5	10	332	8.6
Thailand	1		1	7.3
Average for all economies	6.9	28	317	7.5

Source: Data on online banking and online brokerage are from various sources, but mainly from DataMonitor and central banks. Data on e-money are from the Committee on Payment and Settlement Systems, Survey of Electronic Money Developments, 2000. Business environment rankings are from the Economist Intelligence Unit Country Forecast, with a score of 10 as best and 5 as poor. The rankings combine more than 70 indicators—including the strength of the economy, outlook for political stability, regulatory climate, taxation policy, and openness to trade and investment—to measure the expected attractiveness of the general business environment through 2004. See Annex 1 for further details.

Table 1). In these countries e-cards have complemented or replaced existing financial services. A stumbling block to greater penetration has been standards and to some extent security arrangements. Countries with more use tend to be smaller, suggesting that it has been easier to introduce standards for e-money. But in larger countries a lack of standards and critical mass has often not allowed stored-value cards to catch on. As standards are being set and security arrangements enhanced, e-cards and other forms of e-payments are putting pressure on banks' income from payments services throughout the world.

Connectivity

Around the world, consumers and countries are increasingly getting connected. Advanced countries like the United States lead in terms of the percentage of the population that owns a personal computer and has Internet access (Table 2). The density of Internet services is also highest in the most advanced countries. Among these countries, Nordic countries stand out with high connectivity. This high connectivity is augmented by the popularity of mobile phones, which are used by almost two-thirds of the people in Finland and Norway and three-fifths in Sweden. Connectivity generally declines with income, though there are exceptions. For example, Portugal has low computer ownership and Korea has high connectivity, including through mobile phones—yet the countries' per capita incomes are quite

similar (Portugal \$11,384 and Korea \$9,878 in 1999).

In many countries connectivity has been increasing sharply in recent years. Between 1995 and 1998 the percentage of people owning a personal computer in selected industrial countries rose almost 60 percent. In a sample of developing countries the rise was 150 percent, albeit from a lower base.² Increased connectivity is not limited to advanced emerging markets, but is also becoming important in some of the world's least developed countries. Africa Online, for example, is a growing Internet provider in Africa (outside South Africa). Access to telecommunications is being aided by new technology, such as mobile phones with increasingly large bandwidths (Box 1).

These new technologies not only allow countries to leapfrog in connectivity, they also open new channels for delivering e-finance services. In addition to Nordic countries, countries such as Cambodia, India, Malaysia, and Poland are seeing financial service providers use mobile phones to deliver financial services. Around the world, connectivity is being further enhanced by rapid improvements in telecommunications regulation.

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- 2 The industrial countries were Australia, Denmark, Hong Kong (China), Japan, the United Kingdom, and the United States. The developing countries were Brazil, Chile, China, Guatemala, Hungary, India, Kenya, Mexico, Peru, Senegal, Sudan, Vietnam, and Zimbabwe.

Box 1

Mobile phones: The developing world's technological springboard

In 1990 there were just 11 million mobile phone subscribers worldwide. By 1998 the number had jumped to 320 million, and current estimates are of more than 500 million users. Privately built wireless networks drive the growth. Mobile phones have made telecommunications available even to the world's poor, partly because of the widespread creation of telecenters and public call offices.

Recognizing the benefits, governments are adopting policies to encourage mobile telecom use in rural areas. Policies include license obligations to serve rural communities (Mexico, the Philippines), subsidies through rural telecom development funds (Chile, Peru), variations of build-operate-transfer arrangements (Thailand), and low-interest loans. The spread of rural telecommunications is further facilitated by falling costs for mobile phones.

Some developing countries typify the possibilities of leapfrogging using mobile phones. Zimbabwe saw wireless subscribers skyrocket to 174,000 in 1999—growth of more than 800 percent, the fastest in the world. In Botswana, Cote d'Ivoire, and Rwanda wireless phone subscribers outnumber fixed-line users. Brazil has more than 15 million mobile phone subscribers, more than all Nordic nations combined. With a devastated fixed network after more than 20 years of civil war, adopting cellular technology was the obvious choice for Cambodia, and within a year mobile subscribers outnumbered fixed telephones. Even though its per capita income is among the world's lowest, Cambodia now surpasses 31 countries in overall telephone penetration—including countries with much higher incomes.

Source: See bibliographical note.

Table 2

Connectivity across countries, 1999

Income group/economy	Personal computer use (percentage of population owning personal computers)	Internet connectivity (Internet hosts per 10,000 people)	Mobile phone use (percentage of people who are mobile or cellular subscribers)
Industrial country average	32	346	44
Australia	47	417	34
Belgium	32	162	31
Denmark	41	72	49
Finland	36	1,057	65
France	22	83	36
Germany	30	161	29
Italy	19	59	53
Japan	29	133	45
Netherlands	36	357	44
Norway	45	715	62
Portugal	9	50	47
Spain	12	67	3
Sweden	45	488	58
United Kingdom	31	241	46
United States	52	1,123	31
Emerging market average	9	40	16
Argentina	5	18	12
Brazil	4	13	9
China	1	0	3
Czech Republic	11	72	19
Egypt	1	0	1
Hong Kong, China	29	120	63
Hungary	7	83	16
India	0	0	0
Korea, Rep. of	18	40	50
Mexico	4	12	8
Poland	6	28	10
Russia	4	10	1
Singapore	44	208	42
South Africa	6	34	12
Thailand	2	3	4
Turkey	3	5	13
Average for all economies	20	188	30

Source: International Telecommunication Union, World Telecommunications Indicators Database 1999. See Annex 1 for details.

Still, many emerging markets require substantial reforms in such regulation to enhance the enabling environment and allow the private sector to deliver financial services.

Migration

A third technology-driven trend has been the large migration of securities trading and capital raising to international financial centers. The share of capital raised abroad and traded offshore has been increasing sharply, especially in emerging markets. In 1990–2000 equity capital raised internationally (through American depository receipts) jumped from less than \$5 billion a year to nearly \$30 billion

(Figure 1a). This trend has been accompanied by an even sharper increase in offshore trading, with offshore trading in American depository receipts reaching more than \$1 trillion in 2000 (Figure 1b). Emerging markets have seen a particularly rapid rise in offshore capital raising and trading of their securities. In 2000 the six largest emerging markets in terms of capital raised in 1980–2000—Argentina, Brazil, China, India, Korea, and Mexico—raised some \$10 billion in offshore capital, and offshore trading in American depository receipts from these countries totaled \$180 billion. By 2000 about 19 percent of trading in emerging market securities was occurring offshore (Table 3).

Table 3

Capital migration: Shares owned, traded, and listed abroad, 2000

Percent

Region/economy	Share of foreign ownership	Share of foreign value traded	Share listed in New York or London
Latin America	24	54	53
Argentina	10	65	65
Brazil	28	43	63
Chile	13	55	46
Colombia	5	8	13
Mexico	42	58	48
Peru	9	59	24
Venezuela	62	73	44
Asia	7	7	18
China	4	14	46
India	11	14	29
Indonesia	12	10	16
Korea, Rep. of	17	5	24
Philippines	11	14	17
Taiwan (China)	6	2	22
Thailand	12	0	0
Europe, Middle East, and Africa	15	60	50
Hungary	32	5	54
Israel	29	90	78
Poland	14	2	13
Russia	14	13	88
South Africa	14	24	55
Turkey	10	1	13
All emerging markets	13	19	38

Source: Goldman Sachs Research estimates.

Figure 1a

Capital raised by companies in American depository receipts, 1980–2000

Billions of U.S. dollars

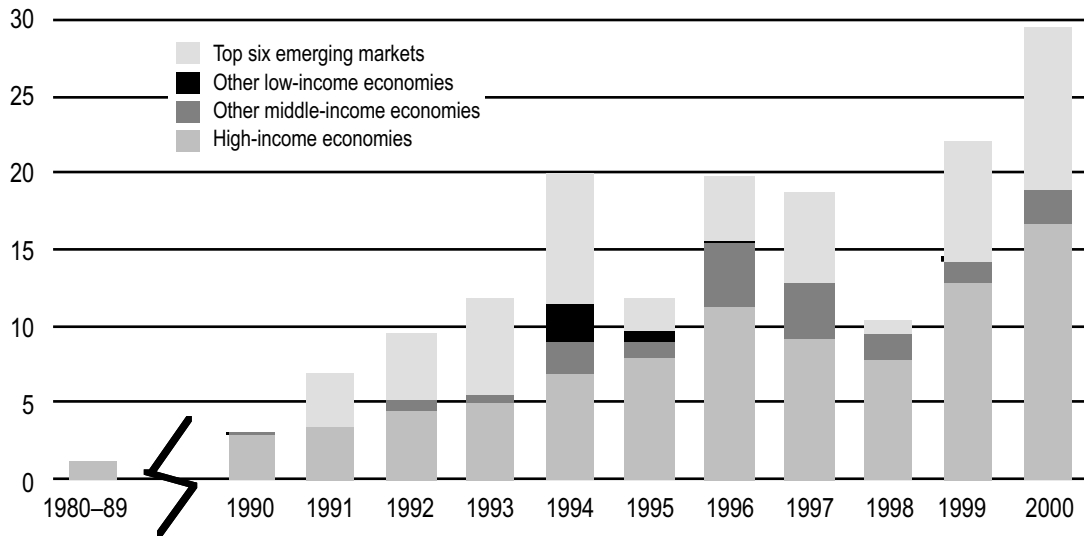
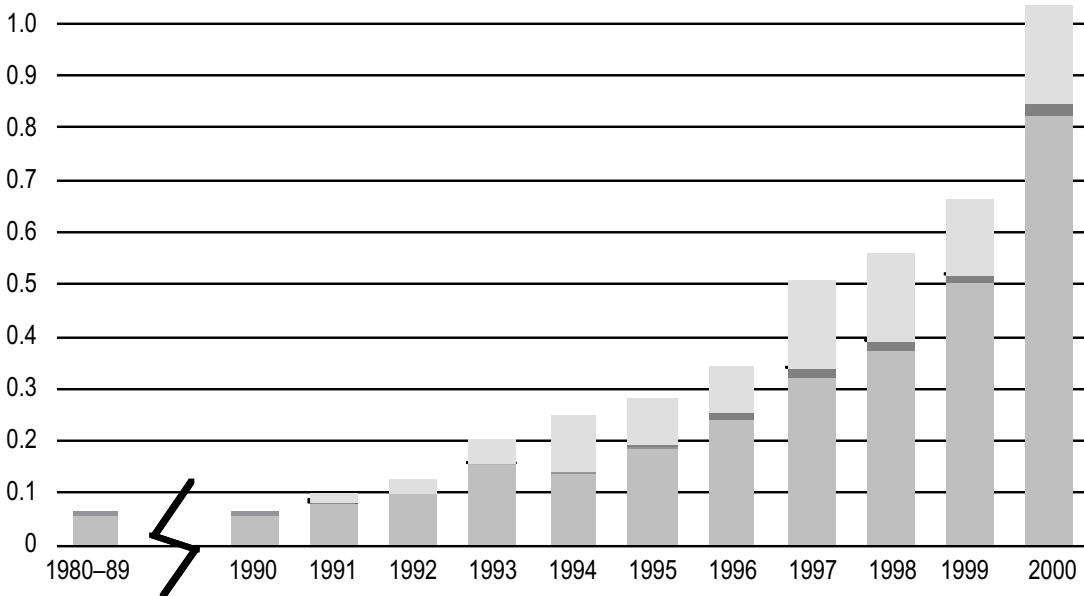


Figure 1b

Value traded by companies in American depository receipts, 1980–2000

Trillions of U.S. dollars



Note: Figure 1a shows the amount of capital raised in international financial markets through American depository receipts. Figure 1b shows trading on the New York Stock Exchange in American depository receipts. Data for 1980–89 are the annual average for the period. In both figures the top six emerging markets—based on total capital raised in American depository receipts in 1980–2000—are Argentina, Brazil, China, India, Republic of Korea, and Mexico. The high-income economies are Australia, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hong Kong (China), Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, Spain, Sweden, Switzerland, Taiwan (China), and the United Kingdom. The middle-income economies include Bahrain, Chile, Colombia, Croatia, Czech Republic, Dominican Republic, Egypt, Estonia, Hungary, Jordan, Kazakhstan, Latvia, Lebanon, Lithuania, Malta, Morocco, Papua New Guinea, Peru, Philippines, Poland, Romania, Russia, Slovak Republic, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, Uruguay, and Venezuela. The low-income economies are Ghana, Indonesia, Malawi, and Pakistan.

Source: Bank of New York; see also Claessens, Klingebiel, and Schmukler 2001.

This migration has generally led to gains for both issuers and investors. Issuers have seen better prices and increased liquidity for their securities. And with remote access to global trading systems, institutional and individual investors can now execute their trades on the platforms with the best prices and execution.

Migration has been accompanied by increased variety in trading systems and electronic communication networks. In the past most trading in securities occurred on a single official market in each country. But today many new, for-profit systems for trading securities and routing orders have been introduced.

This has long been an important trend in the United States, where electronic communication networks have captured about one-third of the order flow related to trading in equities. Advanced emerging markets have seen fewer new systems for equity trading, but that is starting to change. Many new trading systems have been set up in industrial and emerging markets, mainly for trading fixed income, foreign exchange, and derivatives (see Annex 3). These and other systems are raising new policy issues ranging from fragmentation of liquidity to determining the right supervisory agency to ensure the integrity of the market.

The potential and the impact of e-finance

The potential

As noted, e-finance has been growing quickly in many markets. This growth reflects expansion patterns of certain services and products with network externalities, such as telecommunications and some financial services (Furst, Lang, and Nolle 2000). Penetration tends to accelerate once a market has reached critical mass. This critical mass—and subsequent growth—is often similar across markets. Most analysts expect e-finance to exhibit this same pattern of market penetration (see ongoing analysis by Forester Research, Jupiter Research, and DataMonitor).

So what determines when a country reaches a critical mass of penetration? A variety of factors, including the quality of a country's telecommunications infrastructure, its approach to regulation, and the demand for and supply of e-finance services (see CID 2000). It is too early to fully explain the determinants of e-finance penetration. Nevertheless, in countries where e-

finance penetration has reached a level that should lead to faster growth, the level of connectivity and the quality of the business environment appear to explain the point of takeoff. This assessment is based on simple regression analysis using connectivity and business environment as the explanatory variables and takeoff for online banking penetration as the dependent variable (see Annex 1). The higher is the level of connectivity, the earlier a country reaches the point at which online banking can be expected to take off.

This relationship indicates when countries can expect a sharp increase in penetration rates (Table 4). For example, this relationship suggests that France can expect rapid growth in online banking by 2003, and Portugal by 2004. Russia, by contrast, will not reach the takeoff stage for online banking until 2006. A similar relationship holds for the penetration of online brokerage, except e-brokerage appears to depend not just on connectivity but also on the business environment.

Using the actual and projected takeoff years for 16 industrial countries with more extensive e-finance penetration, it is possible to project e-finance penetration for a group of emerging markets (using the typical pattern of diffusion after takeoff). These projections indicate that by 2005 an average of 50 percent of banking services will be provided online in the industrial countries and 10 percent in the emerging markets—up from 8.5 percent and 1 percent in 2000. The change will be even more dramatic for online brokerage: from an average of 28 percent to 80 percent in the industrial countries and from 1.5 percent to 15 percent in the emerging markets.³

But these averages hide big differences between countries, depending on whether they have reached critical mass. In Nordic countries online banking will shoot from some 20 percent in 2000 to nearly 80 percent in 2005. And in Sweden online trading will jump from 55 percent to 94 percent. But in Italy penetration in banking will rise from just 1 percent to 22 percent, because the country has not yet achieved critical mass in e-finance. But by 2010 it might, and e-banking penetration in Italy could exceed 70 percent.

3 The 2000 data on online banking and online brokerage for emerging markets differ from those in Table 1 because the 1 percent and 1.5 refer to a larger sample of emerging markets.

Table 4

The takeoff point for online banking depends on the level of connectivity

Income group/economy	Current connectivity rating	Projected takeoff year	Connectivity rating with connectivity improvement	Projected takeoff year
Industrial countries				
Australia	8	2001	8	2001
Austria	8	2001	8	2001
Belgium-Luxembourg	8	2003	8	2003
Denmark	8	1998	8	1998
Finland	9	1998	9	1998
France	8	2003	8	2003
Germany	8	2001	8	2001
Ireland	8	2000	8	2000
Italy	8	2004	8	2004
Japan	8	2001	8	2001
Netherlands	8	2002	8	2002
Norway	9	1998	9	1998
Portugal	6	2004	6	2004
Singapore	8	2001	8	2001
Spain	7	2002	7	2002
Sweden	9	1998	9	1998
Switzerland	8	1999	8	1999
United Kingdom	8	2001	8	2001
United States	9	2001	9	2001
Emerging markets				
Argentina	6	2004	6	2004
Brazil	5	2006	6	2004
China	3	2010	6	2004
Czech Republic	5	2006	6	2004
Egypt	3	2010	6	2004
Hong Kong, China	8	2001	8	2001
Hungary	5	2006	6	2004
India	3	2010	6	2004
Korea, Rep. of	7	2003	7	2003
Mexico	5	2006	6	2004
Poland	5	2006	6	2004
Russia	5	2006	6	2004
South Africa	5	2006	6	2004
Thailand	5	2006	6	2004
Turkey	5	2006	6	2004

Note: Connectivity ratings are from the Economist Intelligence Unit and range from 0–10. Connectivity ratings combine ratings on computer ownership, Internet hosts, mobile phone use, and other telecommunications connectivity criteria. For industrial countries the projected takeoff year is based on the typical pattern of penetration and the country's current level of penetration (see Table 1). For emerging markets the projected takeoff year is based on the country's current connectivity rating, with the projections based on a regression analysis using the industrial countries' projected takeoff year, where the regression line is estimated as $2,014.6 - 1.71 \times \text{Connectivity}$. See Annex 1 for details on information sources and methodology.

Source: Authors' calculations.

E-finance penetration could grow even faster if the environment for it improves. Figure 2 shows the results of a simulation in which connectivity in all emerging markets rises to about the level of the lowest-ranked industrial country today—a rating of 6. This would imply that the penetration of online banking in most emerging markets could rise to about 20 percent in 2005, and brokerage services to about 40 percent. With a more conducive environment, e-finance penetration around the world could thus increase 6 fold in banking, from 5 percent at end of 1999 to 30 percent in 2005, and almost double in brokerage, from 27 percent to 45 percent.

Because these projections are based on current trends in advanced industrial countries, they do not allow for the possibility of leapfrogging. But several countries show that e-finance penetration can proceed much more quickly than is implied by the previous analysis. Brazil, Estonia, and Korea have already moved beyond levels predicted on the basis of their current connectivity and business environment (Box 2). The diversity in level of development among these three countries, with per capita incomes ranging from \$3,500–10,000, suggests that leapfrogging is possible for many other countries as well. It might even be that what appear to be disadvantages, such as poor financial services and weak financial infrastructure, actually accelerate the move to e-finance. Just as in securities markets, where rapid migration offshore

has partly been a response to weak market infrastructure and poor corporate governance in countries, many consumers could move quickly to e-finance delivered in part from remote locations.

The impact

E-finance will lower the costs of providing financial services—savings that can be passed on to consumers. The lower costs for providing financial services will also allow greater access to financial services. Quantifying the full consumer gains is difficult because the gains will include not just the cost savings passed on but also better, more widely available financial services for consumers and corporations. New technology should, for example, allow credit to be extended to a wider range of consumers, including small and medium-size firms—and increasing access is an important objective in many developing countries. The next section applies the new approach to financial sector development and explores the scope for broadening access. Here the decline in bank margins and brokerage revenues is analyzed.

Using new technology, new entrants will provide financial services at lower cost. Incumbents will see pressures on their profits unless they can quickly move their business online and cut operating costs to levels like those of the new entrants. Lower revenues for incumbents could pose problems in countries where financial institutions have been sheltered from competition and where

Box 2

Leapfrogging around the globe: Estonia, Republic of Korea, and Brazil

Estonia has made impressive progress in information technology. After communism collapsed, this nation of 1.5 million people moved straight to wireless technologies, with almost 30 percent of the population now owning a mobile phone. In addition, about 35 percent have access to Internet services. E-finance has also taken off. Five of the seven Estonian banks have online services, making for more than 250,000 Internet banking clients—a penetration rate almost as high as in the advanced Nordic countries. As elsewhere, banks in Estonia see Internet banking as a cost-efficient way of expanding, avoiding expensive new branch offices.

In Korea the number of people banking online shot up from 120,000 at the end of 1999 to 4 million at the end of 2000. Over the same period the number of transactions increased

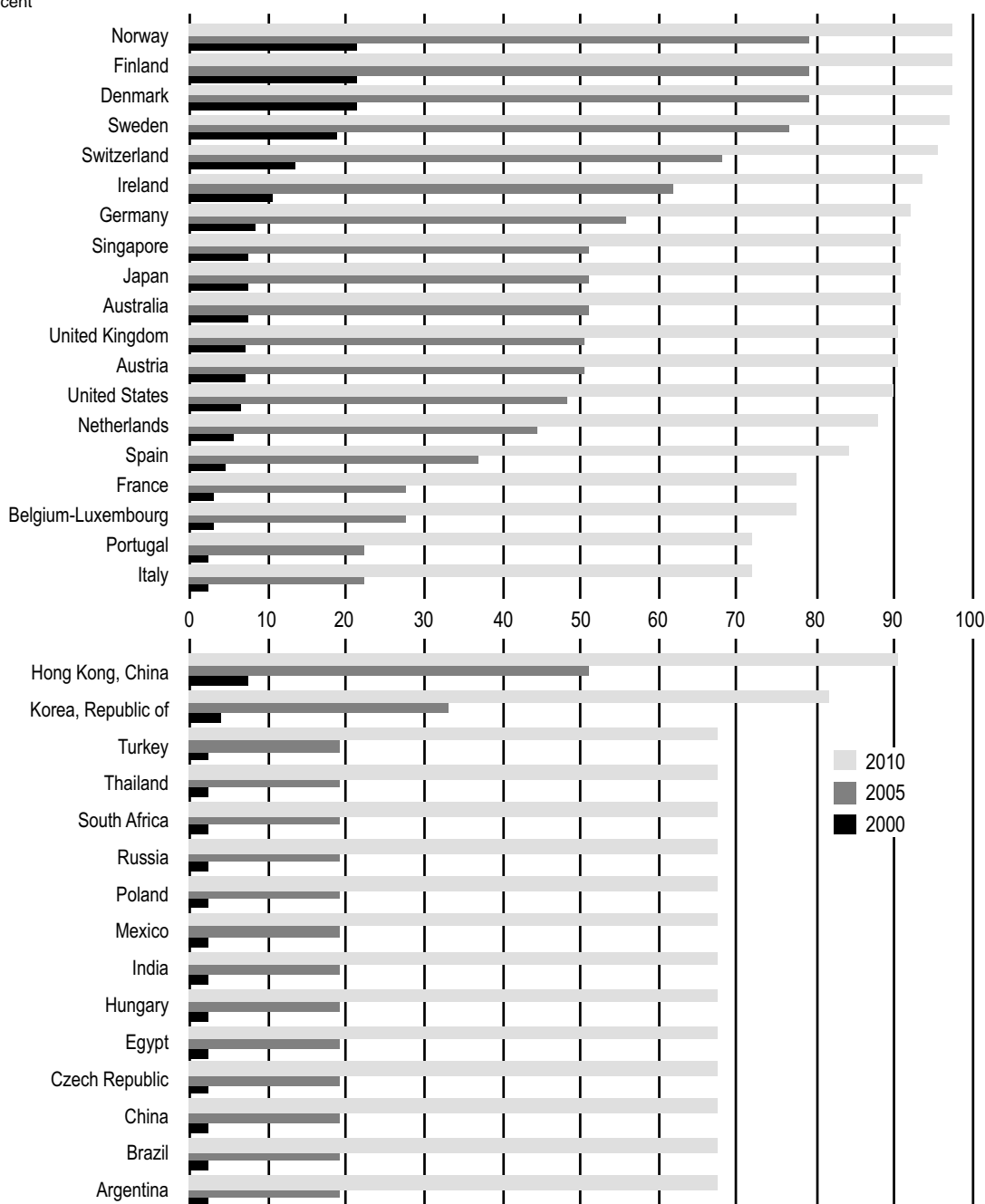
from 700,000 to 32 million a month. Online trading has been growing exponentially, with more than 65 percent of brokerage transactions now conducted online. This revolution has been facilitated by the fact that while only 18 percent of Koreans own a personal computer, more than half have a mobile phone, and wireless has been the medium of choice.

Bradesco, Brazil's largest private bank, is the world's third largest Internet bank, with 1.7 million clients banking online. Bradesco provides to its more than 700,000 corporate clients a business to business site with brokerage, insurance, and pension fund services used by more than 800 companies, and a business to consumer site that facilitates financial transactions for 1,000 companies. Bradesco places its transaction payment services on smart cards that consumers can download from their computers.

Figure 2

E-finance penetration: Projected rates for 2000, 2005 and 2010

Percent



Note: The figures show projections based on takeoff years with connectivity assumed to be in all emerging markets at the same level as the connectivity rating in today's lowest-ranked industrial country, 6 (or better if their current rating is already higher); thus the projections lead to the same minimum level of penetration in each emerging market. This is admittedly a substantial simplification, because it assumes that all emerging markets will improve their connectivity to the same degree. It also ignores the fact that several emerging markets already have higher e-finance penetration today even though their connectivity is perhaps not as high. See Annex 1 for more details.

Source: Authors' calculations.

branch networks have high fixed costs.

The risks to revenues and profitability will depend on the speed of penetration, the cost advantages of providing e-finance, and the ability of incumbents to adjust. The marginal costs of e-finance are much lower than those of traditional delivery channels, with each transaction costing a few cents—compared with \$1 or so for transactions at bank branches and \$0.50 at automated teller machines. Although there are significant upfront costs, in the medium term the online costs of delivering bank services will be much lower, at least as low as those of today's most Internet-advanced banks, such as some in Sweden. This could cut margins for banking services to 1.6 percentage points (the average margin in 1997–98 in Nordic countries) or less.⁴

Because today's most Internet-active banks have not completed their transformation to e-finance, their current cost structure might be higher than their long-run structure. As such, a margin of 1.6 percentage points may overestimate the marginal costs of providing e-finance services. But recent experience shows that banks may need to rely on a “bricks and clicks” approach that involves higher marginal costs than just the “clicks” part. Because Nordic countries have seen the most e-finance, their current cost structure may be most indicative of fully electronic financial service provision. Still, Nordic, Dutch, and other banks involved in e-finance are making big cuts in branches and staff (see Riksbank 2000), and further cost reductions are likely.

These margins and the above projections for online penetration rates would then imply that for banks in industrial countries, bank margins would drop from an average of 2.3 percentage points in 1997 to about 2.0 percentage points in 2005 (Table 5). Margins would fall less initially in emerging markets, from 4.4 percentage points in 1997 to 3.9 percentage points in 2005. But some countries

would see more dramatic changes. In Denmark, bank margins could fall by 47 percent by 2005. In Sweden and the United States margins could fall by some 20 percent or more by 2005. Over longer periods the decline would be even sharper. By 2010 bank margins could be some 50 percent lower in Brazil, Denmark, Poland, Russia, South Africa, Thailand, Turkey, and the United States.

For brokerage revenues, changes would be dramatic almost everywhere because penetration has been fast and costs savings large. The projections here assume that the costs of online brokerage are just 25 percent of traditional costs, which is still less than the drop in commissions in markets like the United States since online brokerage was introduced. As online brokerage proceeds, commission revenues could decline by a factor of about 2 in many countries. With higher connectivity, and expressed as a share of bank assets, brokerage revenues in industrial countries could fall from 0.1 percent to 0.05 percent in 2005 and in developing countries from 0.19 percent to 0.13 percent.

The projected decline in revenues will not be limited to bank services and brokerage revenues. Many other financial services—payments services, underwriting, asset management services, personal financial advice—could see similar revenue declines when they become subject to more competition from e-finance. More generally, the threat of entry has probably lowered the market value of incumbent banks and other financial service providers, suggesting that markets are expecting lower profits.

In the short run the impact on revenues will be largest in countries where e-finance has already reached critical levels, such as the Nordic countries. In the medium run the impact of e-finance could be greatest in countries with less efficient financial services that may have seen little penetration to date. Migration and cost differences are both likely to be higher in such markets once e-finance comes onstream. In Brazil and Turkey, for example, bank margins are now more than 7.7 percentage points—which helps explain the spread of e-finance and the potential for new entry by e-finance providers.

4 Margins differ by financial product; to average margins, total net interest income is calculated as a share of bank assets and then expressed in percentage points.

Table 5

Projected impact of e-finance on banks' net interest margins, 2005 and 2010

Net interest income as a percentage of bank assets, with connectivity improvement

Income group/economy	Net interest margin, 1997	Start of rapid growth	Net interest margin, 2005	Net interest margin, 2010
Industrial country average	2.34		1.96	1.69
Australia	2.03	2001	1.82	1.64
Austria	1.72	2001	1.66	1.61
Belgium-Luxembourg	1.25	2003	1.34	1.52
Denmark	4.20	1998	2.20	1.68
Finland	1.57	1998	1.59	1.60
France	3.30	2003	2.84	1.99
Germany	2.37	2001	1.95	1.67
Ireland	1.14	2000	1.42	1.57
Italy	2.74	2004	2.50	1.93
Japan	1.84	2001	1.72	1.62
Netherlands	1.62	2002	1.61	1.60
Norway	2.55	1998	1.82	1.63
Portugal	1.81	2004	1.76	1.66
Singapore	2.30	2001	1.95	1.67
Spain	3.19	2002	2.62	1.86
Sweden	2.46	1998	1.82	1.63
Switzerland	1.75	1999	1.65	1.61
United Kingdom	2.57	2001	2.09	1.70
United States	4.06	2001	2.91	1.87
Emerging market average	4.39		3.85	2.50
Argentina	4.20	2004	3.73	2.46
Brazil	7.76	2004	6.63	3.63
China	2.26	2004	2.14	1.82
Czech Republic	3.04	2004	2.77	2.07
Egypt	1.73	2004	1.71	1.64
Hong Kong, China	2.90	2001	2.26	1.73
Hungary	3.65	2004	3.28	2.28
India	2.89	2004	2.65	2.02
Korea, Rep. of	1.90	2003	1.80	1.66
Mexico	3.64	2004	3.26	2.27
Poland	5.50	2004	4.78	2.88
Russia	4.79	2004	4.21	2.65
South Africa	4.96	2004	4.34	2.70
Thailand	5.50	2004	4.78	2.88
Turkey	11.17	2004	9.41	4.75

Note: Assumes a level of connectivity in each emerging market equal to at least the level of the least advanced industrial country—that is, a rating of 6 (or better if their current rating is already higher).

Source: Authors' calculations.

The Financial Sector Development Paradigm: Are Changes Needed?

E-finance has considerable potential in many countries, and could deliver large gains for consumers while changing the role of existing financial institutions. The potential is especially large for countries without well-functioning, efficient financial systems with wide access. But achieving the full gains from e-finance requires changing the model for financial sector development.

A number of questions need to be addressed. Are there now better ways of building a robust, efficient financial system that provides wide access to a broader set of consumers of financial services? What public policies best facilitate such a process? Will some traditional policy issues areas be less important? How will areas of emphasis differ by the level of development of a country's financial sector? Which policy prescriptions are more important for countries with better services and wide access, and which are more important for countries with little financial infrastructure and little or no well-functioning financial system? In all cases, what policy changes should be made to avoid unnecessary risks and allow for the greatest gains? And what policy changes have countries already made in response to e-finance?

The current paradigm

The traditional approach to financial sector development has been "institution oriented," with a heavy emphasis on developing commercial banks (Box 3). This approach is increasingly being overtaken in advanced countries by the "functional" approach (Merton 1995). In that approach financial services are unbundled into their various functions with their own production structures, not

necessarily associated with any particular type of financial institution. The range of institutions offering financial services has also broadened, with less emphasis on commercial banks as financial service providers relative to large financial conglomerates or increasingly specialized entities in areas such as asset management, brokerage, and insurance. This commoditization of financial products and functions is changing public policies toward financial sector development in advanced countries.

Rapid technological change and the Internet are making the functional approach relevant for emerging markets as well. First, local institutions have become less important. Basic financial services can now be efficiently produced and delivered from remote locations through the Internet. More sophisticated services, such as securities trading and asset management, can be produced in and sourced from a few global financial centers with less need for local systems and associated human and physical capital investments. Second, a financial system need no longer be built around banks, which used to be considered special. Rather, governments can focus on how financial services can be provided most efficiently, regardless of the location or the entity providing the service.

Table 6 summarizes how the new paradigm differs from current approaches to financial sector development, with the last column showing the areas of emphasis of various international working groups (see also Annex 2). The changes in public policy for financial sector development will vary by the stage of development of a country's financial sector. To really benefit from e-finance, emerging

Box 3

The institutional approach to financial sector development

The public policy paradigm used to foster financial sector development has largely been based on an institutional approach. This paradigm centers on the creation of effective local institutions (commercial banks) that provide payments services, intermediate resources, and help overcome problems of asymmetric information. At the same time, these banks are often considered special (given their role in the payments system and credit intermediation) and protected by a public safety net, necessitating the development of good regulation and supervision.

But creating credible and effective regulation and supervision has proven difficult in many emerging

markets, as shown by many, often expensive, banking crises. The development of other institutions—brokerage firms, investment banks, leasing companies, insurance companies, pension funds, exchanges, and a host of other institutions and related legal frameworks—has been supported through changes in overall legislation and actual institution building. Examples of institution building include the establishment of private entities (investment banks, stock exchanges), public development banks, and other public intermediaries and the provision of special lending windows.

markets will need a significant change in emphasis. For more developed financial systems that already have sophisticated services, wide access, much of the infrastructure to support e-finance, and much innovative e-finance already occurring, public policy changes will be more evolutionary and less pronounced, with many already under way. These advanced countries still need policy changes, however.

Although the emphasis will vary by stage of economic development, key reforms will often include creating an enabling environment, fostering a regulatory approach that emphasizes disclosure and related actions to protect and educate investors and consumers, and focusing more on competition policy and its application to the financial services

industry. Greater emphasis is also needed on the functioning of markets. Finally, the role of government needs to be reconsidered.

Creating an enabling environment

Four areas of the regulatory framework are particularly important for e-finance: the framework for providing telecommunication services, the framework for security and related public and private key infrastructure, the standards for information and privacy, and the framework for contract enforcement and credit risk assessments. In addition, financial system laws and market infrastructure will remain important, though less so than in the past. Countries are making progress in these areas.

Table 6

Toward a new paradigm for financial sector development

- Not important or not addressed
 ● Somewhat important
 ●● Important
 ●●● Very important

Area	Current paradigm	New paradigm	Working groups
Creating an enabling environment			
Regulatory framework for telecommunications	○	●●●	●
Security framework and public key infrastructure	○	●●●	●●
Framework for information and privacy	●	●●●	●●
Framework for contract enforcement	●	●●●	●
Financial system laws that are institution specific	●●●	●●	●●
Market infrastructure	●●●	●●	●●
Risks at the consumer, investor, and institution levels			
Consumer protection	●●	●●●	●●
Investor protection	●●	●●●	●●
Prudential regulation	●●●	●●	●●●
Markets—functioning, performance, and risks			
Competition policy	●	●●●	○
Functioning and volatility, rules for markets, liquidity, transparency, access, disturbances, liquidity risks, stress properties.	●●	●●●	●
Forms of government intervention			
Development banks, public microlending institutions, and directed credit	●●	●	○
Information provision and “collateral” institutions	●●	●●●	○
Modifying use of existing institutional infrastructure	●●	●●●	○

Source: Authors' assessments as the area relates to financial sector development. For working groups column, the assessments are based on various reports issued by international working groups and bodies (see also Annex 2).

Box 4

Enhancing connectivity in emerging markets by improving telecommunications regulation

Connectivity can be enhanced in many countries through a combination of policies:

- Anticompetitive behavior by incumbent telecommunications companies—charging excessive rates for interconnection, refusing to build or make available adequate interconnection capacity, refusing to unbundle network elements or services needed for efficient interconnections—has retarded or prevented competition in telecom markets in many countries. Mandatory interconnections and unbundling of public switched telephone networks are needed to make the telecom sector more competitive.
- Many emerging markets have yet to privatize telecommunications. Privatization is essential for making telecom services more efficient, because without it competition will be hindered and key services will be costly—widening the digital divide.
- In many countries the licensing of competitive operators must be enhanced to give domestic and international telecom providers sufficient incentives to compete within and across media—fixed line, cellular, and so on.
- Regulatory authorities must be independent, and regulatory processes must be transparent. To enhance the governance of such agencies—a complex issue in emerging markets—certain international and objective standards must be applied in such areas as interconnections, licensing, and pricing.
- Price cap regulations that ensure price increases for telecom services are in line with general price changes can make services more efficient and reduce regulatory lags. Such regulations should not, however, place undue discretion in the hands of the existing telecommunication companies or in the regulatory authority.
- Targeted universal access funds may help increase access to telecom services in countries with great income diversity. Chile and Peru provide examples of effective funds.
- Removing barriers to trade in telecommunications and harmonizing competition policy on a global basis will help. Under the auspices of the European Commission and the World Trade Organization, standards are being developed to define market dominance and identify barriers to competition.

Source: Intven, Oliver, and Sepulveda 2000.

Regulatory framework for telecommunications

Telecommunications regulation—for both fixed and nonfixed lines—is a key area for e-finance.⁵ Nonfixed lines are offering important possibilities in developing countries, including in remote areas in Africa, China, and many less developed Asian countries such as Cambodia. Regulation must privatize post and telegraph administrations, improve licensing of competitive operators, enhance mandatory interconnections and unbundle public switched telephone networks, implement an independent regulatory body, and implement proper pricing regulations (Box 4). Improving access to telecommunications services for a larger portion of the population is especially important in emerging markets.

Security framework and public key infrastructure

Both providers and consumers of e-finance view security as a constraint and concern. Serious

operational risks and potential liabilities are associated with security breaches in the transfer of funds or instructions and the actual theft of identification information over the Internet (Furst, Glaessner, and Kellerman 2001). In response, encryption techniques and various protocols (secure socket layer, Financial Interchange Extended language) have been developed by the private sector. But for the whole set of security arrangements—that is, the so-called public key infrastructure, or PKI—to work, four functions must be present: authentication (knowing the parties when exchanging information), integrity (messages cannot be changed during transmission), nonrepudiation (agreements cannot be later denied), and confidentiality (messages cannot be read or copied by unauthorized users). Authentication has been perhaps the most difficult to address.

Authorities will have to address three main issues in designing a country's public key infrastructure. First, adequate penalties are needed

5 A full treatment of these issues is beyond the scope of this paper. An excellent reference beyond documents issued by the International Telecommunication Union

is *Telecommunications Regulation Handbook*, Intven, Oliver, and Sepulveda, eds., World Bank, Washington, D.C., 2000.

for unauthorized access to or tampering with computer systems and Websites—penalties akin to those for other crimes. Second, a proper certification process is needed for public and private keys, as are secure systems for storing such keys and adequate cross-certification for private key providers. This can involve a single public certification authority but need not: several countries are successfully operating multiple private and public agencies.⁶ Third, government may need to set minimum authentication or certification standards while preserving incentives for privately provided solutions. Regulations should be flexible

enough to allow for creative use of new technologies (such as biometrics) in improving authentication processes.

Framework for information and privacy

E-finance makes it easier to manage customers and to customize products. For example, a financial institution linked with an Internet service provider can use information culled from a customer's Website use to offer the customer new financial products. But such efforts must respect people's desire for privacy and confidentiality. Information about a person or business can increasingly be seen as a property right that people can voluntarily share with others. That property right must be clearly defined through information and privacy standards.

Such standards should address four issues: notice, choice, access, and security. Individuals must be given notice of which information is being collected and how it is being used. They need to be given a choice of whether to allow such collection. Once the information is collected, the provider of such information must have access to it, and the collector must ensure its security. Privacy standards will mainly require private sector actions, but these need to be backed by government privacy frameworks within and across countries (Box 5).

6 Certification authorities can be government agencies (such as postal authorities), technology providers (such as GTE or Verisign), telecom service providers (such as Nortells Entrust), or financial service providers themselves. The certification authority authenticates the public key by distributing it with a certificate that it digitally signs. The potential liability of the certification authority and the reputation implications of security breaches have been used as an argument for outsourcing the public key infrastructure to private providers. Banks that are certification authorities include ABN, Bank of America, Deutsche Bank, Barclays, Chase, Citigroup, and Hypoverensbank.

Box 5

Privacy problems—the role of the public sector and private solutions

Many countries have started to adapt their privacy statutes to the Internet. Although progress is uneven and national statutes differ, an international move toward more homogeneous standards is under way. The International Labour Organization, International Telecommunication Union, Universal Postal Union, and World Trade Organization are developing in their specific areas of concern a common set of standards for a privacy law. In addition, the Council of Europe is developing with the United States the first international treaty on cyber crime.

Still, countries have taken different approaches. In the United States self-regulation and sector laws have generally been used to ensure adequate privacy. An exception is the Gramm-Leach-Bliley Act, which requires the U.S. Securities and Exchange Commission to issue regulation (to be in force by July 2001) that applies to broker-dealers, investment companies, and registered investment advisers (financial institutions). This regulation protects all "nonpublic personal information" about consumers, including information consumers provide to financial institutions, results of transactions performed for consumers, and any other information about consumers that financial institutions obtain outside such channels.

By contrast, the European Union has favored much more comprehensive privacy legislation enforced by freestanding data protection agencies. The European Union's privacy directives also authorize the cutting off of data flows to countries not in compliance with EU standards. To avoid a trade war over personal data and interruptions in companies' data flows, the United States and the European Union have devised a safe harbor agreement.

The private sector has played an important role in providing solutions to privacy issues on the Internet. New technologies have created new risks for privacy, but they can also provide privately generated solutions. In the United States many Websites certify companies or e-commerce sites as having good practices for information privacy (for example, TrustE, at www.truste.com) or provide consumers with tips on safeguarding their privacy (for example, the Electronic Frontier Association). Many new companies offer software to ensure anonymous browsing, disable cookies, and even develop personal or company firewalls to enhance e-mail security. Direct government monitoring of privacy guidelines and private solutions have different costs and benefits, and thus can complement each other.

Moreover, privacy and secrecy laws should not become barriers to the development of e-finance. Thus secrecy laws, along with other statutes such as bank secrecy laws, need to permit the sharing of not only negative but also positive credit information. As the Internet expands, standards for information and privacy will increasingly need to be global.

Framework for contract enforcement

Poor contract enforcement hinders finance and commerce regardless of the delivery channel. But new technology can lower the costs of contract verification and enforcement. The Internet increases the amount of and speed at which information is available and can easily link disparate sources of information. It can assist, for example, in the automation and efficiency of registries. With digital signatures, credit risk assessment can be made much faster and more efficient. In addition, the Internet and global financial service provision allow for collateralized loans extended from remote locations. E-finance will thus make cross-border dispute resolution and contract enforcement more important. The North America Free Trade Agreement (NAFTA) and EU experiences provide useful examples of how to address these issues.

Technology can help enforce contracts directly. When foreclosing because of late payments, for example, a lender can use remote devices to shut off and track down a leased car. Technology also allows for better methods of assuring perfection of a security interest in collateral in a dematerialized environment, because databases can be linked directly. Finally, smart cards and other multipurpose cards use technology to bypass many contract enforcement mechanisms—which may explain their popularity in Africa.

Financial and market infrastructure

Laws and systems are a crucial element of financial infrastructure. As noted, e-finance will allow for a more functional, rather than institutional, approach to financial sector development. This implies that the laws governing financial contracts will become more important than the laws governing institutions that operate in the financial sector. Laws on secured transactions and capital market dealings, for example, will become more important than laws on commercial banks and insurance companies.

To date the impact of new technologies has been most pronounced in wholesale and securities markets, but gains are also becoming evident in retail markets. In Estonia and Finland, for example, many retail financial transactions are done electronically. A good technology infrastructure thus becomes key. Finally, linking financial service providers—or more broadly, entire financial systems—in emerging markets to countries with more sophisticated technology will allow them to benefit without having to invest in expensive systems and demanding oversight structures. Stock markets in smaller emerging markets, for example, could be linked to and integrated with existing, larger markets.

Progress to date

A recent survey of 23 countries, including 15 emerging markets, shows that few if any have addressed all the aspects of these key areas for creating an enabling environment (Table 7). But progress is being made in many areas, and over time that will allow the full benefits of e-finance. Digital signature laws, for example, are being introduced in many countries, often based on model laws promulgated by the United Nations Commission on International Trade Law (UNCITRAL). Privacy and confidentiality laws are also being adjusted. And while all these areas are important, progress in all of them is not a precondition for e-finance. In some countries with otherwise underdeveloped financial infrastructure (lack of clearing, custody, and settlement arrangements, weak payments systems), developing communications and public key infrastructure can be sufficient to allow the import of many financial services and related forms of financial infrastructure.

Risks at the consumer, investor, and institution levels

E-finance can create new risks, whether at the level of a financial service product—offered at the retail or wholesale level—or at the level of an institution. Reducing these risks will require authorities to focus more on increased disclosure, consumer education, and better risk management by providers of financial services. All these issues will need to be addressed at an increasingly global level. E-finance also calls for rethinking approaches to prudential regulation and issues related to extending the financial safety net (Claessens,

Table 7

Progress in creating an enabling environment

Region/country	Do electronic signatures or online verification of people exist?	Does a secrecy law exist, and has it been modified to address issues raised by e-finance?	Can financial service providers obtain positive (A) or negative (B) information on borrowers?
Europe			
European Union	Yes	Yes, but not modified	△
Czech Republic	Pending	Yes	No
Finland	Yes	Yes	Yes to both
France	Yes	△	Yes to both
Germany	Yes	△	△
Hungary	Pending	Yes	Yes to both
Poland	Pending	Yes	Pending
Russia	Pending	No	△
Sweden	Yes	Yes	Yes to both
Turkey	No	Yes	Yes to B
United Kingdom	Yes	Yes	Yes to both
Americas			
Argentina	Pending	Yes	Yes to both
Brazil	Pending	Yes	Yes to B
Mexico	Yes	Yes	Yes to both
United States	Yes	Yes	Yes to both
Asia			
Australia	Yes	Yes	Yes to both
China	Pending	Yes	Yes to both
Hong Kong, China	Yes	Yes	Yes to B
India	Yes	No	Pending
Japan	Yes	Pending	Yes to both
Korea, Rep. of	Yes	Yes	Yes to both
Singapore	Yes	Yes	Pending
Africa			
Morocco	No	No	No
South Africa	Pending	No	Yes to both

△ Not enough information was available to determine the answer.

Source: World Bank survey. More detailed descriptions of respondents' replies are available from the authors.

Glaessner, and Klingebiel 2000). The second point is especially important in many emerging markets given their often extensive safety nets. Balancing short-run financial stability with longer-run incentives will be challenging during this shift in the form of and approach to regulation and supervision.

Consumer protection

E-finance and related innovations have made it possible to stratify customers through electronic customer relationship management and to individually customize financial service products. These developments can create risks for consumers. For example, information from an online bank

account could be misused in others parts of a financial institution or elsewhere. At the same time, technological developments make it easier for authorities to enforce existing regulations protecting customers because electronic audit trails are assured, and Internet service providers can be required to provide information to authorities. Furthermore, many companies are offering “smart agents” that enable consumers to search alternative products offered on the Internet—cutting search costs and empowering consumers.

Policy decisions must reflect the choices of consumers and the incentives of financial service providers and Internet service or application software providers. The key policy step will be to require increased disclosure and greater transparency on the terms of financial services offered over the Internet. Better privacy and security standards will also help consumers.

Rules are also needed that limit the scope for conflicts of interest within financial institutions and between financial institutions and Internet-related firms. For example, limits may be needed on cross-selling products within financial institutions. Governments may also need to clarify the liability of financial service providers for services contracted out, such as Internet banking software, as recommended by the Electronic Banking Group of the Basel Committee on Banking Supervision.

E-finance can more easily involve outright fraud, theft, and other abuses—hurting small consumers and impinging on the confidence and use of e-finance. Actions such as the development of a cyber-force (as is becoming common among securities regulators) can help weed out the worst offenders and send clear signals. But there will remain severe limits on government’s ability to prevent misuse, making disclosure more necessary (see Annex 2 for international working group efforts in this area). These risks also highlight the need for more extensive consumer education, which could be provided through creative private-public partnerships.

Investor protection

As with consumer protection, issues relating to investor protection and education will take on much greater importance because new risks are particularly difficult to monitor in emerging markets. In a more global and electronic world, regulatory and supervisory approaches and

philosophies will have to put much greater emphasis on disclosure, the quality of information, the timing and release of material information, the definitions and obligations of investment advisers and investment managers, and governance and conflicts. Much greater emphasis will also need to be placed on reducing legal and regulatory impediments to cooperation in cross-border securities enforcement and to harmonizing legal and regulatory treatment of Internet-related securities transactions across borders.

E-finance has also led to a range of questions on how to oversee the many new infomediaries directly or indirectly involved in providing financial services. Links between portals, Internet service providers (ISP), telecommunications and software providers, financial service companies, and specialized online brokers are becoming more ubiquitous—but they raise new risks. Many ISPs and portals, for example, have exclusive links with financial service providers. Will that lead to conflicts?

Other questions arise. Should an ISP or portal be allowed to charge for bringing customers to a specific electronic brokerage firm in what amounts to online order routing? And if so, under what forms of securities regulations? When a portal undertakes offline business that involves underwriting debt or shares, its incentives may be skewed toward its online services. How can electronic initial public offerings (IPOs) and road shows be properly regulated and supervised? Similar complications, not all new, arise when advertising borders on investment advice. And when is the use of an electronic bulletin board by an issuer only providing a forum—and when is it a platform soliciting investors for an electronic offering? Can a portal refuse to allow advertising by certain financial service providers? Box 6 outlines some of the guiding principles developed to date, some of which have been laid out by the International Organization of Securities Commissions’ Internet Taskforce (see Annex 2 for details) and other regulatory authorities.

Prudential regulation and the safety net

Of particular short-run importance in prudential regulation are changes needed to prevent new risks. Much of this work is occurring in international forums such as the Electronic Banking Group of the Basel Committee on Banking Supervision, which

Box 6

Securities regulation, the Internet, and emerging markets

Some basic principles have been developed to guide securities regulators in markets that have experienced rapid growth in connectivity and widespread electronic distribution of securities-related financial services (see Annex 2 for Internet principles established by the International Organization of Securities Commissions). In protecting investors, it is useful to distinguish between the responsibilities of three groups: broker-dealers that provide online brokerage services, Internet service providers or portals that provide online order routing services to brokers or are themselves involved in offline services, and issuers (or underwriters) that distribute their securities publicly or privately over the Internet.

Online brokers' communications with investors should satisfy the principles of notice (timely and adequate notice that information is available electronically), access (access given electronically should be comparable to that available in other forms), and evidence to show delivery (reason to believe that delivery requirements will be satisfied). When financial information is delivered electronically, there must be adequate protections for privacy and confidentiality. In many countries self-regulating organizations (often exchanges) have been encouraged to work with issuers and related brokerage firms and investment banks to establish review committees that determine whether market participants meet requirements for proper communication and advertising to investors. In many cases written policies have been required of broker-dealers as well as a pre-use review process and even "fair disclosure" guidelines to ensure that all material nonpublic information is disclosed simultaneously across all forms of communications. In some countries even public disclosure reports on broker-dealers must be posted on Websites to allow for better-informed investors. "Suitability" and "know thy customer" rules are also important. These rules often oblige brokers to make certain determinations—such as ascertaining investors' financial status, tax status, investment objectives, and any other information deemed reasonable—before making a transaction

Source: See bibliographical note.

recommendation. In many countries questions arise on how this process can be made more efficient—through use of other authentication processes, including digital signatures—and not require physical interaction with investors.

Online order routing by an associated Internet service provider or portal in exchange for a fee raises the question of whether this constitutes provision of brokerage services. Many countries are starting to view such arrangements as brokerage unless the portal does not recommend specific securities or participate in any financial services offered by the ultimate provider. Complicating matters, the extensive offline businesses of many portal companies can create conflicts about the accuracy of the company information they report. This problem makes regulatory oversight difficult—and is becoming more common in emerging markets that have seen a rapid increase in financial service portals. Korea, for example, is home to nearly 300 such portals.

Online securities offerings can lead to conflicts of interest. Many issuers advertise using electronic bulletin boards, but this can be viewed as an offering. In general, securities issuers that use electronic bulletin boards on the Internet are being asked to maintain some status with regulators. They also need to provide on their Websites financial information required of registered issuers, keep records of quotes, provide no advice on buying or selling securities, receive no compensation for creating the bulletin board, and receive and transfer no securities on behalf of third parties. Third-party bulletin boards are complex to regulate because they may be acting as an exchange, alternative trading system, or a broker dealer. In addition, online offerings of securities through an initial public offering (IPO) or a private placement or offering raise regulatory and supervisory challenges. Similarly, attention must be paid to stock purchase plans, stock giveaways, electronic road shows, and offshore or cross-border offerings over the Internet. Much of this will require developing global standards, taking into account issues such as differences in the definition and treatment of solicitations.

has focused on the risks presented by e-finance (Box 7). Important risks identified by the group are operational risks related to the increased use of technology and systems, including the greater reliance on outside vendors, legal and reputational risks, and conflicts that may be introduced by the electronic delivery of financial services. Most of these risks are not new, but e-finance intensifies them.

For the future, regulations relating to the disclosure, timing, and release of information and to governance and conflicts will become more important, altering the traditional approach to bank supervision and regulation. This shift will be

accompanied by risks of reduced profitability for existing financial institutions—a trend under way for a long time. But e-finance could sharply accelerate the drop in profits, so the Electronic Banking Group has identified strategic and business risk as one of the main risks of e-finance.

For the most part a laissez-faire approach to regulation and supervision has been adopted for e-finance development. But some countries have implemented regulations that could stymie the development of e-finance. Some industrial countries, for example, have limited the establishment of online banks to existing banks, suppressing the innovation and competition that

Box 7

Principles for managing risk in electronic banking

A report by the Electronic Banking Group of the Basel Committee on Banking Supervision identifies 14 key risk management principles for e-banking (see also Annex 2). Banking institutions and their supervisors should consider these principles when formulating risk management policies and processes for e-banking activities.

- **Management oversight.** Effective management oversight of the risks associated with e-banking needs to be in place, and e-banking risk management should be integrated with overall risk management.
- **Management of outsourcing and third party dependencies.** A comprehensive, well-defined, ongoing oversight process for managing outsourced relationships and third party dependencies supporting e-banking needs to be in place, including adequate prior due diligence.
- **Segregation of duties.** Appropriate measures are needed to ensure proper segregation of duties in e-banking systems, databases, and applications.
- **Proper authorization measures and controls in e-banking systems, databases, and applications.** Appropriate authorization measures and proper controls need to be in place in e-banking systems, databases, and applications.
- **Clear audit trail for e-banking transactions.** A clear audit trail is needed for all e-banking transactions.
- **Authentication of all entities, counterparts, and data.** Banks should authenticate the identity and origin of all entities, counterparts, and data transmitted over the Internet.
- **Nonrepudiation (accountability) for e-banking transactions.** Nonrepudiation should be ensured to hold

users accountable for e-banking transactions and information.

- **Comprehensive security control.** Banking organizations should ensure the appropriate use of activities and properly safeguard the security of e-banking assets and information.
- **Integrity of e-banking transactions, records, and information.** Banks should prevent unauthorized changes to and ensure the reliability, accuracy, and completeness of e-banking transactions, records, and information.
- **Appropriate disclosure for e-banking services.** To avoid legal and reputation risks, including for cross-border activities, banks should have adequate disclosure.
- **Confidentiality and privacy of customer information.** The confidentiality of customer information and adherence to customer privacy requirements should be ensured.
- **Business continuity and contingency plans to ensure the availability of e-banking systems and services.** Plans should ensure that e-banking systems and services are available to customers, internal users, and outsource service providers when needed.
- **Incident response planning.** Incident response plans should be in place to manage, contain, and minimize problems arising from unexpected events—including internal and external attacks that hamper the provision of e-banking systems and services.
- **Role of the supervisor.** Bank supervisors should assess a bank's management structure, practices, internal controls, and contingency plans with regard to e-banking.

Source: Electronic Banking Group of the Basel Committee on Banking Supervision; see also Annex 2.

come with new financial service providers. Access to the large value transfer system can be another barrier to entry for online service providers. In the European Union money can be issued electronically only by traditional credit institutions and a new type of credit institution known as an electronic limited money institution (ELMI). But ELMIs face tougher prudential restrictions on their investments, which may hamper the spread of e-finance as it increases the cost of entry for new financial service providers.

Some aspects of prudential regulation are becoming more important, but others may need to be reviewed in a new light, particularly in emerging markets. This is especially true for the financial safety net, defined here to include policies on deposit insurance, lender of last resort facilities, and government's role in the payments system at the wholesale level and the exact conditions under which it will guarantee payment. For countries with

underdeveloped financial systems, the development of a safety net and the associated prudential framework may need to be evaluated more carefully. In such countries many financial services can come from nonbanks, which should not fall under a public safety net. Furthermore, in such countries financial services, and associated supervision and prudential regulation frameworks, can be imported if foreign multinational financial service conglomerates can enter or deliver services remotely—a trend that has been increasing worldwide (Crystal, Pages, and Goldberg 2001).

The reduced emphasis on prudential regulation and the limits on the financial sector safety net will save not only scarce human resources but also fiscal resources. Many governments have found it difficult to credibly signal that they will not bail out financial institutions. But with less emphasis on banks and a bigger role for foreign providers of

financial services, governments may find it easier to resist bailouts, save valuable fiscal resources, and improve the allocation of resources. Of course, mechanisms are still needed to ensure that financial services are imported only from “good” systems and to limit risks arising from links between financial institutions and nonfinancial companies.

Markets—functioning, performance, and risks

Not only will investor and consumer disclosure, protection, and education become more important, so will ensuring the proper conduct and performance of institutions and markets. In emerging markets, perhaps even more than in advanced economies, poorly defined and enforced competition policies often combine with highly concentrated ownership and wealth and weak corporate governance. Yet effective competition policies and good corporate governance are essential to achieve the gains from e-finance that come with increased efficiency, competition, and credibility. Although it has gotten easier to create and access markets—as shown by the migration of trading and listing abroad by corporations from emerging markets—they do not necessarily function properly. Emerging markets harbor significant risks of local markets becoming far less liquid and more subject to insider dealing. Moreover, the related risks of fragmentation and volatility can increase with e-finance and increased connectivity.

Competition policy

Securing more efficient production and delivery of financial services requires a competition framework that provides for liberal entry to and cross-border provision of financial services. A contestable system is needed for both foreign and domestic providers of financial services, including nonbanks.

Recognizing the potential gains, several countries with unsophisticated financial systems have taken an open stance toward imports of financial services. For example, in 1997 Ghana, Kenya, Malawi, and Mozambique committed to almost entirely opening their financial systems to foreign competition, including through cross-border provision. For these and other countries, effective opening will require removing indirect barriers, such as harmonizing standards in many areas.

Opening to foreign competition does more than give countries access to more efficiently produced

financial services. It also allows countries—particularly less developed ones—to benefit from competition policies that the source country applies to financial service providers. Thus opening can allow underdeveloped countries to move forward without an elaborate domestic competition policy—especially important when institutional capacity is weak.

Still, some issues, particularly the possible links between network providers and financial service providers, may require attention from local policymakers. Given the potential for monopolistic behavior in markets such as telecommunications, vertical integration of financial service providers and network providers—whether through ownership, strategic alliances, or otherwise—can raise issues for competition policy. Many such issues are not specific to the financial sector, and arise more generally in e-commerce. But they can be important, particularly in smaller markets with only a few network providers (Claessens, Glaessner and Klingebiel 2000).

Market functioning, fragmentation, and volatility

As noted, investors and issuers in emerging markets are making greater use of global trading systems, and capital raising is increasingly moving to more liquid offshore exchanges. As a result liquidity has fallen in local exchanges—especially in small economies but also in larger emerging markets. Given international trends, the development of local capital markets and the role of local exchanges will likely continue to change. Exchanges will increasingly demutualize, merge, and spin off functions while developing other business lines (software production and distribution to market participants, risk management services, clearing services provided across borders, business to business exchange development and support, etc.).

The challenges in regulating and supervising securities markets will require a new model for authorities (Box 8). Issues include the scope of regulatory oversight within and across borders, constraints to joint enforcement as more trading of emerging market securities takes place abroad, and definitions of what constitutes an exchange, an alternative trading system, an order routing system, and a brokerage operation. How should governance and ownership structures be restricted to avoid conflicts of interest as demutualization proceeds,

and what self-regulating functions should be performed?

Recent regulation to address new risks

Among countries with sophisticated financial systems, most regulatory and supervisory adjustments to address e-finance have been piecemeal (Table 8). These countries already have good financial services, and most income groups are able to access at least basic financial services. As a result e-finance has been an evolutionary process, and its penetration is progressing fairly smoothly, with no big new risks having arisen. Authorities are updating laws and regulations to varying degrees. Stored-value cards are being regulated, rules for online banking are being introduced, and disclosure laws are being adjusted. In some cases rules are being harmonized with international standards, helping to define international best practice.

But advanced countries have not necessarily addressed all the issues. Furthermore, because most countries have taken a piecemeal approach to regulation, new risks can arise. For example, some countries have not issued special legislation and related operational criteria for online banks. Many have yet to review the rules applying to infomediaries that play a direct or indirect role in providing financial services, such as portals. Many countries do not have adequate laws and regulations to address possible conflicts that arise through Internet-based offerings of securities-related services, varying from use of electronic bulletin boards to online order routing by portals to an electronic road show in the context of an electronic debt offering. Moreover, few countries have clarified whether issuers of various forms of quasi deposits or multipurpose cards will be guaranteed.

Box 8

Challenges for market regulation within and across countries

Securities market regulation confronts complex challenges when it crosses borders. Three mutually nonexclusive approaches should be considered (see Aggarwal 2000).

One is where a country's regulator retains primary responsibility for markets, with mutual recognition of supervision. This would only work for countries with similar rules and would require some harmonization. Local regulators would maintain primary responsibility even when trading platforms are based offshore or when trades are primarily in foreign stocks (say, U.S. stocks traded primarily on a European-based exchange). This is essentially the European approach—mutual recognition with some harmonization.

A second model is the exchange registration approach, where the domestic regulator applies the same regulations to foreign and domestic exchanges operating in the country. This could imply that exchanges are subject to multiple regulations. For example, a European-based exchange operating in the United States and Europe would be subject to U.S. and European regulations.

Finally, access providers—such as brokers that provide investors with access to foreign exchanges—could be regulated (in addition to whatever regulation applies to the exchanges). This approach does not overcome the problem that investors can get access in many ways, often with no clear jurisdictional oversight.

Whichever approach is taken, even more fundamental questions arise in harmonizing definitions of an exchange, an Alternative Trading System (ATS), or a broker-dealer. Furthermore, countries that are home to many companies listed and traded abroad will need to find ways to jointly enforce

securities actions. Such efforts may involve not just memorandums of understanding but also changes in legal enforcement power, including investigatory powers and secrecy statutes for financial institutions, to support active, timely, and effective cooperation.

Across and within countries there is a need to more carefully define the functions of exchanges and self-regulating organizations given the trend toward demutualization and the for-profit nature of many intermediaries. A for-profit exchange may not be subject to conflicts of interest if maintaining its reputation and service are its key sources of order flow. But in many emerging markets, exchanges have few incentives to undertake certain self-policing functions. A for-profit exchange, with the accompanying financial pressures for new shareholders, and given the increasing migration of order flow abroad, could seek to block competition through legislation or noncompetitive regulations. Hence it will be important to ensure competition in the provision of trading and related services.

There is also a trend toward consolidation of back-end systems and clearing custody and clearing arrangements for securities. This trend is especially evident in Europe, where Euronext (Paris, Amsterdam, and Belgium) is consolidating the provision of depository services and establishing one central clearing counterparty that will offer such services across all cash and derivative instruments traded in fixed income and equity in these three markets. A unified structure can greatly reduce risks in securities markets. But for that to happen, solvency statutes must be harmonized across countries. Proper supervision and regulation of central clearing counterparties will require more cooperation among supervisory agencies.

Source: See bibliographical note.

Table 8

Issues in e-finance regulation, by country

Region/country	Are there disclosure requirements for portals?	Is there regulation for stored-value cards or electronic payments (such as deposit substitutes)?	Are issuers of deposit substitutes required to inform their customers that the cards are not guaranteed if the issuer fails?
Europe			
European Union	No	Yes	No
Czech Republic	No	Pending new Banking Act	Pending
Finland	No	Yes	Pending
France	No	Yes	△
Germany	No	Yes	No
Hungary	No	Yes	Yes
Poland	No	Pending	No
Russia	No	Yes	△
Sweden	Yes	Yes	No
Turkey	No	No	△
United Kingdom	No	No	No
Americas			
Argentina	Yes	No	△
Brazil	Pending	No	△
Mexico	No	No	No
United States	Yes	No	Yes
Asia			
Australia	No	Yes	△
China	Yes	Yes	Yes
Hong Kong, China	Yes	Yes	No
India	No	Yes	△
Japan	No	Yes	△
Korea, Rep. of	No	No	No
Singapore	Yes	Yes	No
Africa			
Morocco	No	No	No
South Africa	No	Yes	Yes

△ Not enough information was available to determine the answer.

Source: World Bank survey. More detailed descriptions of respondents' replies are available from the authors.

Table 8—continued

Issues in e-finance regulation, by country

Region/economy	Are there separate authorization requirements for virtual providers of e-finance?	Do statutes, regulations, or guidelines address issues of outsourcing for financial institutions?	Institutions with access to the government-sponsored (and/or government-operated) large value transfer system
Europe			
European Union	Same as for “brick and mortar” providers	Yes	Only credit institutions or electronic limited money institutions
Czech Republic	No	No	Domestic banks and stock exchange institutions
Finland	No (refers to EU)	△	Central Bank
France	No (refers to EU)	△	△
Germany	No (refers to EU)	Pending	Credit institutions
Hungary	No	△	Financial institutions
Poland	No	Yes	Banks and clearing houses
Russia	No	△	Bank of Russia clients
Sweden	No (refers to EU)	△	Credit institutions
Turkey\	No	No	Banks
United Kingdom	No (refers to EU)	△	Banks
Americas			
Argentina	No	△	Banks and clearing houses
Brazil	No	Yes	△
Mexico	No	No	Banks and brokers
United States	Pending	Yes	Depository institutions
Asia			
Australia	No	Yes	Depository institutions
China	No	No	Banking institutions
Hong Kong, China	No	Yes	Depository institutions
India	No	△	Banking institutions
Japan	Yes	Yes	Financial institutions
Korea, Rep. of	Pending	Yes	Commercial banks
Singapore	Yes	Yes	Banks
Africa			
Morocco	No	No	Banks
South Africa	No	△	Banks

△ Not enough information was available to determine the answer.

Source: World Bank survey. More detailed descriptions of respondents’ replies are available from the authors.

E-finance Applications—and the Implications for Government

Private solutions will help countries reap many of the benefits of e-finance even when the enabling environment is imperfect. But further gains will require improving this infrastructure. Thus e-finance calls for a review of government's role—direct and indirect—in the financial sector. In general, e-finance allows governments to curtail many of their direct efforts to provide financial services (for example, through development banks). But other, less direct approaches have become more attractive, such as using existing government infrastructure—including post and telegraph offices—as conduits for the private delivery of financial services.

Past and potential government involvement in the financial sector

Government intervention in the financial sector has generally had very poor results. Attempts to reach underserved groups often miss their targets, are captured by special interests, and incur large fiscal costs. Government ownership of banks tends to retard financial sector development and increase the risk of financial crises (World Bank 2001; Barth, Caprio, and Levine 2001; La Porta, Lopez-de-Silanes, and Shleifer 2000).

E-finance can reduce the need for government intervention. The increased availability of financial services, almost regardless of a country's level of financial sector development, reduces the need for government to provide financial services or to direct intermediaries to do so. Moreover, market failures are less likely: information is more readily available and, with reforms, can be of higher quality. These improvements allow financial services to be provided more widely and make markets for trading risks and assets more complete—reducing the need for government to provide financial services and to mitigate risk.

So, government's main remaining role is then to enhance the enabling environment. In addition, there can be scope to improve information and increase private access to that information. For example, information on public registries for collateral could be shared more easily using new technology. Government can also make more information available, such as basic information on consumers (say, utility bills if administered by a public agency). But this more active role needs to be balanced against privacy concerns. In addition, government can make better use of

existing infrastructure and reduce duplicate infrastructure (such as branches and agencies of development banks or state banks). Here creative use of the post office network (as proposed in India and South Africa) and even telegraph offices (as proposed in Mexico) can have a major impact (Box 9).

Government's role can change dramatically in many areas where it once delivered financial services itself—including retail payment and banking services, housing finance, insurance, nonbank financial services (factoring, leasing), storage finance, trade finance, lending to small and medium-size enterprises, and even microlending. E-finance coupled with basic reforms will allow private market participants to deliver such services far more effectively to a much wider audience with much smaller transactions, even in remote areas. The Internet slashes processing costs for providers and search and switching costs for consumers. As a result providers can market many financial services to low-income borrowers because smaller transactions still provide adequate profit. As the rest of this paper shows, many financial services are already being delivered electronically, even in emerging markets.

Smart cards: an alternative to development banks?

In advanced countries single and multipurpose cards are replacing or complementing other forms of payment (Box 10). In less advanced countries these cards are seen as a new way to build a complete financial system. Issued by private providers of financial services, such cards are being used for very small transactions and are tied to payroll systems. Over time these cards could be tied to cellular phones and other communication devices—such as kiosks—and be linked to other databases and financial transfers, including publicly provided social services (see Annex 4a for more examples of smart card applications around the world). Cards can also be linked with public infrastructure, as between Mondex (an international electronic cash system) and South Africa's post office, so that smart cards can be offered in remote regions. Such cards can be a far more efficient alternative to traditional development bank lending in regions such as Africa.

Box 9

Making creative use of existing public infrastructure: Post offices

In emerging markets as diverse as South Africa and India, efforts are under way to use publicly owned infrastructure—particularly post and telegraph offices—as conduits for delivering non-financial and e-finance services, and as access points for information.

South Africa's post office provides a wide variety of services, including financial services, to over 40 million people dispersed over more than 1.2 million square kilometers. Under the citizens' post office concept the agency is providing telephones, fax machines, computers, Internet access, and other value added financial services through alliances with a growing number of private providers in search of appropriate distribution channels. The post office has already formed alliances with e-commerce companies such as Compuquote (offering comparative insurance and financial quotations) to provide financial services through terminals located in its branches. The terminals also allow people in remote areas to access e-mail and obtain information online, such as comparative prices for inputs and crops common in rural areas. Users are certified through biometric systems that allow for unique identification and registration

(based on their fingerprints), then assigned e-mail accounts and personal identification numbers for access. The system also allows users to pay bills for retail services (see Box 10).

India is conducting a similar experiment with its post office. The government has been investing in high-speed (DSL) Internet wiring to link the 154,000 post office branches with 110 million savings account holders (in a country with 1 billion people). The government is also using the VSAT (satellite system) to link all the branches and to permit international money transfers—at much cheaper rates. This infrastructure will be open to multiple private providers, including providers of financial services, and promises to greatly expand access to many forms of financial services. The post office can serve as a point of origination for authentication, a source of education about social or other services, a gateway to purchase retail goods, a payment point for municipal and federal bills, a vehicle for electronic debit card information and related transfers, a point for payment of key benefits (such as pensions), and even a key dissemination point for essential information such as commodity prices.

Source: See bibliographical note.

A new approach to housing finance

Around the world, authorities have played a big role in housing finance because of housing's importance for economic development and because of social demands for such finance. As a result many government-backed housing development banks

have been created to perform all relevant functions—from loan origination to financing. But housing finance can involve many steps from the time a house is appraised to the time all documentation has been obtained to underwrite a loan. The Internet allows for the unbundling and

Box 10

Smart cards: A clever way to leapfrog?

Smart cards hold value electronically and can be used to make payments. Such cards can allow countries to leapfrog stages of financial sector development because they ease the need for costly and comprehensive financial infrastructure. Cards can also lower costs and reduce the need for traditional credit history checking.

Thus there is a growing interest in smart cards in Africa. In 1999, 16 East and Southern African countries jointly purchased franchise rights for Mondex, an electronic cash system. The deal permits the transfer of value between cards without the need to centrally record every transaction, allows for offline transactions, and reduces cash handling costs. In addition, the cards can handle multiple currencies and can be used across countries.

This initiative has inspired similar efforts elsewhere. Ghana plans to introduce a chip-based, preauthorized offline payment card—the first example of e-cash banking in West Africa—as well as other e-banking products based on smart cards. These

initiatives could allow Ghana to move from having almost no e-banking infrastructure to having full electronic cash capability. Other projects include a joint effort between Mondex International and South Africa's post office (see Box 9). Using the country's 2,000 post bank counters, the project will give South Africa's most remote region its first access to banking services. Smart cards will enable people to set up pseudo bank accounts, with biometrics technology through fingerprints providing reliable identification. The e-accounts can be used, after a cardholder has paid in benefits or wages, to transfer payments to other parties or to set up savings "pools" for specific investments. The South African post office also takes advantage of the existing payment settlement system on behalf of the post office savings bank. It offers retail payment services through such services as "Pay a Bill", which allows the payee to pay over 100 different accounts at post office counters including Telkom accounts; municipality accounts, mail order houses, financial institutions, and credit card retail accounts.

Source: See bibliographical note.

automation of mortgage loan processing. It can also cut search costs for consumers of mortgage services. Especially in emerging markets, many of these costs are quite high, and the Internet could make mortgage loan underwriting much more efficient.

Furthermore, when government development banks subsidize mortgage finance, it discourages private actors from developing ways to mitigate risks or cut the transactions costs of mortgage loans. Most of these distortions occur because authorities often do not separate the financing of mortgage lending from the subsidies being provided. Where this distinction has been made, many aspects of mortgage loans are becoming more efficient, including by using the Internet. Advantage.com in Hong Kong (China) and Dollar Dex in Singapore are two examples of what will likely be a growing number of such entities (Box 11). Like online brokerages, these companies are also starting to offer their services across borders. Emerging markets seem to offer considerable potential for the electronic delivery of mortgage loans—unlike some more advanced countries, where growth has been slow because housing finance systems are reasonably efficient.

In addition to originating loans, the Internet can play a role in housing markets by providing information on financing and other options to a wide spectrum of potential homeowners. Given the many steps involved in buying a home, the Internet

can also slash transactions costs. For example, Internet platforms have been used to lower the cost of real estate appraisals and to secure financing. Automated loan preparation can also generate big savings (see Box 11). Finally, the clearing and information exchange functions made possible by the Internet—through a business to business model applied to home buyers and sellers—can provide a powerful boost for efficiency.

Can insurance be opened to e-finance?

Like housing, insurance is an industry where governments in emerging markets have provided services directly—such as offering crop insurance through special agencies, providing subsidized credit to farmers suffering crop losses, supporting victims of natural disasters, and offering reinsurance through monopoly, government-owned reinsurance companies. Such insurance is often meant to redistribute income or mitigate risks (as with commodity prices).

In countries as diverse as the Republic of Korea, Mexico, Philippines, and Singapore, insurance products are increasingly being offered electronically to consumers directly and through intermediaries, allowing different roles for government (Box 12). Most of the companies offering their services online allow consumers to shop for different insurance products, using complex algorithms to ensure proper comparisons.

Box 11

Mortgage finance: The impact of the Internet

Advantage Mortgage began operations as the only true specialized mortgage broker in Hong Kong (China). Over time the company has become an overall aggregator much like lendingtree.com in the United States. Advantage derives its revenue from fees paid by 15 of the biggest lenders in Hong Kong's real estate market as well as two lenders not supervised by the Hong Kong Monetary Authority. Advantage solicits borrowers, evaluates mortgage loan packages for presentation to borrowers, prepares all documentation required to underwrite loans and send complete loan packages to final lenders, and provides offline support on documentation. Advantage assumes no underwriting risks and does not charge borrowers for such services because prospective lenders pay all fees. Advantage is also acting as a backup underwriter for mortgage insurance given its expertise and knowledge about mortgage borrowers. It is considering

expanding to China, the Republic of Korea, and Taiwan (China).

Dollar Dex in Singapore is using the Internet to help financial institutions sell products to consumers. Products include home loans, car loans, travel insurance, and a variety of others. Dollar Dex has become a kind of third-party aggregator of such financial products on behalf of lenders. In particular, it has developed block reverse auctions for home loans to improve the prices that consumers can obtain for mortgages—thereby providing a kind of aggregation and search engine service. Like Advantage, Dollar Dex does not really take on credit risk, but transfers the loan file to financial institutions that then do the underwriting. The company is also targeting markets such as Hong Kong (China), Malaysia, the Philippines, Taiwan (China), and Thailand—precisely because the potential rents are higher in less developed, less efficient markets.

Box 12

Insurance: E-financeable?

How e-finance will affect insurance is the subject of intense debate in the industry. Many insurance companies recognize the Internet's potential as more than a marketing tool, but actual e-insurance applications remain limited. In part this is because most life insurance and pension products, health insurance, and many types of commercial insurance appear to have limited suitability for sale on the Internet. Still, many firms recognize that the Internet will lower costs and allow companies to serve customers better. This realization is perhaps more pronounced in some emerging markets, where the penetration of traditional insurance products has been limited.

In 1999 Renaissance Insurance became the first Russian insurer to go online. Clients of the company can pay for eight different insurance policies using its payment system. In April 2000 Ingosstrakh, the largest Russian insurance company, launched a site allowing clients to apply for insurance online. So far, however, payments must be made in the offices of Ingosstrakh. In Mexico Grupo Nacional Provincial is offering online automotive policies through a joint venture with International Insurance Group. Consumers, agents, brokers, and insurance companies can buy insurance policies directly from a Website. Yapster.com in the Philippines has set up an online portal that offers end-to-end delivery of insurance products and services. Companies can get instant quotes from a range of providers.

Re2Re, a Bermudas-incorporated company with offices

Source: See bibliographical note.

in Hong Kong (China) and the Philippines, has developed an open exchange for global insurance risks and reinsurance capacities. Re2Re uses proprietary technology to improve reinsurance exchange between direct insurance companies, insurance brokers, reinsurance brokers, and reinsurance companies worldwide. Dollar Dex is a Singaporean company that enables online consumers to compare, shop, auction, and apply for loans and insurance products from more than 30 leading financial institutions in Asia. Customers can get instant quotations based on a full comparison of features and prices, and can buy motor, travel, hospital, home, personal, long-term care, and other insurance. Dollar Dex recently pioneered the first fully online life insurance product, M@xvalue, which enables healthy applicants to get instant approval. Prudential Insurance of the United States plans to introduce new Web-based investment products in the Republic of Korea, Mexico, and Taiwan (China). Its move, complemented by a greater brick-and-mortar presence, is part of efforts to offer online insurance products on a global basis.

In March 2000 the first insurance Website was launched in China. Wangxian delivers insurance documents to policy holders and allows customers to use credit cards to purchase insurance. Sohu.com, a major Web portal, and Taikang Online, a major insurer, followed the same trend a year later. The two companies offer online insurance services to clients, agents, and other insurance companies.

Some companies have established business to business exchanges like those for global risk and reinsurance. The increasing penetration of insurance service portals and the increasing interest of major insurers in entering emerging markets using e-finance make it far less likely that governments need to directly provide insurance products—as long as an enabling environment is in place.

Factoring, leasing, storage finance, and trade finance: an e-revolution

Factoring, leasing storage finance, supplier credit, and trade finance are well-established financial services. Companies use these techniques to obtain finance by pledging receivables, leasing machinery or other financial or nonfinancial assets, pledging warehouse receipts to finance storage of goods in warehouses, and pledging actual or expected trade-related receipts. These forms of finance are important in many emerging markets—especially where banking systems are under stress or standard means of contract enforcement are deficient.

E-finance can improve the delivery of these services and substantially lower transactions costs given the often paper-intensive documentation requirements of these services.

For *factoring and leasing* new technology has lowered the cost and increased the availability and ease of transferring information. This development has increased lender and client opportunities for factoring, which is the sale of accounts receivable, and leasing, which are loans collateralized by assets such as accounts receivable and inventory, and other forms of asset-based lending. Electronic transmission of sales and receipts allows real-time information exchange between parties, increased security, immediate credit decisions, and lower transactions costs. Lenders can continuously access firms' ledgers to track changes in outstanding receivables as inventory is sold and receivables are collected, lowering the transactions costs for clients. New factoring companies offering online applications and more transparent rates have increased competition and reduced fees even

further. But as with other electronic transactions, more secure technology should be developed to prevent fraud and to extend laws to cover electronic sales of receivables.

Storage finance is an area where governments in many emerging markets have played a large role by providing storage for agricultural commodities—as in India—and by purchasing physical stocks on grounds of security—as in African and to a lesser extent Asian and Latin American countries. E-finance offers interesting possibilities for storage finance. The ability to track commodities being stored, to uniquely define storage certificates, and to keep warehouse receipts electronically can facilitate the provision of credit against stored goods for farmers, exporters, and processing companies. In India and Mexico Internet platforms are being developed to trade and pledge electronic warehouse receipts. These developments will reduce the need for government to purchase commodities for stockpiling or to provide financing to farmers.

Trade finance is another area where governments have provided credit to exporters and importers, often through development banks. New technology will allow letters of credit, bills of lading, and other documents associated with trade finance to be dematerialized and tracked electronically, resulting in large savings. Bolero.net, a joint venture of Society for Worldwide Interbank

Financial Telecommunications, commercial banks, freight forwarders, and shipping companies, is one of the first platforms to completely automate the trade financing process, reducing handling time and delays caused by improper documentation. This and other mechanisms will also allow smaller transactions, increasing access to trade finance for smaller businesses and so expanding the volume of trade financed. Electronic trade finance will require adequate security arrangements as well as a framework for using electronic signatures.

E-finance for small and medium-size enterprises

Lending to small and medium-size enterprises (SMEs) is yet another area where e-finance can obviate the need for direct government intervention. SMEs are major sources of growth and employment, and authorities around the world are constantly evaluating how best to ensure their access to finance—including through existing or even new government-owned development banks. But development banks have often proven to be the wrong approach (Barth, Caprio, and Levine 2001, La Porta, Lopez-de-Silanes, and Shleifer 2000).

Instead, governments need to provide the infrastructure and platforms needed for private entities to offer such finance electronically—including through public infrastructure such as post

Box 13

E-finance for small and medium-size enterprises

SMEloan Hong Kong Limited (known as SMEloan) has reengineered the commercial lending process using the Internet and has become the leading provider of online financing for small and medium-size enterprises in Hong Kong (China). SMEloan conducts most of its lending on the Internet and manages credit risk using a Web-based risk management model. In October 2000 SMEloan closed a HK\$600 million (about US\$75 million) financing facility with a group of banks, a first for a startup e-finance company in Asia. The facility will enable SMEloan to expand its current customer base of 200 SMEs to well over 1,000 by mid-2002.

Pride Africa is a financial institution that provides access to credit to more than 80,000 small-scale entrepreneurs in Kenya, Malawi, Tanzania, Uganda, and Zambia. Pride Africa has created DrumNet, a virtual information and service network linking clients to markets, information, and services. Through its network of microlending branches and information kiosks, Pride Africa's clients will have access to wholesale supplies and services, advertising, and partnership and association building

opportunities. To integrate microentrepreneurs with the formal financial sector, Pride Africa created Sunlink Cashpoints. Sunlink clients have smart cards that provide teller access, loan authorization, and client identification, helping to establish credit ratings—and so facilitating access by SMEs to other financial services.

Major financial conglomerates with worldwide operations are also entering the SME market. In April 1999 Citigroup created CitiBusiness, a new business group that specializes in financial services for SMEs. In May 2000 it launched the CitiBusiness Platinum Select Master Card, which in addition to providing credit gives access to various services—including information on building a Website, setting up an employee benefits program, and so on. Then in early 2001 Citigroup offered CitiBusiness Direct, a comprehensive Internet banking program, to SMEs in the Czech Republic, Hungary, and India. In India CitiBusiness accounts for 15 percent of Citigroup's corporate bank business, and counts 5,000 SMEs among its clients.

Source: See bibliographical note.

offices. E-finance for SMEs is already a reality in many parts of the world; SMEloan in Hong Kong (China) and Pride Africa show what is possible (Box 13). Pride Africa's DrumNet, an information and service network linking small-scale clients in several African countries to markets, information, and services, may be replicable. Large financial conglomerates are also starting to target SMEs because the lower transactions costs made possible by e-finance make this market attractive (See Box 13).

Microfinance and e-finance?

Governments often intervene in microfinance through direct programs that mix financing with subsidies. As with lending for small and medium-size enterprises, the Internet and other new technology will further weaken the case for such direct intervention in microfinance. Whether it is the development of an Internet-only bank that delivers services to the urban poor or the use of smart cards and even cellular phones to reduce processing time for microloans (Box 14), technology can dramatically lower the unit costs of delivering financial services to such borrowers—increasing

access. In addition, to the extent that such activities are automated and information about customers is pooled and provided to credit bureaus, there can be a natural move of clients to more formal methods of finance.

Leapfrogging in securities markets

E-finance and new technology will also allow for big changes in the operation of payments systems and other middle- and back-office functions for financial service providers as well as for the faster development of an entire communications network backbone. Economies such as Hong Kong (China), Malaysia, and Singapore are trying to interconnect all financial service providers into “financial nets” that will allow straight-through processing, payment versus payment, significantly lower costs, and better risk management (Box 15). Because much of the infrastructure for securities markets is starting to operate on a for-profit basis and because monopolies are disappearing (as in clearing and settlement systems), governments will increasingly need to set the overall framework for connecting these various systems and assess the risks in doing so, rather than regulate or own specific infrastructure components.

Box 14

Microfinance and e-finance—a viable match?

Access, cost, and technical expertise are the main factors hindering the use of information and communications technology by microfinance institutions. Yet new technology can not only transform systems for delivering microcredit to the poor, it can also facilitate the microfinance business itself.

In 1993 South Africa's Standard Bank created an affiliate, E Bank, to deliver basic bank services to the urban poor. Using modified automated teller machines (ATMs), E Bank provides a package of financial services, including payment services and savings accounts, designed for low-income clients. By rethinking the needs of basic bank customers, E Bank was able to bundle services valued by poor clients while covering costs with low overall fees. In Nigeria, Gemcard plans to give smart cards to poor citizens so that they can participate in a microcredit scheme involving local banks. Bank services will be provided by mobile vans that use facial biometrics to identify customers. The project aims to encourage good banking habits among the poor and to collect funds from the informal sector.

ACCIÓN International, one of the world's leading microfinance organizations, is using handheld computers to cut the time and cost of making microloans. Loan officers typically record all data using Palm Pilots, which frees them from carrying burdensome equipment when visiting clients. Including the time it takes to record data and upload it back at the office, it takes less than an hour to process a loan.

Source: See bibliographical note.

New software will allow loan officers to record client data, take applications, and make loan calculations on the spot.

PlaNet Finance, launched in 1999, aims to share knowledge among microfinance institutions and promote local initiatives. PlaNet Finance also created PlaNet Fund to provide microfinance institutions with services like loans, guarantees, joint funding, and bond purchases. For example, a carpenter in Bolivia who needed new tools applied to a local microfinance institution for a loan, but the institution could not provide the funds. So the microfinance institution made an Internet appeal to PlaNet Fund, combining the applications of several craftsmen. A specialist in Bolivia examined the case in La Paz, Peru, and gave his approval to PlaNet Fund, which quickly disbursed the loan.

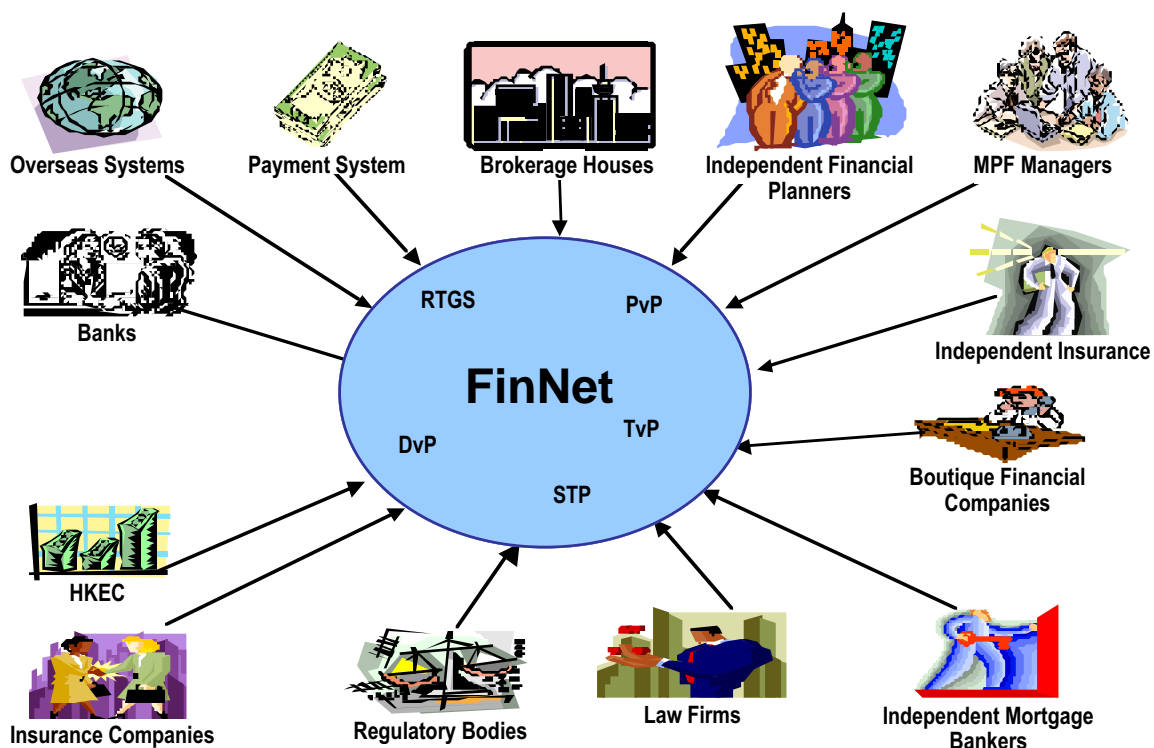
Similar to the PlaNet Finance concept, the United Nations Conference on Trade and Development created the Virtual Microfinance Market, an information exchange designed to facilitate interactions between microfinance institutions, private investors, governments, and other participants in the microfinance market. The Virtual Microfinance Market is aimed at creating sustainable market links between commercial investors and microenterprises in developing countries, and is expected to permit the investment (using commercial terms) of millions of dollars at the grassroots level and the creation of thousand of jobs.

Box 15

FinNet: Toward a paperless infrastructure backbone for financial services

Hong Kong (China), along with some other economies, has been modernizing its financial network infrastructure to enhance its status as a financial center and become one of Asia's most convenient centers for business to business commerce. Governed by a public-private partnership, a financial network, FinNet, will be established (see Figure). The network will be a secure, open, scalable, and high-performance community network interconnecting all types of financial services and all financial markets and institutions in Hong Kong (China). This includes all securities, derivatives, banking, and insurance

activities; all licensed financial entities and key government agencies (such as regulatory agencies); law firms; independent mortgage brokers and insurance companies; independent financial planners; and even overseas systems if they meet certain standards. FinNet will allow straight-through processing of all functions related to financial transactions, from the front end to the back end of their operations. In addition, it will permit real-time delivery versus payment and payment versus payment.



DvP = Delivery versus Payment; RTGS = Real Time Gross Settlement System; PvP = Payment versus Payment; TvP = Trade versus Payment; STP = Straight Through Processing; MPF=Mutual Portfolio Funds; HKEC = Hong Kong Exchanges

Source: Hong Kong Monetary Authority.

Annex 1: Data sources and methodology for the projections

Data sources

Table 1

The share of online banking customers is from various sources. For the US, UK, Spain, France, Italy, the Netherlands, Sweden, Norway, Belgium, Portugal and Denmark data was furnished by DataMonitor for end 1999. For Germany, Australia, Hong Kong, the Czech Republic, Hungary, Poland, Turkey and Mexico data was furnished by the Central Banks of the respective countries in 2001. For Finland, Singapore, Argentina and Brazil data was furnished by Credit Suisse in 1998. Data for India was furnished by Netsense for the year 2000.

The share of online brokerage customers is from various sources. Data for the US, UK, Germany, Spain, France, Italy, the Netherlands, Sweden, Norway, Belgium, Portugal and Denmark was furnished by DataMonitor for 1999. Data for Japan was furnished by Monex for the year 2000. Data for Australia, China, Hong Kong, Hungary, Korea, the Czech Republic, and Mexico was furnished by their Central Banks for the year 2000. Data for Singapore was furnished by TDWaterhouse for the year 2000. Data for India was furnished by Netsense for the year 2000 and data for Brazil by E-Trade for the year 2000.

The number of merchant terminals per 100,000 people for the US, the UK, Germany, Spain, France, Italy, the Netherlands, Sweden, Norway, Belgium, Portugal, Denmark, Finland, Japan, Australia, Egypt, South Africa, China, Hong Kong, Korea, Singapore, Thailand, India, The Czech Republic, Hungary, Poland, Russia, Turkey, Argentina, Mexico and Brazil is from the Committee on Payment and Settlement Systems, as published in the *Survey of Electronic Money Developments in May of 2000*, Basle, Switzerland.

The Business Environment Ranking for the US, the UK, Germany, Spain, France, Italy, the Netherlands, Sweden, Norway, Belgium, Portugal, Denmark, Finland, Japan, Australia, Egypt, South Africa, China, Hong Kong, Hungary, Korea, Singapore, Thailand, India, the Czech Republic, Hungary, Poland, Russia, Turkey, Argentina, Mexico and Brazil was furnished by the Economist Intelligence Unit Country Forecast. The score is out of 10 with more than 8 = very good; 6.5–8 = good; 5.5–6.4 = moderate; 5–5.4 = poor. The Business environment ranking combines more than 70 different indicators, covering criteria such as the strength of the economy, the outlook for political stability, the regulatory climate, taxation policy and openness to trade and investment. The resulting “Business Environment ranking” measures the expected attractiveness of the general business environment over the next five years. The ranking covers 60 countries. It has been used in other contexts to predict the levels of FDI.

Table 2

The Percentage of the Population that Own Personal Computers for the US, the UK, Germany, Spain, France, Italy, the Netherlands, Sweden, Norway, Belgium, Portugal, Denmark, Finland, Japan, Australia, Egypt, South Africa, China, Hong Kong, Korea, Singapore, Thailand, India, the Czech Republic, Hungary, Poland, Russia, Turkey, Argentina, Mexico and Brazil was furnished by the International Telecommunications Union’s *The World Telecommunications Indicators Database 1999*.

The Percentage of the Population that are Mobile Cellular Subscribers Data for the US, the UK, Germany, Spain, France, Italy, the Netherlands, Sweden, Norway, Belgium, Portugal, Denmark, Finland, Japan, Australia, Egypt, South Africa, China, Hong Kong, Korea, Singapore, Thailand, India, the Czech Republic, Hungary, Poland, Russia, Turkey, Argentina, Mexico and Brazil was furnished by the International Telecommunications Union's *The World Telecommunications Indicators Database* for the year 1999.

The number of Internet Hosts per 10,000 people within the US, the UK, Germany, Spain, France, Italy, the Netherlands, Sweden, Norway, Belgium, Portugal, Denmark, Finland, Japan, Australia, Egypt, South Africa, China, Hong Kong, Korea, Singapore, Thailand, India, the Czech Republic, Hungary, Poland, Russia, Turkey, Argentina, Mexico and Brazil was furnished by the International Telecommunications Union's *The World Telecommunications Indicators Database 1999*.

Table 4

The Connectivity Rating for the US, the UK, Germany, Spain, France, Italy, the Netherlands, Sweden, Norway, Belgium, Portugal, Denmark, Finland, Japan, Australia, Egypt, South Africa, China, Hong Kong, Korea, Singapore, Thailand, India, the Czech Republic, Hungary, Poland, Russia, Turkey, Argentina, Mexico and Brazil was furnished by Pyramid Research, the EIU's communication division, for the year 2000. (The scale is from 1-10;10 being the highest)

Figure 1

In the upper panel, stock market internationalization figures illustrate the amount of capital raised by emerging markets in international financial markets. The lower panel depicts the trading at the NYSE in ADRs. The "1980s" stands for the average annual capital raised during 1980-1989. In both figures, the top six emerging economies include Argentina, Brazil, China, India, South Korea, and Mexico. These countries were selected in accordance to their total capital raised during the period 1980-2000 in ADRs. High income countries include Australia, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, Spain, Sweden, Switzerland, Taiwan, and the United Kingdom. Other middle-income countries include Bahrain, Chile, Colombia, Croatia, Czech Republic, Dominican Republic, Egypt, Estonia, Hungary, Jordan, Kazakhstan, Latvia, Lebanon, Lithuania, Malta, Morocco, Papua New Guinea, Peru, Philippines, Poland, Romania, Russia, Slovak Republic, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, Uruguay, and Venezuela. Other low-income countries include Ghana, Indonesia, Malawi, and Pakistan. The source of the data is the Bank of New York. See Claessens, Klingebiel and Schmukler (2001).

Methodology for the projections

The projections use the data for online bank customers (percentage of online bank accounts) as reported in Table 1. These data typically cover 2000 figures online banking customers data for European countries and end of 1999 data for the US. Using these current levels of penetration, the year is determined at which take off can be expected. This is based on a pattern of penetration that can best be described as an S-curve. The particular shape of the S-curve is determined by three parameters: the penetration rate at which take-off occurs, the final level of

saturation and the rate of hyper growth. The final rate of saturation is set at 100 percent. The rate of hyper growth is set at a value such that it would take 10 years after take-off to reach full saturation. The current level of penetration for each developed country for which we have penetration levels, 16 in total, is then matched to the one implied by an S-curve. The S-curve chosen then implies a certain date at which hyper growth will start (or has already started in case the current level of penetration is higher than the penetration rate at which take-off occurs).

These (derived) hyper growth take-off dates for the 16 developed countries were used in conjunction with an OLS regression to find the relationship between take off point dates (dependent variable) and the EIU Business Environment and Connectivity indexes (independent variables, as reported in Tables 1 and 3). We find that for online banking, the connectivity index is a more important explanatory variable than the business environment index. Specifically, the regression results are: $\text{takeoff} = 2014 - 1.71 * \text{Conn}$, with $R^2 = 0.397$. For online brokerage, both the business environment and connectivity are important explanatory factors. Specifically, the regression results are: $\text{takeoff} = 2027.2 - 2.16 * \text{BusEnv} - 1.49 * \text{Conn}$, with $R^2 = 0.8$. Using these two regression results, the other countries' business environment and connectivity rankings are used to project the take-off dates for banking and brokerage for each country.

These projected take-off dates and the corresponding S-curves, imply certain projected shares of online banking and brokerage customers for each year in each developed and developing country. We next use assumptions on net-interest margins and brokerage revenues for traditional and on-line operations to project the future net-interest margin and brokerage revenues given these shares of online activities in each country in each year. To do so, we need an assumption on the revenues generated from on-line transactions. Specifically, we assume that net-interest income as a share of banking assets—margins—for on-line banking services would be 1.6 percentage points, which is below average banking margins in most countries. While there are significant upfront costs, it is realistic to expect that in the medium term the on-line costs for delivery of banking services will be much lower than current costs, at least as low as those experienced by the currently most internet-advanced banks. Since the Nordic countries have seen the most e-finance, their current cost structure may be indicative of a cost structure under fully e-financial service provision. In 1997/98, net interest income as a share of banking assets—margins—in the Nordic countries was about 1.6 percentage points or less.

Revenues for banks from providing traditional services in a fully e-finance world may be even lower since the Nordic (and other) banks have not yet completed their transformation to a more e-finance world. Nordic, Dutch and other banks are, for example, still reducing branches and staff considerably (see Financial Stability Report of Riksbank, November 2000). As such, their current cost structures might still be higher than their long run costs structure. The 1.6 percentage points margin, for example, is definitely higher than the marginal costs of providing e-finance services, which are estimated to be only a few cents per transaction, compared to about \$1 for a branch transaction and 50 cents for an ATM. On the other hand, recent experience has shown that banks may need a “brick and clicks” approach, which would involve higher overall costs than the marginal costs of providing a transaction on-line. On balance, the current revenues of the Swedish banks may represent a good albeit lower estimate of the long run overall cost advantages of e-finance.

For brokerage revenues, we assume that on-line only revenues are about one-quarter of normal brokerage revenues. The 25% fraction for on-line revenues is still less than the drop in commissions in markets like the U.S. since the introduction of on-line brokerage. Again, the marginal costs of on-line only provision are much less than using the traditional sources. The competition already seen for this type of financial service implies that a substantial part of the costs savings can be expected to be passed on to consumers. In Korea, for example, on-line only brokerage services have been provided for free by some competitors. Again, a “bricks and clicks” approach is likely necessary and as such the 25% might represent a balanced estimate of the long run overall cost advantages of e-brokering.

Projections are undertaken using the margins and brokerage revenues prevailing in each country for 1997 as the starting point. We use 1997, as that year was less affected by the introduction of e-finance. We project the new margins and revenues in each year in each country until 2010 given the specific projected shares of on-line banking and brokerage. This projection methodology assumes that incumbent financial institutions have to lower their margins and fees to the on-line only-costs in line with the projected shares of on-line banking and brokerage. It thus assumes that the lower cost structures of on-line banking are being passed on to consumers in the form of lower cost, that is, lower margins and brokerage fees. This is consistent with a model of strong competition among financial institutions and vis-à-vis new entrants.

Annex 2: Synopsis of Reports Produced by Current International E-finance Working Groups

Over the last year and a half international agencies and bilateral regulatory agencies have established a variety of working groups to study electronic commerce and electronic finance, summarized in Table 1. This Annex provides a brief synopsis of these reports, drawing largely on official documents. Where possible, web site links are provided.

A. Ongoing and Recent Work Relevant to Sound Financial Systems¹

- I. The Basel Committee for Banking Supervision (BCBS) is reviewing developments in electronic banking in G-10 countries. The BCBS Working Group on Electronic Banking's Phase 1 Report and White Papers were released in October 2000. Four areas for future work were identified: (a) developing guiding principles for prudent risk management of E-banking activities; (b) consideration of cross-border issues; (c) promoting international co-operation and (d) encouraging and facilitating supervisory training programs. The group issued a report on risk management principles for E-banking in May 2001. www.bis.org
- II. The World Bank is reviewing the policy implications for financial sector development of changes in financial services, markets and institutions driven by globalization and technological advances. www.worldbank.org
- III. The Financial Action Task Force (FATF) is identifying the vulnerability of Internet banking to money laundering activities. Specifically, how on-line banking, electronic cash and smart cards can facilitate money laundering. www.oecd.org/fatf/pdf/TY2001_enpdf
- IV. The International Organization of Securities Commissions (IOSCO) is to develop a follow up report to the 1998 Internet Task Force Report laying out further principles that should guide securities regulation. www.iosco.org.
- IV. The International Association of Insurance Supervisors (IAIS) is to review developments in insurance activities on the Internet. There will be a detailed discussion on supervisory issues and subsequent standard setting. Principles on the Supervision of Insurance Activities on the Internet were adopted at the IAIS Annual Meeting 2000. www.iaisweb.org
- VI. The Committee on Global Financial Systems (CGFS) will assess the trends in the use and the nature of electronic trading in financial markets and to study their potential implications on financial stability. A report on "The Implications of Electronic Trading" was released. It examined how Electronic Trading systems function in wholesale financial markets. www.bis.org
- VII. The Committee on Payment and Systems Settlement. CPSS is to conduct a study on future developments in features of Internet payment methods. A report on Clearing and Settlement Arrangements for Retail Payments in Selected Countries was released www.bis.org.
- VIII. The OECD is to review the impact of e-finance on public debt management techniques and practices. At a meeting in November of

1 Note by the Secretariat of the Financial Stability Forum (with inputs from various bodies), 22 March 2001, FSF Meeting.

Table 1

Current E-Finance Initiatives by International Bodies

International bodies	Protection of privacy and personal data	Secure infrastructures: authentication and certification	Consumer protection	Commercial law	Taxation	Electronic payment and movement of goods
BIS						■
IEC		■				
ILO	■					
ISO		■				
ITU	■	■	■	■		■
ITC						
UN/CEFACT		■		■		
UNICTRAL		■	■	■		■
UNCTAD				■		■
UNESCO	■	■	■	■		
UPU	■	■	■			■
World Bank		■		■	■	■
WCO		■				■
WIPO				■		
WTO	■					■
International bodies	Trade facilitation and market access	Intellectual property	Internet governance	Standards	Economic and social impacts	SMEs
BIS						■
IEC		■				
ILO	■					
ISO		■				
ITU	■	■	■	■		■
ITC						
UN/CEFACT		■		■		
UNICTRAL		■	■	■		■
UNCTAD				■		■
UNESCO	■	■	■	■		
UPU	■	■	■			■
World Bank		■		■	■	■
WCO		■				■
WIPO				■		
WTO	■					■

Source: OECD Emerging Market Economy Forum on Electronic Commerce, Dubai U.A.E., 16 January 2001.

2000, the working group discussed the impact of electronic systems on the following items: Issuance of government debt securities; The future of primary dealer systems; Sovereign debt markets

B. Electronic Banking Group Initiatives and White Papers

The Basel Committee established the Electronic Banking Group (EBG) in 1999 to focus on the following action items²:

- (i) “Building upon work conducted to date and in process, the EBG will develop guiding principles for the prudent risk management of E-banking services” (P. 1).
- (ii) The EBG will identify where and if the existing Basel Committee guidance needs to be adapted so as to facilitate the sound supervision of cross-border E-banking activities.
- (iii) The EBG will promote cooperative and international efforts within the banking industry and between the public and private sectors to identify E-banking risk issues and the sound practices to deal with them.
- (iv) The EBG will encourage and facilitate the exchange of supervisor E-banking training programs and materials that are being developed by bank supervisors.

Since E-banking is based on technology that by its very nature is designed to expand the “virtual” geographic reach of banks and customers without necessarily requiring a similar “physical” expansion, market expansion can extend beyond national borders, which significantly increases cross-border cooperation challenges for bank supervisors. Adapting Basel Committee guidance as necessary to address E-banking issues is therefore a principal goal of the EBG.

Specific cross-border risk factors which are raised by e-banking include:

- (i) The potential ease and speed with which banks located anywhere in the world can conduct activities with customers over interconnected electronic networks into countries where a bank is not licensed or supervised.
- (ii) The potential ability of a bank or non-bank to use the Internet to cross borders and to seamlessly link banking activities that have typically been subject to supervision with non-banking activities that might be unsupervised by any financial market authority.
- (iii) The practical difficulties faced by national authorities wishing to monitor or control local access to E-banking sites originating in other jurisdictions without the cooperation of home country authorities.

Recent EBG surveys of supervisors and bankers in G10 countries cite a number of specific trends and issues that could impact bank risk profiles:

- (i) A significant increase in competition in the electronic financial services industry as both banking and non-banking firms rapidly introduce new financial products and services.
- (ii) Rapid technological improvements in telecommunications and computer hardware and software enabling greater speed in transactions processing.

2 Basel Committee for Banking Supervision, 2 October 2000.

- (iii) Bank management and staff often lack the expertise in technology and E-banking risk issues.
- (iv) Greater reliance on outsourcing to third party service providers, and a proliferation of new alliances and joint ventures with non-financial firms.
- (v) Greater demand for global infrastructures for technology that are scaleable, flexible and interoperable, both within and across enterprises that can ensure the security and integrity and availability of information and services.
- (vi) Increased potential for fraud, due to the absence of standard business practices for customer verification and authentication on open networks like the Internet.
- (vii) Legal and regulatory ambiguity and uncertainty with respect to the application and jurisdiction of current laws and regulations to evolving E-banking activities.
- (viii) The collection, storage and frequent sharing of significant quantities of customer data can lead to customer privacy issues that potentially create prudential risks for banks.
- (ix) Questions regarding the effectiveness and efficiency of online disclosures.

Although bank supervisors agree that the supervisory principles of traditional banking are applicable to E-banking, the amalgam of changes in technology and the degree of dependence exhibited by banks upon service providers and technological distributors mutate and magnify the typical levels of risk.

Following this work, the Electronic Banking Group of the Basel Committee on Banking Supervision issued Fourteen Principles for Risk Management of Electronic Banking. The principles are reproduced on the next page ad-verbatim. The full text of the reports can be found at: www.bis.org/publ/bcbs76.htm and [/bcbs82.htm](http://www.bis.org/publ/bcbs82.htm).

These fourteen principles fall into three fundamental categories: Effective Board and Management Oversight; Security Risk Issues; Reputation Risk Issues. Banking institutions and their supervisors, should consider these principles when formulating risk management policies and processes regarding specific e-banking activities.

C. The Implications of Electronic Trading in Financial Markets

The Committee on Global Financial Systems (CGFS) was established in 1999. It was previously known as the Euro-Currency Standing Committee. The CGFS's current mandate is to analyze the functioning of international interbank markets, financial derivatives and the systemic consequences of standard management practices. This working group takes a preliminary look at the possible implications of the use of electronic trading platforms for the functioning of global free markets. It issued a report in January 2001 (www.bis.org/cgfs16.pdf). The following are some excerpts of the report.

Electronic trading (ET) systems are systems that provide some or all of the following services: electronic order routing (the delivery of orders from users to the execution of the system), automated trade execution (the transformation of orders into trades) and post-trade information (transaction

Fourteen Principles for Risk Management of Electronic Banking

- 1) **Management Oversight of E-Banking Activities.** The Board of Directors and/or senior management should establish effective management oversight per the risks associated with E-banking activities, including the establishment of specific accountabilities, policies and controls to manage these risks. In addition e-banking risk management should be integrated within the institution's overall risk management processes.
 - 2) **Management Process of Outsourcing Relationships and Third party Dependencies.** The Board of Directors and/or senior management should establish a comprehensive well-defined and on-going process for managing outsourced relationships and third party dependencies supporting e-banking including adequate due diligence that should be conducted before engaging into relationships with third parties.
 - 3) **Segregation of Duties.** The Board of Directors and senior management should make certain that appropriate measures are in place to ensure proper segregation of duties within e-banking systems, databases and applications.
 - 4) **Proper Authorization Measures and Controls within E-Banking Systems, Databases and Applications.** The Board of Directors and senior management should ensure that appropriate measures and proper controls are in place over authorization within e-banking systems, databases and applications.
 - 5) **Clear Audit Trail for E-Banking Transactions.** The Board of Directors and senior management should ensure that a clear audit trail exists for all e-banking transactions.
 - 6) **Authentication of Any Entity, Counterparts or Data.** Banking institutions should authenticate the identity/origin of any entity, counterpart or data transmitted over the Internet.
 - 7) **Non-Repudiation/Accountability for E-Banking Transactions.** Banking institutions should ensure non-repudiation to hold users accountable for e-banking transactions and information.
 - 8) **Comprehensive Security Control Process.** Banking institutions should establish authorization privileges, logical and physical access controls and adequate infrastructure security to maintain appropriate boundaries and restrictions on both internal and external user activities and properly safeguard the security of E-banking assets and information.
 - 9) **Integrity of E-Banking Transactions, Records and Information.** Banks should prevent unauthorized changes; ensure the reliability, accuracy and completeness of e-banking transactions, records and information.
 - 10) **Appropriate Disclosures for E-banking Services.** In order to avoid legal and reputation risk, including those associated with cross-border activities, banking institutions should provide their customers adequate disclosures within their websites, in order to assist them in making informed choices.
 - 11) **Confidentiality and Privacy of Customer Information.** Banking institutions should take appropriate measures to preserve the confidentiality of customer information and ensure adherence to customer privacy requirements. Measures taken to preserve confidentiality and privacy should commensurate with the sensitivity of the information being transmitted.
 - 12) **Business Continuity and Contingency Plans to Ensure the Availability of E-banking Systems and Services.** Banking institutions should implement effective capacity planning, business continuity and contingency plans to ensure that E-banking systems and services are available to customers, internal users and outsource service providers when necessary.
 - 13) **Incident Response Planning.** Banking institutions should develop incident response plans to manage, contain and minimize problems arising from unexpected events including internal and external attacks that hamper then provision of e-banking systems and services.
 - 14) **Role of the Supervisor.** Banking supervisors should make their own assessment of a bank's management structure, practices, internal controls, and contingency plans with regard to e-banking activities.
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price and volume data). Electronic systems differ from traditional markets in several respects. ET is both location-neutral and allows continuous multilateral interaction. Consequently, ET systems facilitate cross-border alliances and mergers between trading systems to a greater extent than traditional markets. ET is scalable. ET is integrated. ET potentially allows straight through processing (STP), i.e. the seamless integration of the different parts of the trading process, starting from displaying pre-trade information and ending with risk management.

Electronic systems are used for trading in financial markets worldwide. ET has become the dominant method in the inter-dealer foreign exchange market and is moving into preeminent position within the inter-dealer fixed income market. At this stage however, ET has not made a significant showing within the OTC derivatives market. The counterparty credit risk involved in these instruments is an important reason for its limited penetration. In general ET is not widely accepted within markets wherein this type of risk is prevalent. Only systems that have been altered to, for example, “incorporate a set of limits” is the counterparty credit risk effectively managed.

ET is a changing market structures. The impact on market structure with regard to transparency and efficiency is vital to comprehension of the ramifications of this modern phenomenon. In the inter-dealer market, trading is moving from bilateral OTC relationships towards a marketplace with a more centralized price discovery and transparency. The foreign exchange market is being transformed, in this manner, at a significantly greater rate than the fixed income markets wherein there are several competing systems. The role of voice booking and direct dealing between dealers is diminishing. The current market structure is one wherein many different trading mechanisms coexist. A full transformation is expected to occur to a fairly centralized and open network allowing all market participants to transact directly with each other.

Another factor lies in the contestability of the electronic market. Although ET is associated with low variable costs, entry costs may be high if fixed costs for the creation of the IT infrastructure are taken into account. First mover advantages and network externalities may make it difficult to attract business away from established systems. Liquidity does not move easily from one platform to another. Although ET makes markets more transparent, it has been noted that full disclosure of trading information does not always lead to better market functioning.

ET’s Impact on Financial Stability. Liquidity is not expected to suffer from the introduction of ET not bold or is the fragmentation of markets expected to profoundly affect the cost of arbitrage. But, ET does introduce new risks. The extent to which ET systems are designed to cope with counterparty credit risk may affect their use in times of stress. ET has the potential to improve the operational efficiency of individual firms, but also it increases the dependency on these systems...the design of these systems, their robustness and their contingency plans therefore deserve careful attention from both system providers and the authorities. ET is lowering transaction costs but also raising the issue of breakdown. One example would be the automated execution by systems with pricing engines. These automated systems will need human intervention and whether or not this intervention will be possible, in a timely manner, remains to be seen.

D. Principles on the Supervision of Insurance Activities on the Internet

The development of electronic commerce presents the insurance industry with new challenges. Whereas the number of cross-border transactions will increase and the insurance products cost and inefficiencies decline, the protection of policyholders becomes inherently more difficult. The International Association of Insurance Supervisors (IAIS) issued in September 2000a paper on internet insurance activities at (www.iais.org). The paper proposes an environment for the supervision of insurance activities on the Internet, which aims at ensuring that relevant information is available to consumers, insurers and insurance supervisors through a common set of principles.

According to the paper, insurance activities on the Internet are to be guided by three principles.

Principle 1: Consistency of Approach. The supervisory approach to insurance activities on the Internet should be consistent with that applied to insurance activities through other media.

Principle 2: Transparency and Disclosure. Insurance supervisors should require insurers and intermediaries over whom they exercise jurisdiction to ensure that the principles of transparency and disclosure applied to Internet insurance activities are equivalent to those applied to insurance activities through other media.

Principle 3: Effective supervision of Internet activities based on cooperation. Supervisors should cooperate with one another, as necessary, in supervising insurance activities on the Internet.

E. Securities Activity on the Internet

The International Organization of Securities Commissions issued in September 1998 a report on securities activities on the internet (available at http://www.iosco.org/docs-public/1998-internet_security.html). The study highlights how the Internet presents new challenges for securities regulators and self-regulatory organizations (SROs). Electronic communication and interactivity does not coincide within the parameters of statutes, regulations and directives originally intended for a telephone- and paper-based environment, thus creating possible regulatory burdens or unintended regulatory gaps. The report addresses the regulatory and enforcement issues posed by securities activities conducted over the Internet.

Key Recommendations

1. Application of Domestic Regulatory Requirements to Securities Activities on the Internet

A. Offers and Advertisements

- a. Regulators and SROs should provide guidance to alert market participants and markets as to how their existing registration, licensing and other regulatory requirements apply to offers and advertisements conducted on the internet and alert them to the possibility that other jurisdictions likewise may impose other requirements.

- b. Regulators should amend, or seek to have the relevant authorities or legislative bodies amend, specific requirements when appropriate to accommodate and ensure appropriate regulatory coverage of the Internet environment.
- c. General antifraud provisions should apply to all offers and advertisements involving securities or financial services, regardless of the medium and regardless of whether a regulator or SRO is involved in approving the offer or advertisement.
- d. Regulators and, where appropriate, SROs should strengthen surveillance of internet advertising and offerings for unauthorized or fraudulent activities.

B. *Delivery of Disclosure Documents and Other Information*

- a. Regulators should ensure that issuers who use the Internet to communicate with and send offering material to shareholders and potential investors provide the same disclosure about their operations, financial condition and securities that would be provided in a paper-based medium, so that investors can evaluate the risk and value of investing in the issuer.
- b. Regulators should provide guidance for the financial service industry on the use of the Internet to satisfy their obligation to deliver disclosure documents.
- c. Regulators should permit the financial service industry to deliver disclosure documents electronically when an investor has given an informed consent to this form of delivery.

C. *Communications and Customer Orders*

- a. Regulators should require that financial service providers continue to satisfy suitability and general conduct requirements when transacting business over the Internet.
- b. Regulators should require that financial service providers ensure that their computer networks have sufficient operational integrity (security, reliability, capacity, backup systems and alternative means of communication) and that they have adequate personnel to handle Internet communications, including trading instructions.
- c. Regulators should consider requiring financial service providers to develop written procedures for the review of incoming and outgoing electronic correspondence between employees and the public relating to the financial service provider's securities business.
- d. Regulators should clarify if, and under what circumstances, the use of authentication technologies will be allowed and when manual signatures will be required.

D. *Recordkeeping*

- a. Record keeping requirements applicable to financial service providers should apply to Internet transactions.
- b. Record keeping policies and requirements should address e-mail communications that relate to the securities business of a financial service provider.

2. Exercise of Regulatory Authority over Cross-Border Securities Activities on the Internet

- a. If an issuer's or financial service provider's offer or sales activities over the Internet occur within a regulator's jurisdiction, or if the issuer's or financial service provider's offshore activities, in fact, have a significant effect upon residents or markets in the regulator's jurisdiction, a regulator may impose its regulatory requirements (e.g., licensing and registration requirements) on such activities.
- b. Regulators should examine the following factors in determining whether to assert regulatory authority over an offer of securities or financial services on the Internet.

Factors that may support the assertion of regulatory authority include:

- It is evident that information is targeted to residents of the regulator's jurisdiction.
- The issuer or financial service provider accepts purchases from or provides services to residents of the regulator's jurisdiction (unless
- made pursuant to an exemption or under circumstances that may exclude a public offering).
- The issuer or financial service provider uses e-mail or other media to "push" the information to residents of the regulator's jurisdiction.

3. Use of the Internet to Foster Investor Education and Transparency

- a. Regulators and SROs should include use of the Internet in educating investors and providing guidance to the securities industry.
- b. Regulators and SROs should educate investors about securities fraud on the Internet by providing information about possible fraudulent activities. For example, regulators and SROs could use their websites to post warnings regarding false or misleading offerings or advertisements.
- c. Regulators, SROs, and organized markets should consider using their websites to provide current and potential investors with access to information about their institutions, including current laws, regulations, by-laws and governance procedures.
- d. Regulators, SROs, and organized markets should facilitate investor access to corporate and market information by developing electronic databases for reports and legally required disclosure documents, and making the information publicly available on their websites.
- e. Regulators and SROs should strengthen surveillance of Internet activities by routinely monitoring for unauthorized or fraudulent activities.
- f. Regulators and SROs should have staff sufficiently trained in current techniques for conducting surveillance on the Internet.
- g. Regulators should assist one another by exchanging details about techniques for monitoring Internet advertising, offers of securities or financial services that may contain false or misleading

information, and by sharing expertise with regulators who have limited experience in this area.

F. International Telecommunications Union

In 1999, the (ITU) Council endorsed a series of new initiatives for the Union to promote the growth and expansion of electronic commerce. The New Initiatives program includes Strategic Planning Workshops, Telecommunication Case Studies, Internet Policy and Web Publishing. Presently, the ITU serves as a forum to address policy issues related to electronic commerce in developing countries. In the first phase, during 1999-2000, three workshops were carried out. At its 2000 Session, the Council endorsed the continuation of the program and approved a set of Guidelines for Strategic Planning Workshops. Broadband and 3G Mobile have been chosen as the subjects for the next two workshops, to be held in 2001. In 2001, the World Telecommunication Policy Forum on IP telephony will examine the challenges for developing countries, including skill shortages vis-à-vis IP technology, and is likely to result in an opinion on human resources development issues. Further information at: <http://www.itu.int/wtpf/agenda/index.html>

G. United Nations Commission on International Trade Law (UNCITRAL)

The Working Group on Electronic Commerce of UNCITRAL issued on 20 December 2000 a study that focused on issues of “transferable bills of lading” in an electronic environment (<http://www.uncitral.org/en-index.htm>). The main findings of this study are:

- I. Developing electronic equivalents of traditional, mainly paper based, methods for transferring or creating rights in or tangible goods or intangible property may face serious obstacles where the law requires physical delivery of goods or of paper documents for the purpose of transferring property or perfecting security interests in such goods or in the rights represented by the document. The particular problem presented by electronic commerce is how to provide a guarantee of uniqueness equivalent to possession of a document of title or negotiable instrument.
- II. Modern technology makes it possible to transmit information in electronic form satisfactorily down a chain of parties. The same process could conceivably be used by any of the parties to transmit the information that it renounces its title in favor of another person, thus amounting to an endorsement of the instrument. It is true that no electronic message can actually be the very same message as another; but so long as it is technically possible for a message, with no possibility of detection, to be replicated exactly and sent to someone else, there could be no guarantee of singularity.
- III. Electronic equivalents of paper-based negotiability had to rely on “central registry” systems in which a central entity managed the transfer of title from one party to the next.
- IV. Developments of harmonized rules are needed to support the development of electronic registry systems. Such registry systems may be divided into three main categories.
 - A. *Governmental Registries.* An agency of the State records transfers as public records and may authenticate or certify such transfers, as in the case of electronic registration of real estate in Canada.

- B. *Central Registries.* These can be established where a commercial group conducts its transactions over a private network (such as SWIFT), which is accessible to only its members.
- C. *Private Registries.* These registries are conducted over open or semi-open networks, where the issuer of the document, its agent, or trusted third party administers the transfer or negotiation process.

Related efforts include the following.

Conflict of Law Issues. The Secretary General of the Hague Conference convened a conference in January of 2001 which examined the possibility of preparing and adopting, through a “fast track” procedure, a new instrument dealing with the issue of the law applicable to the proprietary aspects of collateral transaction effected through indirect holding systems.

Substantive law issues. The Secretariat is currently preparing a study on the legal problems in the field of secured credit law, including security interests in investment securities. Issues more specifically related to the use of electronic means of communication (such as conditions for cross-border recognition of records; standards of trustworthiness or registry keepers and certification service providers and liability) are inseparable from policy concerns on matters such as capital market regulation, inter-bank settlements and monetary policy. The working group, in cooperation with the Comité Maritime International (CMI), is currently conducting a broad investigation of legal issues arising from the gaps left by existing international laws and international conventions in the area of the international carriage of goods by sea.

Annex 3: Types of Online Trading Systems

A. E-Trading in Fixed Income Securities

Online trading³ in the fixed income securities market started in 1998 with TradeWeb, the first online bond market. Since then, the advent of online trading in the fixed income securities market has led to a highly fragmented industry, where different types of platforms compete among themselves and against “traditional trading systems.”⁴ Intense competition in this market has resulted in an ongoing transition toward systems which are able to attract greater liquidity to their platforms. Market participants expect this transition to be towards more centralized, open architectures, providing multi-product coverage and wider access to investors.

Online trading systems can be divided into various categories according to: (1) the trading model used, (2) the ownership structure of the systems, (3) source of prices for securities, (4) customer-base, and (5) coverage and product. This annex summarizes these five categories and gives some examples.

I. Trading Model

- *Auction trading platforms:* This model allows online auctions of primary issues of fixed-income securities. The issuing party posts the details of the security offering on an auction trading platform and collects bids from investors. The offering is then automatically awarded to the best price or lowest yield bidders. Certain platforms are also tailored to enable auctions for secondary market offerings by institutional investors. (e.g. Bloomberg secondary market auction system). While electronic auction trading enables the disintermediation in the primary markets, most of the issuers still rely on the other services by intermediaries, such as underwriting (ensuring the sale of a security) and market making in the secondary markets. Examples of auction trading systems are TreasuryDirect (for trading Treasury bills and bonds), ValuBond (for primary and secondary offerings of fixed income securities), and MuniAuction (for online auctions of municipal securities).
- *Inquiry-based systems:* This trading model enables investors to get executable prices from multiple dealers for their inquiries to buy or sell certain amount of securities. These systems are also able to collect information regarding the types and amounts of trades by large institutional investors, which is not largely accessible to retail investors, but instead is only available to dealers. The largest inquiry based online trading system is TradeWeb, which is a multi-dealer consortia formed by 14 of the biggest dealers in the market.
- *Cross-matching (open architecture, exchange based) systems:* This trading system automatically matches the bid and ask prices submitted both by institutional investors and dealers. By allowing traders to get prices from many dealers and trade in large amounts

3 For the purposes of this annex, online trading systems (platforms) are defined as web-based trading systems (platforms), where investors/dealers can perform trading actions electronically on the internet.

4 Non web-based trading systems, i.e. investment banks taking orders personally or via phone conversations.

anonymously, thus eliminating the necessity for intermediaries, cross-matching systems capture all the advantages of increased liquidity and better execution efficiency. Such systems allow participants to generally see a great proportion or all of the order book (by types of orders). This trading model is used by online trading platforms such as Apogean Technology, Currenex, and BondBook.

II. Ownership structure

- *Investment banks:* The emergence of online trading has been a significant threat for investment banks, lowering the barriers to entry in the industry. This has challenged the hold that investment banks have in this market. In response to these threats, investment banks have moved toward creating their proprietary online trading platforms. Some examples of systems owned by investment banks are: Web.ET (<http://www.gs.com/>)-Goldman Sachs; PrimeTrade (<http://www.csfb.com/primetrade/index.shtml>)-Credit Suisse First Boston; AutoBahn (<http://www.autobahn.db.com>)-Deutsche Bank; Lehman Live (<http://www.lehmanlive.com/>) - Lehman Brothers.
- *Consortia:* In order to bring competitive prices and increased liquidity, and share in the burdensome technology costs of building and maintaining these platforms, some investment banks came together to form online trading platforms, while maintaining their own proprietary systems. This also made it possible to compete with independent platforms, which are not able to enjoy the support of dealers to provide liquidity. Some examples of such systems are: TradeWeb (<http://www.tradeweb.com>): Credit Suisse First Boston, Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley Dean Witter, Salomon Smith Barney, Deutsche Bank, Barclays Capital, JP Morgan Chase, Greenwich Capital, ABN AMRO, Bear Stearns and UBS Warburg; BondClick (<http://www.bondclick.com>): ABN Amro, Barclays Capital, BNP Paribas, Caboto, Deutsche Bank, Dresdner Bank and JP Morgan Chase; Asiabondportal (<http://www.asiabondportal.com>) : ABN-Amro, Daiwa SBCM, Deutsche Bank, Income Partners, JP Morgan Chase, UBS Warburg. Beyond joint liquidity support large dealers have also joined together to roll out joint- content sites such as bond hub (<http://www.bondhub.com>) which allow users access to all joint fixed income and other research produced by a group of the largest U.S. dealers.
- *Independent systems:* Online trading systems independent of dealers have been able to show little success. Without the support of a dealer, these systems usually fail to meet investors' liquidity and content needs. However some systems which specialize in specific securities and markets have been able to survive. Some better known examples of these kinds of systems are: Currenex, Blackbird and Apogean Technology.

III. Source of prices for securities

- *Single dealer systems:* These systems allow investors to execute transactions with a single dealer. These are less preferable to investors due to limited price competition and usually serve the

existing customer base. However most single-dealer systems are able to offer trading in multiple products, so some institutional investors trading in more than one type of product still prefer these sites (e.g.: Autobahn, WebET).

- *Multi-dealer systems:* These systems allow the traders to get prices from and trade with multiple-dealers, thus increasing liquidity and price competition. (e.g.: MarketAxess, TradeWeb)

IV. Customer-base

- *Dealer-to-dealer (inter-dealer) systems:* These systems are only accessible by dealers. The multilateral interaction in an inter-dealer system allows the dealers to get competitive prices for their positions and trade anonymously. Especially trading in foreign exchange and derivatives markets tends to take place in inter-dealer electronic trading platforms. Some of the examples of inter-dealer systems are: Reuters Dealing 2000-2, EuroMTS, and eSpeed.
- *Dealer-to-customer systems:* These systems allow online trading between dealers and institutional investors. Examples of dealer-to-customer systems are TradeWeb, MarketAxess, and BondClick. Some of the inter-dealer systems, such as eSpeed, are getting ready to open their services to institutional investors.

V. Coverage and Product

Online trading systems also vary in terms of the types of products they cover, and the markets they operate in. Some multi-dealer trading systems specialize in one kind of security in one market (US), whereas certain trading systems allow electronic trading of multiple securities in many markets.

- eSpeed allows the electronic trading of multiple types of securities (munis, treasury securities, repos etc.) in the US and non-US G10, and emerging markets. Asiabondportal is a consortia owned trading platform that allows institutional investors to trade in Asian bonds. MuniAuction is a dealer-to-customer auction trading platform for municipal securities and money market instruments.
- Trading in Foreign Inter-dealer Exchange Market is largely dominated by electronic trading systems. Reuters Dealing 2000-1 and 2000-2, EBS, Currenex, FX Connect are some systems specializing in foreign exchange and FX derivatives trading.
- Apogean Technology Inc. together with IBM launched a B2B e-marketplace for trading emerging markets debt including Brady bonds last June. POEMS (Phillip Online Electronic Mart System) and Patagon.com are systems for e-trading both in stocks and fixed income securities in Asia and Latin America.

Table 1 provides an overview of some fixed-income trading systems.

Table 1

Fixed-income trading systems**Auction systems**

	Ownership	Owners	Price source	Customer-base	Product	Region
MuniAuction	Investment bank	Grant Street Securities	Single-dealer	Dealer-to-customer	Municipal securities, money market instruments	US
EBondUSA.com	Independent	Privately-held	Multi-dealer	Dealer-to-customer	Agency securities, asset-backed securities, corporate securities, mortgage-backed securities, Treasury securities	US
Bloomberg Secondary Market Auction System	Independent	Bloomberg	Multi-dealer	Dealer-to-customer	Federal agency, corporate, mortgage-backed and asset-backed securities	US
Valubond	Independent		Multi-dealer	Dealer-to-customer	Agency securities, corporate securities, municipal securities, Treasury securities	US

Inquiry-based systems

	Ownership	Owners	Price source	Customer-base	Product	Region
TradeWeb	Consortium	CSFB, Goldman Sachs, Lehman Brothers, Merrill Lynch, MSDW, SSB, Deutsche Bank, Barclays, JP Morgan Chase, Greenwich Capital, ABNAMro, Bear Stearns, UBS Warburg	Multi-dealer	Dealer-to-customer	U.S. Treasury, agency, Euro Sovereigns, and TBA-MBS securities	US
MarketAxess	Consortium	ABN AMRO, J.P. Morgan, Deutsche Bank, Chase Manhattan, UBS Warburg, Bear Stearns, Lehman Brothers Holdings Inc. and Credit Suisse First Boston	Multi-dealer	Dealer-to-customer	Agency securities, corporate securities, European securities, municipal securities, Treasury securities	US
BondClick	Consortium	ABN Amro, Barclays, BNP Paribas, Caboto, Deutsche Bank, Dresdner Bank, JP Morgan	Multi-dealer	Dealer-to-customer	Euro government bonds	Europe
PrimeTrade	Investment bank	Credit Suisse First Boston	Single-dealer	Dealer-to-customer	Derivatives, foreign exchange, government and credit bonds	US, Asia
Bloomberg	Independent	Bloomberg	Multi-dealer	Dealer-to-customer	Treasury securities customer	US

Table 1

Fixed-income trading systems—continued**Cross matching systems⁵**

	Ownership	Owners	Price source	Customer-base	Product	Region
BondBook	Consortium	Goldman Sachs, Merrill, MSDW	Multi-dealer	Dealer-to-dealer	Investment-grade and high-yield corporate and municipal bonds	US
BondDesk	Consortium	ABN AMRO, Bank of America, BondExchange LLC, The Bear Stearns First Union Corporation	Multi-dealer	Dealer-to-customer	Agency, corporate, municipal, Treasury securities	US
BondsInAsia	Consortium	BRIDGE eMarkets, Citigroup, Deutsche Bank and HSBC	Multi-dealer	Dealer-to-dealer	Domestic government and corporate bonds	Asia (regional franchises)
Broker Tec	Consortium	ABN Amro, Banco Santander, Barclays Capital, CSFB, Deutsche Bank, Dresdner Bank, Goldman Sachs, Lehman Brothers, Merrill Lynch, MSDW, SSB, UBS Warburg	Multi-dealer	Dealer-to-dealer	Agency/Treasury securities	US, Europe
EuroMTS	Consortium	More than 20 dealers	Multi-dealer	Dealer-to-dealer	Government bonds, eurobonds	Europe
eSpeed	Investment bank	Cantor Fitzgerald Securities	Multi-dealer	Dealer-to-dealer	Government bonds, Eurobonds, corporate bonds, U.K. gilts, emerging-market securities, repos, and municipal securities	US, G7, Europe, emerging markets
Autobahn	Investment	Deutsche Bank	Single-dealer	Dealer-to-customer	U.S. Treasury and agency securities, European government and semi-government bonds	US, Europe
Apogean Technologies	Independent	Apogean Capital Inc.	Multi-dealer	Dealer-to-dealer	Emerging market debt securities	Emerging markets
Currenex	Independent	Venture capitalists and	Multi-dealer	Dealer-to-dealer	Foreign exchange	US, Europe
Instinet	Independent		Multi-dealer	Dealer-to-dealer	Treasury securities, Euro sovereigns	US, Europe

B. E-Trading in Equity Markets:

Online trading in global equity markets has mostly been led by the introduction of European continental electronic exchanges and Electronic Communication Networks that made use of efficient technologies to lower transaction costs and geographical limitations in stock trading. This has brought in many opportunities to the global financial markets, as well as challenges to regulate and manage these opportunities.

The trading models in equity markets can be divided into two categories: Order driven systems that combine all bid and ask orders into one central order

5 The online trading systems that use cross-matching trading model vary in terms of the level of access they provide. The extreme case of cross-matching systems are the open architectures that allow access to all kinds of traders, where infinite number of clients can trade anonymously on their platforms. On the other extreme are the inter-dealer systems that only give access to dealers to trade on their site, so although the participants trade anonymously among each other, the number of traders are limited to the number of allowed users.

book and automatically match the orders without any intermediaries. The major automated stock exchanges use this system to automatically match the orders of dealers. Quote-driven systems bring together dealers that provide two way prices for securities. The bid-ask spread in this case constitutes the profit for these systems.

Electronic Communications Networks: Using a computerized network, investors can place their bid price for a share of stock, or set their own selling price, in an “off-exchange market”. These systems are known as Electronic Communications Networks (ECNs). Institutional investors, such as mutual fund and pension fund managers, who are not members of stock exchanges are the biggest users of ECNs. ECNs connect buyers and sellers on an electronic network without relying on brokers, so trading becomes cheaper and quicker. Examples of ECNs are Instinet owned by Reuters, Archipelago, Island and Europe’s Tradepoint.

Online Stock Brokerages: The online discount brokerages offer order routing services to their subscribers for a flat-fee for each transaction. Due to the high competition in the industry, these flat-fees can be as low as \$6 per transaction. In the Korea case, where the commissions on online trades are at all-time low due to high trading volume and low flat fees, some online brokerages are making losses, or even closing doors. These online stock brokerages provide either low cost or sometimes free research and analysis on stocks to their customers. Most online brokerages give their customers the ability to make bids for IPOs and also provide banking facilities treating the customer accounts as regular bank checking accounts. The online trading of stocks in emerging market countries mostly occurs through internet brokerages that redirect orders to the major exchanges. In some of these countries Alternative Trading Systems (ATS), which are ECNs that function as exchanges, are allowed on a limited basis in order to avoid dilution of liquidity from the exchanges in relatively small markets.

Some big players in the US market are listed in Table 2.

Table 2

Major U.S. online stock brokerages

Brokerage	Commissions (Market / limit order)	Features					
		Online banking	Checking accounts	Option trading	Phone helpline	Bonds via phone	Mutual funds
Charles Schwab & Co.	\$29.95		●		●		●
Fidelity	\$25		●		●		●
Merrill Lynch & Competitiveness	\$29.95		●	●	●	●	●
TD Waterhouse Inc.	\$12.00		●	●	●	●	●
E*Trade Group	\$14.75 / \$19.95	●	●	●	●	●	●
Ameritrade	\$8 / \$13		●	●	●	●	●
DLJ Direct	\$20		●	●	●	●	●
Datek Online Inc.	\$9.99				●		●
National Discount Brokers	\$14.75 / \$19.75		●	●	●	●	●

Source: Basics of Stock Trading Online, <http://onlinebrokerage.about.com/money/onlinebrokerage/cs/webtradingbasics/>

Most of these brokerages are also expanding their services globally and forming joint ventures with the local brokerages in the emerging markets. An example of such brokerage is SE Global Equities Company Limited (SEG), a subsidiary of Capital Alliance Group Inc., that has expanded its network of global trading alliances with over 100 brokerages covering 50 stock exchanges around the world.

Direct Access Trading: Direct access trading is the type of online trading where when an investor makes an order online, the brokerage firm routes your order directly to a market maker and gets a commission from the market maker called “Payment for Order Flow”. Direct access usually routes your trade to an “Electronic Clearing Network” or a “Small Order Execution System” (SOES).

The investors have to download a specific software for trading in this environment. This is a more complicated trading environment than the other online brokerages, so investors tend to be more sophisticated, institutional investors or day traders. Examples of direct access brokerages are the following.

Brokerage	Cost per 500 trades/mth (\$US)
CyberTrader	9.95
SourceTrade	16.00
EdgeTrade	8.95
Firefly Platinum Pro	9.95
Trade WallStreet	9.95

Emerging markets: Some examples of online stock trading initiatives in emerging markets include the following (by region).

Eastern Europe

- Electronic System for Trading Securities on the Stock Exchange and OTC-Market (Bulgaria, Romania, Croatia, Bosnia and Herzegovina, Macedonia, Albania). Economic Construction and Development in Southeast Europe (a joint World Bank-European Commission web-site that aims to coordinate assistance to the countries in the region) posted a project datasheet proposal to establish an electronic system for trading securities on the Stock Exchange and OTC market. The project aims to establish an integrated, efficient and transparent capital market, raising the investment activity in these countries, legitimizing and popularizing the operation of the trade companies, and attracting foreign investments to the region. (<http://www.seerecon.org/NewIdeas/BIA/4.htm>)
- Sati Online Brokerage, the first broker in the Czech Republic, has developed a system of stock handling via Internet that is used by clients from the Czech Republic as well as by clients from abroad.
- Hungary: Currently there are only a few brokerage firms using the Internet for online trading with the Budapest Stock Exchange. Some of these systems are: Quaestor Financial Group; Equitas; Internet Broker Kft.

Asia

- Karachi Stock.com (Pakistan) offers its members and visitors online and off-line stock trading in KSE (Karachi Stock Exchange) and processes the orders to buy or sell stocks in Karachi stock exchange.
- DFNN.com is a Philippine-based application services provider, financial e-commerce solutions provider, financial portal and online stock trading firm. The portal provides free access to updated stock quotes, research reports, technical analysis charts, news headlines, market commentaries and product information on various financial products and services, all of which helps the user to decide what financial transaction to make ex. online trading, online banking etc.
- Phillip On-line Electronic Mart System (POEMS) a Singapore based non-bank online broker that offers online trading on three regional exchanges - Singapore, Kuala Lumpur and Hong Kong.
- Asian Capital Equities, Inc is a Philippines based online stock broker which is a joint venture partnership between the Hong Kong-based Bank of East Asia Ltd., the Philippine investment banking pioneer East Asia (AEA) Capital Corporation, the Malaysian conglomerate affiliate MUI Philippines, Inc. and individual Filipino investors. Incorporated in 1989, the company was the first Philippine brokerage house to go online and currently averages one billion Philippine Pesos in annual value transactions.
- Korea Samsung Securities Cyber Stock offers trading, quotes and charts and real-time trading services for Korean securities.
- ARKaccess Asia Limited a multi-broker trading platform that will allow efficient and virtually direct access to local members of multiple Asian/ Pacific securities exchanges from anywhere in the world. The routing system, ARKlink, will be introduced in the second half of 2001 in five Asian markets. These markets are Hong Kong, Singapore, Japan, Australia and Thailand, as well as in the United States and the United Kingdom. ARKmatch, the matching system, will be introduced at a later date.

Latin America:

- Patagon.com is a Latin America online brokerage site for stock trading and personal financial management.
- Rava Sociedad de Bolsa: Argentina's online stock trading firm
- Hedging Griffio: Brazil's online stock trading firm.

Annex 4a: Selected Smart Card Projects in Emerging and Developing Countries

Africa	Card	Institutions	Project Description
Common Market for Eastern and Southern Africa ⁶	Mondex e-cash: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the internet.	Eastern and Southern African Trade and Development Bank ("PTA Bank")	The Eastern and Southern African Trade and Development Bank ("PTA Bank"), purchased the franchise rights for Mondex. The deal, which is on behalf of the Committee of COMESA Central Bank Governors, may be the largest governmental endorsement of smart card technology and follows the five existing Mondex franchises in Africa (South Africa, Lesotho, Namibia, Swaziland, and Ghana). The Mondex electronic cash application allows for off-line transactions and has both multi-currency and cross-border capability. Because it allows for the transfer of value between cards, without the need to centrally record every transaction, the Mondex e-cash application can function without developing a costly and comprehensive traditional infrastructure to support it. Mondex also offers the ability to download value directly from chip to chip using a phone, therefore bringing flexibility to both retailers and consumers at a relatively low cost. Mondex's unique security architecture allows for person-to-person transfer of electronic cash, also enables a cardholder to carry up to five different currencies at once. This interoperability means that Mondex's technology is flexible enough to be used as an alternative to cash across a number of the COMESA territories. http://194.112.42.16/mondex/cgi-bin/printpage.pl?style=noframescash&&path=../documents/newsfweyk.txt
Ghana	Visa Horizon: chip-based, pre-authorized, offline payment card	Visa International, Standard Chartered Bank Ghana	Visa International and Standard Chartered Bank Ghana launched the first domestic Visa card program in the West African country and the first public use of Visa Horizon, a chip-based, pre-authorized, offline payment card. The program marks the first large scale roll out of Visa Horizon with up to 100,000 offline domestic debit cards being issued and over 300 merchant sign-ups over the next five years. It is also the largest planned implementation of chip payment technology in West Africa and an example of how chip cards can be used to overcome traditional telecommunication weaknesses in new growth markets. http://www.visa.com/av/news/press_release.ghtml?pr_form_edit=330&edit_file=
Ghana	Mondex e-Cash: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the internet.	Mondex Ghana LTD	Hitachi Europe Ltd. won a contract to supply a smart card based, electronic banking solution to Mondex Ghana Ltd., Mondex Ghana Ltd. (MXG), is a joint venture company established by the two leading Financial Institutions in Ghana, namely Ghana Commercial Bank Limited (GCB) and Agricultural Development Bank (ADB) to exploit the Mondex electronic cash franchise. Mondex Ghana Ltd. intends to deploy the unique and innovative Mondex electronic cash system in phases to bring modern banking to the door steps of over 18 million Ghanaians (90% of who are currently un-banked). The project, worth in excess of \$2 million, shall be the first example of an e-cash banking project in West Africa. http://194.112.42.16/mondex/cgi-bin/printpage.pl?path=../documents/newsuyn07.txt&user=

6 Angola, Burundi, Comoros, Djibouti, DR Congo, Ethiopia, Eritrea, Kenya, Malawi, Madagascar, Rwanda, Seychelles, Sudan, Tanzania, Uganda, Zambia, Zimbabwe

Africa	Card	Institutions	Project Description
Nigeria	e-Purse Card	Securecard Trust Group	Securecard Trust Co. Ltd., which licenses the Proton technology in Nigeria, plans to have 100,000 mainly electronic purse cards in the market by the end of the year and 500,000 cards in circulation by the end of 2003. Nigerian banks that make up the Securecard Trust group plan to convert an existing 15,000-card e-purse project, Diamond Bank Paycard, to Proton. In addition, the banks will use Proton on salary payment and club membership cards they plan to issue.
http://www.cardtech.faulknergray.com/arch00.htm			
South Africa	Visa Cash: card loaded	Visa International South Africa's PEP Bank	South Africa's PEP Bank will become the first issuer of Visa Cash stored value chip cards using Proton technology. In a one year pilot launched in November 2000, the bank will issue 10,000 chip cards to its customers and another 15,000 cards to individuals without bank accounts, who will be able to load money onto the cards at terminals in railways stations, banks, shops and other public areas in the Cape Town area. The cards will have a US\$74 limit. Two stations of the commuter rail operator Metrorail will accept Proton for payment, and Visa International and Proton World executives say the pilot is their first step into the mass transit sector in a country where most adults lack bank accounts but frequently ride buses and trains. Visa and Proton announced an agreement in November 1999 that allows issuers to use the Visa Cash brand on chip cards using Proton technology.
http://www.cardtech.faulknergray.com/arch00.htm			
South Africa	Mondex e-Cash: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the internet.	Mondex International	UK-based smart card firm Mondex International Limited (MXI) has designed the electronic cash and banking system to be adopted and incorporated through the South African Post Office's 2000 Post Bank counters. This new smart card-based project developed by Mondex International, will enable people to set up pseudo-bank accounts, with biometrics technology enabling fingerprints to provide reliable identification. The e-bank accounts can be used in a variety of ways. When a cardholder has paid in his benefits or wages, he/she can choose to transfer direct payments to organizations such as the Church (in most regions, community members pay a regular subscription to the Church). Alternatively they can set up savings "pools" where they store pots of money they are saving to pay for something specific. These "pots" can then be used for a variety of expenses such as education. Although all the money is held on the same smart card, the different pots enable people to take a more planned approach to their finances than ever before and the direct payment facility provides guaranteed transfer of funds without inappropriate and costly intervention.
http://194.112.42.16/mondex/cgi-bin/printpage.pl?style=noframescash&&path=../documents/newsomkoi.txt			

Asia	Card	Institutions	Project Description
China	Chip-based cards: multifunctional debit and credit smart cards	Major banks in Brazil	Several major banks in China have launched pilots of chip-based debit cards in Beijing and Changsha, using standardized card and point-of-sale terminal software adopted by China's central bank, the People's Bank of China. The pilots could lead to the large-scale rollout of interoperable debit and credit smart cards nationwide as one of China's Golden Card projects. The pilots will last for about two years. Many of the same banks, among them the state-run Bank of China, Industrial and Commercial Bank of China and Construction Bank of China, launched a similar test of several thousand standardized cards in Shanghai in December 2000.
http://www.cardtech.faulknergray.com/arch00.htm			
Hong Kong	i.Life card: multifunctional-credit, debit and other	Hongkong and Shanghai Banking Corporation Limited (HSBC)	Hong Kong's major full-service communications provider, Cable & Wireless HKT and The Hongkong and Shanghai Banking Corporation Limited (HSBC) jointly launched i.Life Card, a high capacity smartcard which will bring enhanced security and convenience to online shopping and electronic transaction. Powered by a 16k MULTOS chip, the multi-functional smartcard is the first of its kind in the market and has been developed to meet the growing need for sophisticated e-commerce applications. Credit and debit card functions, International Calling Service, Mondex electronic cash and chip-based e-commerce applications have been combined into a single card. i.Life Card is also the first in Hong Kong to provide a carrier for electronic certificates, such as Hongkong Post's e-Cert. The electronic certificate carrier facilitates e-commerce activities and online transactions that require identity authentication. It also demonstrates the Card's vast e-commerce enabler capabilities to support innovative e-applications.
http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newsw8wf1.txt&user=			
India	e-Purse and EMV-compliant debit: targeted at micropayments and the debit application for higher-value day-to-day transactions	NA	In July 2000 Proton World (PW) and Alittleworld.com Private Limited (ALW) signed agreements granting ALW Proton operating licences for India and the Philippines. ALW is an Indian technology company with a mission to 're-define the future of money' in developing countries. ALW will provide the technology integration, the operational support and the mass deployment implementation model for issuers such as banks, post offices and telecom companies. It will initially offer smart cards in both countries with either or both of two Proton applications, the electronic purse and EMV-compliant debit. The e-purse will be targeted at micropayments and the debit application for higher value day-to-day transactions, both offering full auditability and the world-renowned Proton end-to-end security. ALW's Proton based dual purpose smart cards will provide end-users with a secure and practical alternative to cash without the limitations on eligibility or restrictions on usage associated with credit cards in developing countries.
http://www.protonworld.com/press/releases/press63index.htm			

Asia	Card	Institutions	Project Description
Indonesia	Paspor BCA/Maestro/ Cirrus card: PIN-based, on-line, real-time debit program	MasterCard, BCA	MasterCard International and BCA—the biggest private bank with 800 online branches and approximately eight million customers in Indonesia—introduced the Paspor BCA/Maestro/ Cirrus card, allowing millions of PASPOR BCA cardholders to have access to Maestro and Cirrus facilities. Maestro, MasterCard's global debit brand, is the only Personal Identification Number or PIN-based, on-line, real-time debit program in the region. The MasterCard Cirrus/Maestro Network allows cardholders to withdraw local currency from their accounts at over 560,000 Cirrus ATMs in 102 countries across the globe.
http://www.mastercard.com/about/press/pressreleases.cgi?id=344			
Korea	Mondex e-Cash and MasterCard M/Chip™: multi-functional-credit, debit and other	MasterCard Korea Kookmin Card	One of Korea's largest credit card companies, Kookmin Credit Card, and MasterCard Korea, are to jointly introduce one of the first multifunctional smart cards, with both chip and eCash functionality. The card, called the Kookmin Trade Pass Card, will integrate multiple applications such as credit card, debits, electronic wallet, ID card and automated passenger clearance. Operating on the Multos smart card platform, the cards will have credit and debit functionality through MasterCard's credit/debit application for chip, M/Chip. Cash purchases will be enabled by Mondex's Electronic Cash application. Card holders will be able to choose from either program for specific financial transactions.
http://www.epaynews.com/archives/index.cgi?ref=browse&f=view&id=98225113121212015050			
Philippines	Visa Cash: card loaded or with predefined value designed for payments over the internet, mobile phones and for low-value purchases	Visa International, major banks in the Philippines	Visa International announced that several banks in the Philippines intend to roll out 10 million Visa Cash electronic purse cards over the next five years. The banks, among them Equitable Bank, Metro Bank, Union Bank, Banco De Oro and First E-Bank, signed a memo of understanding with several other partners, including the Philippines Long Distance Telephone Co., the country's largest telecommunications company; 7-Eleven stores and other retailers; and two major theme parks. The partners would accept the reloadable cards, which could also be used on the Internet. The telco now issues more than 14 million of its own chip-based prepaid phone cards each year.
http://www.cardtech.faulknergray.com/arch00.htm			
Philippines	Mondex e-Cash: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the internet.	Mondex Philippine, Inc.	In October 2000, Mondex Philippines projected a cardholder base of at least 800,000, with 500 Mondex loading stations and at least 15,000 commercial establishments in different industries. Mondex electronic cash on the high security MULTOS smart card platform gives issuers greater flexibility and control over the range of services they can provide. Mondex electronic can be used across open networks such as telephony or the Internet. It is ideal for high volume, low-value payments. MULTOS can hold a number of applications (e.g. e-cash, credit and ticketing) and run them securely and independently on a single smart card. Under the terms of an agreement with MasterCard International and Mondex Asia, Mondex Philippines has the license to operate the Mondex technology for the local market. The company also has the right to promote and sub-license the technology to financial institutions, merchant establishments and other service providers in its nationwide deployment of the Mondex chip-based cards.
http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newscebas.txt			

Asia	Card	Institutions	Project Description
Singapore	Cash Withdrawal	Network for Electronic Transfers (Singapore) Pte Ltd, local banks	In March 2001, Network for Electronic Transfers (Singapore) Pte Ltd launched a new service that enables Singaporeans to withdraw funds from their bank accounts at retail outlets using their ATM cards. This is part of a move to improve accessibility to cash withdrawal facilities. The service is available to ATM card holders of DBS Bank, Keppel TatLee Bank, OCBC Bank, Overseas Union Bank and United Overseas Bank. NETS is introducing the CashBack service with NTUC FairPrice, Liberty Market, Cheers, BP, Delifrance and Metro. The CashBack service operates as part of the NETS' Electronic Funds Transfer at Point of Sale (EFTPOS) service, a direct payment facility that allows retailers to debit the customer's bank account at the time of purchase. Consumers are able to withdraw funds with or without having to make a purchase, depending on the retailer. The amount that can be withdrawn will depend on the availability of cash held in the store. Like all EFTPOS payments, NETS does not impose a charge on the consumer.

<http://www.nets.com.sg/news/article.php?artID=11>

Singapore	CashCard® TopUp Via Internet: the system utilizes E-Wallet, a software application that enables the CashCard to be credited and debited via the Internet	Network for Electronic Transfers (Singapore) Pte Ltd, local banks	In August 2000, Network for Electronic Transfers (Singapore) Pte Ltd (NETS) introduced a new feature that will enable users to top up their electronic purses via the Internet. CashCards via the Internet will provide users with more access points and greater ease. On launching the application, users will be guided through a series of instructions that include entering the top-up amount and a HomeNETS Personal Identification Number (PIN). The HomeNETS PIN is used solely for CashCard top-ups on HomeNETS terminals, mobile phone like the Motorola StarTac Dual Slot D and the Internet. With the CashCard inserted in the Smart Card Reader, the E-Wallet will credit the CashCard with the amount to be topped up upon receiving approval from the user's bank. Currently, CashCards can be topped up using the Automated Teller Machines (ATMs), Nets Kiosks, HomeNETS terminals, mobile phone like the Motorola StarTac Dual Slot D and at major petrol stations.
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<http://www.nets.com.sg/news/article.php?artID=9>

Singapore	CashCard® TopUp on Mobile Phones: the system utilizes a dual slot mobile phone, a smart ATM card and a Home NETS PIN	Network for Electronic Transfers (NETS) Pte Ltd, local banks	In April 2000 MobileOne (M1) and Network for Electronic Transfers (NETS) announced that CashCards, widely used by motorists and other consumers in Singapore, can now be topped up via a mobile phone. All they require is a dual slot mobile phone, a smart ATM card and a Home NETS PIN. Both the smart ATM card and Home NETS PIN can be obtained from the local bank that they have an account with. Customers can also use the service to check the balance in their CashCards and to view a history of previous card transactions. Future applications include a service which will enable M1 customers to pay their bills using their mobile phones.
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<http://www.nets.com.sg/news/article.php?artID=5>

Asia	Card	Institutions	Project Description
South Korea	Multiapplication card: with an electronic purse and credit application from the bank	Pusan Bank of South Korea	In July 2000, Pusan Bank of South Korea announced that it will issue 1 million multiapplication smart cards, letting Pusan cardholders pay fares on trains and buses, make purchases at stores and vending machines, even pay taxes over the Internet. According to KEB Technology Co., the South Korean systems integrator on the project, the cards will include an electronic purse and credit application from the bank, which cardholders will be able to use at 10,000 point-of-sale terminals in 2000 and another 10,000 in 2001. Cardholders will also be able to recharge the transit and bank e-purses over the internet at computer kiosks or on their home PCs, as well as 1,100 reloading machines and ATMs, in the city. communications) network operator.

<http://www.cardtech.faulknergray.com/arch00.htm>

South Korea	Visa Cash: card loaded or with predefined value designed for secure payments over the internet, mobile phones and for everyday low- value purchases	Visa International, various Korean institutions	In June 2000, Visa International announced that it would lead a group in South Korea that includes 13 financial institutions and mobile phone operator SK Telecom to issue 10 million e-purse cards over the next five years for making purchases via the Internet and at physical retail shops. The system will use the Network for Electronic Transfers, a Singaporean company that processes more than 100 million card transactions per year. NETS plans to incorporate Common Electronic Purse Specifications in its e-purse technology. CEPS allows for cross-border purse transactions.
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<http://www.cardtech.faulknergray.com/arch00.htm>

Thailand	Visa Cash: card loaded or with predefined value designed for secure payments over the internet, mobile phones and for everyday low- value purchases	Visas International, various Thai banks	Thai Smart Card Consortium formed by 7-Eleven, Krungthai Bank, Siam Commercial Bank and Bangkok Bank has selected Visa Cash, Visa's electronic purse (e-purse), as the payment brand for the consortium's electronic purse project. The multi-industry secure stored-value (e-purse/e-cash) payment, Visa Cash, use chip card technology and is designed for use for secure payments over the Internet, mobile phones and for everyday low-value purchases such as those made in fastfood restaurants, convenience stores, vending machines, payphones or petrol stations. Visa Cash facilitates fast and convenient transactions, without the need for signature or PIN. The introduction of Visa Cash into Thailand through the Consortium will underpin and stimulate the growth of the use of electronic cash in Thailand, and move the economy one step closer towards a cashless society.
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<http://www.businessinthaillandmag.com/archive/jul00/29.html>

Europe	Card	Institutions	Project Description
Baltic States *	Smart card retail loyalty schemes	Unibanka	In January 2001, Proton World and Netcard announced that Netcard has become the Proton licensee in Estonia, Latvia and Lithuania. Netcard is a smart card company based in Riga, Latvia, which has successfully developed two smart card retail loyalty schemes. In 1999, in association with IT provider BISS and Unibanka, Latvia's largest bank, Netcard developed an access control system for cars in the Old Town district of Riga, where over 5,000 cards have already been issued out of a planned total of 20,000.

http://www.protonworld.com/press/releases/2001/press_2001_01_03_index.htm

*Estonia, Latvia, Lithuania

Europe	Card	Institutions	Project Description
Bulgaria	Proton e-Purse: with Proton R3 and Proton R4 technologies, CEPS and EMV applications. Multifunctional		In December 2000, Proton World and BORICA signed a binding agreement under which BORICA, the Bulgarian national payment card network operator, becomes the Proton licensee for Bulgaria. BORICA is the operator and acquirer of the payment card network, and processes domestic and international payment card transactions on behalf of 25 different Bulgarian banks, and supports the ATM and POS terminal network. BORICA's smart card programme will begin with three Proton World-managed pilots in 2001. The first will be the development of a domestic Bulgarian electronic purse smart card, using the existing and well-established Proton R3 technology. The second will use Proton World's new generation R4 technology, in particular the ASPIC cardholder identification application, to provide secure access, PKI-based digital signatures and secure e-commerce and m-commerce. The third pilot will be a field test of the R4 domestic e-purse, interoperable CEPS-based e-purse and EMV credit/debit applications which will precede the migration of Bulgaria's existing 550,000 magnetic-stripe payment cards to R4 Proton smart cards.
http://www.protonworld.com/press/releases/press76index.htm			
Croatia	MBU smart cards with the Proton e-purse and chip-based credit and debit applications	Consortium of 27: local banks	In January 2000, MBU, a consortium of 27 banks in Croatia, has licensed the Proton electronic purse system for smart cards. Belgium-based Proton World International will manage a two-stage project for MBU, whose members have issued 500,000 debit cards. In the first phase, to begin in February 2001, MBU will replace its existing point-of-sale terminals with C-Zam/Smash POS terminals that accept smart cards from Belgium's Banksys bank association, a part-owner of Proton World. In the second phase, MBU members will replace their magnetic-stripe cards with smart cards carrying the Proton e-purse and chip-based credit and debit applications.
http://www.cardtech.faulknergray.com/arch00.htm			
Turkey	Multifunctional-credit, debit and other	Garanti Bank	It was announced in July 2000 that Turkey-based Garanti Bank will issue 750,000 smart cards with credit, debit and loyalty features. Phoenix-based Hypercom Inc., is supplying 2,500 of its ePic ICE 5000 point-of-sale terminals to merchants participating in the program. The terminals have touch-screens that allow consumers to view their accumulated loyalty points and to choose to use the points for discounts on purchases. The Bonus Card from Garanti Bank will carry a MasterCard logo and will comply with the EMV standards for chip-based credit and debit applications developed by Europay International, MasterCard International and Visa International.
http://www.cardtech.faulknergray.com/arch00.htm			

Americas	Card	Institutions	Project Description
Brazil	MasterCard M/Chip™: multifunctional-credit, debit and other	MasterCard, major banks in Brazil	At least 240,000 of the 16 million MasterCard cardholders in Brazil will take part in MasterCard's pioneering project occurring throughout the region. In partnership with MasterCard's member financial institutions in Brazil — Bradesco, Caixa, Credicard, Itaú, Real ABN-Amro, Unibanco and Redecard — MasterCard is initiating the migration from magnetic stripe cards to smart cards, and expects that in four years, all of the company's credit cards will be operating on the new platform. This effort will provide an infrastructure for combining several applications on a single card — including credit, debit, loyalty programs and others - to create a powerful tool for launching and developing new products and services.
http://www.mastercard.com/about/press/pressreleases.cgi?id=369			
Latin America and the Caribbean	Visa Cash: card loaded or with predefined value designed for secure payments over the Internet, mobile phones for everyday low-value purchases	Visa LAC Region	Proton World has signed an agreement with Visa International Latin America and Caribbean Region for the joint marketing of Proton-based e-purse smart card systems as "Visa Cash-compatible" in most of the Visa LAC region. The Proton multiple application smart card technology allows dynamic creation of applications; conforms to the EMV specifications; will conform to CEPS and Global Platform; is open to multiple sourcing of chips, cards and terminals from any certified manufacturers and can be integrated into a contact/contactless system. The Proton technology is also in use in diverse applications such as telecommunications, access control, cardholder identification, closed user groups, automated transport fare collection and secure Internet payments. It is compatible with all of the world's leading smart card platforms.
http://www.protonworld.com/press/releases/press47/index.htm			
Mexico	Proton e-purse: multifunctional		A Mexican banking and telecommunications conglomerate plans to issue 6 million smart cards in 2001. The cards will allow consumers to use and reload at 350,000 pay phones. The chip cards will carry the Proton electronic purse and merchant loyalty programs. The bank is part of Grupo Carso, which also owns Mexico's major phone company, Telefonos de Mexico or Tel-Mex, and retail stores. The bank plans to expand its ATM base from 300 machines to 2,000, and to deploy 20,000 public kiosks where consumers will be able to reload the Proton cards. The cards issued will have chip-based credit and debit features that comply with the international EMV standard.
http://www.ct-ctst.com/CT/			
Venezuela	Mondex e-cash: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the Internet.	Mondex Venezuela	In August 2000, ACI Worldwide (Nasdaq: TSAI) announced that it has been chosen to provide Mondex system solutions to Mondex Venezuela and its members. Mondex Venezuela- a consortium formed by Banco Mercantil; Banco Universal, S.A.C.A.; Banco Union, C.A.; Consorcio Credicard, C.A.; Banesco; Banco Universal, S.A.C.A.; and InterBank, C.A.- will use the ACI solutions to enable existing and future members, whether banks or non-banks, to handle Mondex value and risk management services. The system will have the ability to handle Mondex smart card processing through traditional ATM and POS channels, as well as Mondex value transfer and customer service via the Internet.
http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newsnbxen.txt&user=			

Annex 4b: Selected E-Finance Examples in Emerging and Developing Countries

1. Housing

Country	Project	Project Summary
Hong Kong	Advantage Mortgage, specialized mortgage broker	Advantage Mortgage in Hong Kong is a specialized mortgage broker in Hong Kong. The company derives its revenues from fees paid by fifteen of the largest lenders in Hong Kong's real estate market as well as two non-Hong Kong Monetary Authority supervised lenders. Advantage undertakes several functions: solicits borrowers; evaluates mortgage loan packages for presentation to borrowers via a kind of aggregator function; prepares all documentation required to underwrite the loan and ultimately send the entire loan package to final lenders; and provides offline support on documentation preparation by running a call center and interactive web page dealing with such issues as the loan to value or debt service ratios required by lenders. Advantage is beginning to examine cross-border expansion to China, Korea, and Taiwan.

<http://www.advantagemortgage.com.hk/pda/index.htm>

Various (Asia)	DollarDEX's online Reverse Auction and Group Mortgage	DollarDEX is a company that enables online consumers to compare, shop, auction and apply for loans and insurance products from more than 30 leading financial institutions in Asia has opened its doors in Hong Kong. It has introduced the Reverse Auction for housing loans in April 2000, and the online Group Mortgage in August of the same year. The online Reverse Auction gets several banks to bid for a group of home mortgages from potential collective customers even before those customers committed to the loans. DollarDEX.com's participating banks will not only know more about what other banks are offering, but can also reduce their cost of customer acquisition. Some of these savings could be passed onto customers. The online Group Mortgage allows borrowers to band together to get better deals from banks. In an arrangement with 7 banks in Hong Kong, dollarDEX's new service – a first in the South Asia region- allow homeowners to present their loans collectively online for better packages from banks.
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<http://www.dollardex.com/>

2. Insurance

Country	Project	Project Summary
China	Sohu. and Taikang's consumer-oriented insurance services online	Sohu.com, a major web portal, and Taikang Online, a major insurer, have agreed to offer consumer-oriented insurance services online. The "insurance online" column will provide insurance consulting, services and transactions to a variety of customers, including internet users, insurance clients, insurance agents and insurance companies. Taikang will use its insurance e-commerce platform to provide Sohu's registered users with online insurance services. Meanwhile, Sohu will share its registered users' information with Taikang to help expand its specialized online insurance market.

<http://www.chinaonline.com/industry/financial/NewsArchive/Secure/2001/March/C01030606.asp>

Hong Kong	Re2R's online open exchange of insurance risk and reinsurance capacities	Re2Re is the first and only online marketplace providing open exchange of insurance risk and reinsurance capacities on a global basis. Re2Re uses proprietary internet and e-commerce technology to dramatically improve the process of reinsurance exchange between direct insurance companies, insurance brokers, reinsurance brokers and reinsurance companies worldwide. Re2Re is a Bermuda-incorporated company with an Asian Regional Office in Hong Kong and a Service Office in the Philippines. Re2Re is a market neutral open exchange for global insurance risks and reinsurance capacities.
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<http://www.re2re.com/>

2. Insurance—continued

Country	Project	Project Summary
Philippines	Yapster's online insurance service	Yapster.com is a family cyber corporation that is hoping to become a contender in the local dot-com arena. It is owned by a Filipino-Chinese family currently engaged in various "traditional" businesses in the Philippines, including travel, mining, stocks and securities, textile, manufacturing, and real estate. Part of the Yapster.com portal is 2insureAll an online insurance service which provides benefits/indemnity in case of losses to the persons or physical well being of an insured individual. 2insureAll products include motorcar, personal accident, fire, comprehensive general liability, electronic equipment, medical, Life, and PreNeed Insurance. http://www.yapster.com/ http://www.2insureall.com/
Russia	Renaissance Insurance Group - First e- insurance agency in Russia	Since November 30, 1999, the Renaissance Insurance Group is offering online insurance services via internet. The major hindrance is the underdevelopment of card payments practice in the country but Renaissance Insurance Group has solved this problem, by allowing customers who do not have a credit card to print the bill from the insurance site and pay it in the nearest bank office. In addition, renins.com portal provides complete information about insurance market, procedures, and terms. The virtual office is permanently attended by on-line manager who can provide immediate help to the customer. http://agency.infoart.ru/it/news/engnews/99/12/06_584.htm www.renins.com
Turkey*	The World Bank' Turkish Catastrophic Insurance Pool	Turkish Catastrophic Insurance Pool - Internet platform prepared by the Turkish Government that would allow customers to enter all personal information including policy number and premium. Policies are issued on the internet and pool is monitored in real time. Since its creation, 100,000 policies have been issued on the web.
Various Countries (Asia)	DollarDEX Customized Travel Insurance	Founded by four Massachusetts Institute of Technology graduates, DollarDEX enables online consumers to compare, shop, auction and apply for loans and insurance products from more than 30 leading financial institutions has launched "Customized Travel Insurance" that lets insurance firms tailor a package of travel insurance services to each consumer at a flexible price, and allows customers to request instant insurance quotations http://www.dollardex.com/insurance/travel/index.cfm?show=travel_moreinfo.cfm
Various Countries (Asia)	Asia's first full online insurance product by DollarDEX	Dollardex has recently pioneered the first full online life insurance product, M@xivalue, underwritten by Singapore's United Overseas Bank's insurance company, which enables healthy applicants to can get instant approval. Dollardex's customers can get instant quotations based on a full comparison of features and prices, and can also buy online motor, travel, hospital, home, personal, long term care and even golfer's insurance. Channelnewsasia , 1 December 2000 - dollarDEX pioneers life insurance online http://www.dollardex.com/press/index.cfm?show=i_insurance.htm

* World Bank Group involvement

3. Microfinance

Country	Project	Project Summary
Bangladesh	Grameen Bank and Grameen Phone's mobile phone project in Bangladesh rural areas	Grameen Bank whose mission is to provide credit to the poorest of the poor in rural areas, established Grameen Telecom dedicated to bringing the information revolution to the rural people of Bangladesh. Grameen Telecom provided two kinds of products to these people. First, the Village Pay Phone to finance village pay phones through selected member borrowers of Grameen Bank who will purchase the phone (under the lease program of the Grameen Bank) and make the telephone available to all users in the village. Second, the Direct Subscriber program to provide telephone service in the rural areas that are not directly engaged with Grameen Bank activities. The phone helped many poor women earn fair profits from their cow rearing grocery stores, poultry farms and vegetable gardening. http://www.cisp.org/imp/december_99/12_99camp.htm http://www.nation-online.com/200002/17/n0021706.htm#BODY8
Nigeria	Smart Cards for microcredit scheme	Gemcard Nigeria Limited has concluded plans to introduce smart cards targeted at the non-banking segment of the Nigeria society. The project is principally aimed at encouraging banking habit among the lower class as well as mopping up funds from the informal sector into the banking system. In addition, the poor citizens will be given free smart cards and with the active participation of banks in the smart pay scheme organize a microcredit scheme for the concerned citizenry. The online banking service available in a mobile van will use facial biometric system to recognize customers. <i>Source: Lagos Post Express, November 23, 2000</i>
South Africa	Modified ATM services to the urban poor	In 1993 Standard Bank of South Africa created an affiliate, called E Bank, to deliver basic banking services to the urban poor. E Bank provides a package of financial services designed specifically for low-income clients, offering greater convenience for the user while keeping under control the costs to the bank of providing services. E Bank combines the innovative technology of modified ATM services with staff available to help all clients. By rethinking the needs of the basic banking customer, E Bank was able to bundle services valued by poorer clients to justify a fee high enough to cover costs. <i>Source: Financial Services for the Urban Poor, JoAnn Paulson, Policy Research Working Paper 2016, November 1998, World Bank.</i>
Various (Accion)	Accion's palm pilots project for efficient microcredit lending	Accion International, one of the world's leading microfinance organizations is now using handheld computer technology (palm pilot) to cut the time and cost it takes to make a microloan. Typically, loan officers record all data by hand, a common practice because of the difficulty of carrying burdensome equipment when visiting clients. Recording data this way takes an average 25 minutes per client. After the data is reentered at the office, the total processing time stretches to one hour. The new microloan-processing software designed for palm pilots allows loan officers to record client data, take applications and make loan calculations on the spot. Back at the office, data can be quickly uploaded to a centralized database, eliminating the time-consuming task of entering it. Evaluating a client this way takes about fifteen minutes. The new software was funded by the US Agency for International Development. http://www.accion.org/pdf/ventures_fall99.pdf http://www.accion.org/press/main.asp

3. Microfinance—continued

Country	Project	Project Summary
Various (PlaNet Finance)	Internet to refinance microfinance organization	PlaNet Fund is the first international organization to refinance microfinance institutions. By using the internet for worldwide coverage and maximum efficiency, PlaNet Fund aims to help MFIs through all the stages of their development. Its objective is to supply a number of services including loans, guarantees, joint funding, purchase of bonds, guaranteeing. In Bolivia for example, a carpenter who needs new tools applies to a microfinance institution (MFI) for a loan. The MFI does not have sufficient funds at the time, and so cannot provide the loan. The MFI appeals over the internet to PlaNet Fund, combining the applications of several craftsmen. A specialist on Bolivia and its institutions examines the case in La Paz. He gives his opinion to the operating committee of PlaNet Fund, which rapidly makes a decision allowing the MFI to meet its' clients' needs.

<http://www.planetfinance.or>

Various (UNCTAD)	The Virtual Microfinance Market	The Virtual Microfinance Market (VMM), developed by the <u>United Nations Conference on Trade and Development (UNCTAD)</u> , is an information exchange system designed to facilitate interactions between microfinance institutions (MFIs), private investors, Governments and other participants in the Microfinance market. It is aimed at creating sustainable market links between the commercial investment world and the microenterprise sector in developing countries. It is expected to permit the investment, under commercial terms, of millions of dollars at the grass-roots level and the creation of thousands of jobs. On the same internet site, The VMM provides contact and financial information on MFIs willing to mobilize commercial funding; information on the legal and regulatory conditions of investment in these MFIs and links permitting direct contact with regulatory authorities on each country; contact data on investors and financial intermediaries and information on conditions attached to past or current offers; and access to sources of knowledge, technical advice and training on state-of-the-art techniques and tools for improving MFIs' financial management and access to capital markets.
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<http://www.vmm.dpn.ch/>

4. Small and Medium Enterprises

Country	Project	Project Description
Ghana*	Computerized Mobile Bank, Advanced Engineering Design and Research Corporation	The Computerized Mobile Bank is an initiative of the Advanced Engineering Design and Research Corporation in Ghana. It was funded by Infodev, a multidonor grant facility managed by the World Bank. The project designs, deploys and operates a Computerized Mobile Bank (CMB) to provide banking services to Susu operators and small to medium enterprises in Ghana over a period of 18 months. The objective of this activity is to determine the extent to which a CMB can expand the outreach of formal banking institutions and reduce the transaction costs of providing complete banking services to informal bankers (e.g. Susu operators in Ghana) and small to medium enterprises.
Hong Kong	On-line financing to SMEs, SMEloan	SMEloan is Hong Kong's leading provider of online financing to SMEs. The Company has re-engineered the commercial lending process by leveraging the power of the Internet. In addition, it manages and monitors credit risk using its proprietary web based risk management model. In October 2000, SMEloan Hong Kong Limited has achieved a first for a start-up e-finance company in Asia - by successfully closing a HK\$600 million financing facility with a group of banks lead arranged by Standard Chartered Bank and backed by a surety bond from Centre Solutions (Asia) Ltd.

<http://www.gorillasia.com/tc/readarticle?id=1524>

* World Bank Group involvement

4. Small and Medium Enterprises—continued

Country	Project	Project Summary
Various (CitiGroup)	CitiBusiness in Czech Republic, India, and Hungary	In April 1999, Citigroup created a new business group, CitiBusiness, that specializes in financial services to SMEs. In May 2000, the new group launched the Citibusiness Platinum Select Master Card, which in addition to providing generous lines of credit, gives access to various services including the CitiBusiness Resource Network that provides information on anything from building a website to setting up an employee benefits program. In early 2001, it offered Citibusiness Direct to SMEs in Czech Republic, India, and Hungary. Citibusiness Direct is a comprehensive internet banking solution that was only available to large companies and multinational clients. http://www.citibank.com http://www.citibusinessdirect.com
Various (Master Card)	The Tradehub Virtual MasterCard Card	In June 2000, MasterCard International signed a Memorandum of Understanding with an electronic trading activity center, Tradehub Asia.com, which builds and networks business-to-business multi-product portals in Asia/Pacific. MasterCard will act as the payment mechanism for all transactions undertaken via the TradeHub Asia.com system, providing financial settlement across borders and across currencies. The Tradehub Virtual MasterCard Commercial Card is to be a catalyst especially for small and medium enterprises to trade with each other as well as among major companies, both domestically and internationally. http://www.mastercard.com/about/press/pressreleases.cgi?id=321
Various (Pride Africa)	Virtual information and service network and smart cards for SMEs	Pride Africa, a financial institution that provides access to credit to over 80,000 entrepreneurs in Kenya, Tanzania, Uganda, Malawi and Zambia created Drumnet and Sunlink to overcome some barriers affecting SME growth. DrumNet is a virtual information and service network linking clients to markets, information and services. Through its network of micro lending branches and information kiosk, Pride Africa's clients will have access to wholesale supplies and services, advertising as well as partnership and association building opportunities. To also integrate micro entrepreneurs in the more formal financial sector, Pride Africa created Sunlink Cashpoints. Among others, Sunlink clients received smart cards that will serve as a client identification card helping establish credit rating, as a loan authorization card, and as a teller access card, thus facilitating SMEs access to more formal financial services. http://www.prideafrica.com/
Various* (The World Bank Group's International Finance Corporation)	E-Finance Small Business Global	The E-Finance Small Business Initiative aims to help financial institutions increase the efficiency and volume of the financial services targeted to SMEs by capitalizing on recent advancements in financial information, and communication technologies. The central concern of this initiative is to create a model that will enable financial institutions to focus on the risk profile and product needs of their SME clients. To this end, the model will integrate technologies that allow financial institutions to simultaneously collect and analyze significant amounts of client information on an ongoing/real time basis. The e-finance model is built around three key factors that ensures sustained profitability in SME lending: operating efficiency, asset quality and growth, and the pilot projects that are to put the e-finance model into practice will be launched in six regions of the world. The International Finance Corporation's holistic approach in the e-finance initiative calls for several support activities including a global credit bureau initiative and a technology practice area on mobile banking and mobile payment systems (i.e., mobile banking using SMS or WAP based solutions, remote banking capabilities for loan officers, mobile payment systems) to facilitate non-cash payment options for SMEs). www.worldbank.org/html/fpd/privatesector/sme.htm www.ifc.org/sme/

* World Bank Group involvement

E-Finance Web Links*

2. International Working Groups

The Electronic Banking Group of the Basel Committee on Banking Supervision issued *Fourteen Principles for Risk Management of Electronic Banking*. The full text of the report can be found at: www.bis.org/publ/bcbs76.htm or www.bis.org/cgfs16.pdf

International Association of Insurance Supervisors (IAIS)

The IAIS is reviewing developments in insurance activities on the Internet. <http://www.iaisweb.org/framesets/about.html>

International Organization of Securities Commissions (IOSC)

The Internet taskforce can be found at: http://www.iosco.org/docs-public/1998-internet_security.html

World Bank

The World Bank is reviewing the policy implications of changes in financial services, markets and institutions driven by globalization and technological advances. <http://www1.worldbank.org/finance/>

Financial Action Task Force

The FATF is identifying the vulnerability of Internet banking to money laundering activities. www.oecd.org/fatf

Committee on Global Financial Systems

The CGFS is assessing the trends in the use and the nature of electronic trading in financial markets and to study their potential implications on financial stability. <http://www.bis.org/cgfs/index.htm#pgtop>

The International Telecommunications Union (ITU)

Presently, the ITU serves as a forum to address policy issues related to electronic commerce in developing countries. <http://www.itu.int/wtpf/agenda/index.html>

UNITED Nations Commission on International Trade Law (UNCITRAL)

The study focused on issues of transferable bills of lading in an electronic environment. <http://www.uncitral.org/en-index.htm>

World Trade Organization (WTO)

Working group regarding the protection of consumer privacy and personal data in cyberspace and general analysis of financial services liberalization. www.wto.org

* This listing follows the sequence of relevant annexes beginning with Annex 2.

3. Selected Trading Platforms

Selected Trading platforms for Fixed Income Securities:

Auction Systems

- **MuniAuction:** conducts online auctions of municipal bonds.
<http://www.grantstreet.com/>
- **EBondUSA.com :** provides price discovery and online trading services for investment grade municipal bonds.
<http://www.ebondusa.com/>
- **Bloomberg Secondary Market Auction System:**
<http://www.bloomberg.com/>
- **Valubond:** a Web-based centralized marketplace for municipal, investment-grade corporate, government and federal agency debt.
<http://www.valubond.com/>

Inquiry-based Systems

- **TradeWeb:** allow institutional customers to buy and sell U.S. Treasury and federal agency securities electronically with multiple primary dealers.
<http://www.tradeweb.com/>
- **Market Axess:** an Internet-based multi-dealer research and trading platform for credit products <http://www.marketaxess.com/>
- **BondClick:** a multi dealer online trading platform specifically designed for institutional investors. <http://www.bondclick.com/>
- **PrimeTrade:** an internet/intranet based real-time trading system of Credit Suisse First Boston <http://www.csfb.com/primetrade/index.shtml>
- **Bloomberg BondTrader:** a multi-dealer electronic trading system for U.S. Treasury securities. <http://www.bloomberg.com/>

Cross-matching systems

- **BondBook:** offer an online marketplace for investment-grade and high-yield corporate bonds and municipal bonds. <http://www.bondbook.com/>
- **BondDesk.com:** a comprehensive trading platform for a wide array of

fixed-income products. <http://www.bonddesk.com/>

- **BondsInAsia:** regional electronic trading platform for Asian fixed income securities. <http://www.bondsinasia.com/>
- **BrokerTec Global, LLC:** a fully electronic inter-dealer broker active in both the U.S. and European capital markets. <http://www.btec.com/>
- **EuroMTS Limited:** a pan-European electronic trading system for Euro-denominated benchmark government bonds. <http://www.euromts-ltd.com/>
- **eSpeed:** an interactive electronic marketplace that allows customers to execute transactions in a range of financial instruments. <http://www.espeed.com>
- **Autobahn:** launched by Deutsche Bank Securities Inc, allows customers to conduct transactions electronically in U.S. , European and Emerging Market fixed income securities, globally on a 24-hour basis. <http://www.autobahn.db.com/>
- **Apogean Technology:** operates an electronic trading system for dealers in emerging-markets debt securities. <http://www.apogean.net>
- **Currenex:** An independent and open institutional financial exchange, linking institutional FX buyers and sellers worldwide. <http://www.currenex.com/>
- **Instinet Fixed Income:** a global electronic broker service that facilitates trading in U.S. Treasury and Euro sovereign debt securities. <http://www.instinet.com/>

See Bond Market Associations Survey for a more comprehensive list of online trading platforms: E-Commerce in the Fixed Income Markets: <http://www.bondmarkets.com/research/ecommerce/>

Selected Trading platforms for Equity Trading

Eastern Europe:

- **Sati Online Brokerage** ,Czech Republic: <http://www.sati.cz/>
- **Quaestor Financial Group**, Hungary: <http://www.quaestor.hu/>
- **Equitas**, Hungary: <http://online.equitas.hu/>

- **Internet Broker Kft**, Hungary: <http://www.cd.hu/fw/vis/index.html>

Asia:

- **Karachi Stock.com**, Pakistan: <http://www.karachistocks.com/>
- **Phillip On-line Electronic Mart System (POEMS)**: <http://www.poems.com.sg/>
- **Asian Capital Equities, Inc**: <https://www.psedirect.net/ace/secured/>
- **Korea Samsung Securities Cyber Stock**: <http://english.cyberstock.co.kr/>
- **ARKaccess Asia Limited**: <http://www.arkaccess.com/>

Latin America:

- **Patagon.com**: <http://www.arkaccess.com/>
- **Rava Sociedad de Bolsa**, Argentina: <http://www2.rava.com.ar/cgi-bin/rt/index.cgi>
- **Hedging Griffio**, Brazil: <http://www.hedginggriffo.com.br/home/>

3. *Innovative E-Finance Providers*

a. *SMEs*

Ghana: Computerized Mobile Bank, Advanced Engineering Design and Research Corporation

<http://wbln0018.worldbank.org/ict/projects.nsf/b0d91e15fb2717f0852569d200505876/8e3deb0355d3f374852569ab00757a43?OpenDocument>

Hong Kong: On-line financing to SMEs, SMEloan <http://www.gorillasia.com/tc/readarticle?id=1524>

Vietnam: Internet Trading Tool for SMEs, MeetVietnam
http://www.ifc.org/pressroom/Archive/2000/01_27/01_27.html

Various (CitiGroup): CitiBusiness in Czech Republic, India, and Hungary

<http://www.citibank.com>
<http://www.citibusinessdirect.com>

Various (Master Card): The Tradehub Virtual MasterCard Commercial Card

<http://www.mastercard.com/about/press/pressreleases.cgi?id=321>

Various (Pride Africa): Virtual information and service network and smart cards for SMEs. <http://www.prideafrica.com/>

The World Bank Group's International Finance Corporation: E-Finance Small Business Global Initiative. <http://www.worldbank.org>

b. Micro-finance

Bangladesh: Grameen Bank and Grameen Phone's mobile phone project in Bangladesh rural areas. http://www.cisp.org/imp/december_99/12_99camp.htm
<http://www.nation-online.com/200002/17/n0021706.htm#BODY8>

Nigeria: Smart Cards for microcredit scheme
Source: Lagos Post Express, November 23, 2000

Various (Accion): Internet to refinance microfinance organizations
<http://www.planetfinance.or>

UNCTAD: The Virtual Microfinance Market <http://www.vmm.dpn.ch/>

Various (PlaNet Finance): Internet to refinance microfinance organizations
<http://www.planetfinance.org>

c. Insurance

China : Sohu.com, a web portal, and Taikang Online, an insurer
<http://www.chinaonline.com/industry/financial/NewsArchive/Secure/2001/March/C01030606.asp>

Hong Kong: Re2R's online open exchange of insurance risk and reinsurance capacities <http://www.re2re.com/>

Mexico: Mexican insurer Grupo Nacional Provincial S.A. will begin offering online Mexican tourist auto policies through a joint Web venture with International

Insurance Group Inc. www.mexicaninsuranceonline.com

Philippines: Yapster's online insurance service. <http://www.yapster.com/> <http://www.2insureall.com/>

Russia: Renaissance Insurance Group - e- insurance agency in Russia.
www.renins.com

Various Asian Countries: DollarDEX Customized Travel Insurance
http://www.dollardex.com/insurance/travel/index.cfm?show=travel_moreinfo.cfm

Various Countries (Asia): Asia's full online insurance product by DollarDEX.
http://www.dollardex.com/press/index.cfm?show=i_insurance.htm

d. **Smart Cards**

Ghana: Mondex e-Cash: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the Internet. *Mondex Ghana LTD*

<http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newsuyn07.txt&user=>

Hong Kong: i.Life card— multifunctional-credit, debit and other. Hongkong and Shanghai Banking Corporation Limited (HSBC).

<http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newsw8wfl.txt&user=>

India: e-Purse and EMV-compliant debit: targeted at micropayments and the debit application for higher-value day-to-day transactions.

<http://www.protonworld.com/press/releases/press63index.htm>

Indonesia: Paspor BCA/Maestro/Cirrus card: PIN based online real time debit. *MasterCard, BCA.*

<http://www.mastercard.com/about/press/pressreleases.cgi?id=3444>

Korea: Mondex e-Cash and MasterCard M/Chip™: multi-functional-credit, debit and other. *MasterCard Korea*

<http://www.epaynews.com/archives/index.cgi?ref=browse&f=view&id=982251131212120150500>

Latin America and the Caribbean: Visa Cash: card loaded or with predefined value designed for secure payments over the Internet, mobile phones and for everyday low-value purchases.

<http://www.protonworld.com/press/releases/press47/index.htm>

Nigeria: EPurse Card. *Securecard Trust Group*. Securecard Trust Co. Ltd., which licenses the Proton technology in Nigeria. <http://www.cardtech.faulknergray.com/arch00.htm>

Philippines: *Visa Cash*: card loaded or with predefined value designed for secure payments over the Internet, mobile phones and for everyday low-value purchases.

<http://www.cardtech.faulknergray.com/arch00.htm>

Singapore: Cash Withdrawal. *Network for Electronic Transfers (Singapore) Pte Ltd, local bank.*

<http://www.nets.com.sg/news/article.php?artID=111>

Singapore: CashCard® TopUp on Mobile Phones: the system utilizes a dual slot mobile phone, a smart ATM card and a Home NETS PIN. *Network for Electronic Transfers (Singapore) Pte Ltd, local banks.*

<http://www.nets.com.sg/news/article.php?artID=5>

South Africa: Visa Cash: card loaded or with predefined value designed for secure payments over the Internet, mobile phones and for everyday low-value purchases.

<http://www.cardtech.faulknergray.com/arch00.htm>

South Korea: Multiapplication card: with an electronic purse and credit application from the bank. Pusan Bank of South Korea.

<http://www.cardtech.faulknergray.com/arch00.htm>

South Korea: Visa Cash: card loaded or with predefined value designed for secure payments over the Internet, mobile phones and for everyday low-value purchases. <http://www.cardtech.faulknergray.com/arch00.htm>

Thailand: Visa Cash: card loaded or with predefined value designed for secure payments over the Internet, mobile phones and for everyday low-value purchases.

<http://www.businessinthailandmag.com/archive/jul00/29.html>

Turkey: Multifunctional-credit, debit and other— *Garanti Bank*

<http://www.cardtech.faulknergray.com/arch00.htm>

Venezuela: Mondex e-cash: multifunctional purse divided into 5 separate pockets allowing up to five different currencies to be held at a time. It can also be used across open networks such as telephony or the Internet.

<http://194.112.42.16/mondex/cgi-bin/printpage.pl?&path=../documents/newsnbxen.txt&user=>

5. **Communications Infrastructure**

International Telecommunications Union www.itu.org

6. **Public Key Infrastructure and Security**

- **American Society for Industrial Security:** The American Society for Industrial Security is the largest international educational organization for security professionals, with over 32,000 members worldwide. ASIS is dedicated to increasing the effectiveness and productivity of security professionals by developing educational programs and materials that focus on both the fundamentals and the most recent advancements in security management.

www.asisonline.org

- **BITS:** The Technology Group for [The Financial Services Roundtable](#), was formed by the CEOs of the largest bank-holding institutions in the United States as the strategic “brain trust” for the financial services industry in the e-commerce arena. www.bitsinfo.orgg
- **MSNBC:** They maintain a very comprehensive and up to date Technology section within their website. <http://search.msn.com>
- **CERT:** The CERT[®] Coordination Center (CERT/CC) is a center of Internet security expertise. It is located at the [Software Engineering Institute](#), a federally funded research and development center operated by

[Carnegie Mellon University.](http://www.cert.org/)

<http://www.cert.org/>

- **ISS:** Internet Security Systems was founded in 1994. ISS is the world's leading provider of security management solutions for the internet. Headquartered in Atlanta, Georgia, ISS has additional offices throughout the U.S., as well as international operations throughout Asia, Australia, Europe and Latin America.

<http://www.iss.net>

- **SearchSecurity.com:** Provides an aggregation of the information security content on the Internet, as well as original featured columns and a highly targeted search engine. www.searchsecurity.com
- **National Infrastructure Protection Center:** Established in February 1998, the NIPC's mission is to serve as the U.S. government's focal point for threat assessment, warning, investigation, and response for threats or attacks against our critical infrastructures. These infrastructures, which include telecommunications, energy, banking and finance, water systems, government operations, and emergency services, are the foundation upon which our industrialized society is based. www.nipc.gov
- www.Attrition.org Website that documents hacker attacks worldwide.
- **Hong Kong Monetary Authority:**
http://www.info.gov.hk/hkma/eng/guide/guide_no/guide_1511xb.htm

7. *Privacy and Information*

- www.privacy.org
- www.nipc.gov
- <http://astlavista.box.sk>
- **ZDNET:** At ZDNet, their mission is to be a premier "full service" destination for people looking to buy, use, and learn more about technology.
www.zdnn.com

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Box 1: Mobile phones: The developing world's technological springboard. Information was garnered from the International Telecommunication Union's World Telecommunication Development Report 1999. A. Romero describes these technological advances in his article entitled "Cell Phone Surge Among the World's Poor" in December 12th, 2000's New York Times (www.nyt.com).

Box 2: Leapfrogging across the globe: Estonia, Republic of Korea, and Brazil. Estonia's progress in information technology is discussed in Maheshwari (2000). Charlie Guarrigues's back to office report on the Estonia Payment System Project provided valuable information. The data on the number of online clients are from the Baltic News Service 2000, and from the Estonian Review of the Ministry of Foreign Affairs of Estonia (2000). The International Telecommunication Union's World Telecommunication Indicators Database (1999) also provided information (www.itu.org).

Box 5: Privacy problems—the role of the public sector and private solutions. The information is based on material provided by the OECD in "International and Regional Bodies: Activities and Initiatives in Electronic Commerce" (2001).

Box 6: Securities regulation, the internet, and emerging markets. The information is based on material provided by the US SEC "Federal Regulations of Securities Activity on the Internet." See also IOSCO's "Internet Taskforce" (www.iosco.org).

Box 8: Challenges for market regulation within and across countries. The box draws on Aggarwal (2000) and the survey by the Economist, Global Equity Markets, May 5, 2001.

Box 9: Making creative use of existing public infrastructure: Post offices. Glaessner, Klapper, and Ladekar (2000), Klapper and Simon (2001).

Box 10: Smart cards: A clever way to leapfrog? The information on the acceptance of smart cards is from the Hitachi Research Institute (2000)'s presentation. Smart card developments in the United States are from Crumley (2000) and Fargo (2000). The Hong Kong example is from Abrahams (1999) and McKinsey (2001), the Korea example from Card Fax (2000), and the recent developments in Africa are from Mondex (1999), Mondex (2000a), Mondex (2000b).

Box 12: Insurance: E-financeable? The use of the Internet in the insurance industry is discussed in Kelly (1998). For further information on the Renaissance Insurance Group, see the company's Website (www.renins.com). The case of online auto policies in Mexico is from Bestwire (2000). The examples on Yapster, Re2Re, DollarDex, and China are from their Websites (www.yapster.com/, www.re2re.com/, www.dollardex.com, www.chinaonline.com/).

Box 13: E-Finance for small and medium enterprises. The SMEloan example draws largely on the information provided on SMEloan's Website (www.SMEloan.com) and Gorillasia.com (www.gorillasia.com/tc/readarticle?id=1524). The examples on DrumNet and Sunlink are from Biashara News Letter (2000), Pride's Website (www.prideafrica.com) and (www.geocities.com/Starsys2000/page3.html). The information on CitiBusiness Direct comes mainly from the Citibank and Citibusiness Direct Websites (www.citibank.com and www.citibusinessdirect.com).

Box 14: Microfinance and e-finance: A viable match? The factors that hinder the use of information technology in microfinance institutions are discussed in Miehlbradt and Chua (1999). The EBank example in South Africa is from Paulson (1998); the Gemcard example in Nigeria was provided in Ungwu (2000); The ACCIÓN Palm Pilot example is from Accion's Fall Ventures (1999); and the PlaNet Finance and Virtual Microfinance Market information are from their Websites (www.planetfinance.org/en/institutionnel/index.htm and www.vmm.dpn.ch/).

