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WHITHER SYSTEMS COMPETITION?

The old systems competition between East and West aimed at military superiority and has, meanwhile, been decided. Globalisation and European integration, however, are producing a new systems competition, whose outcome is yet unknown. The new systems competition aims at improving a location's attraction for potential tax payers and at repelling the state's boarders, and it follows completely different laws than the old one.

The consequences of the new systems competition are drastic reforms of regulation and taxation systems in many countries, improving competitiveness from a national point of view. Germany, too, must make great efforts to introduce long overdue reforms in order not to fall behind even further. Economists largely agree on the nature of these reforms.

Quite another problem arises if system competition is not viewed from the vantage point of an individual country; but rather if the consequences are considered which follow for all countries together if they are successively subject to systems competition in ever new rounds of reforms. The historical processes are still largely understood which unfold over decades, but then bring forth even greater changes. How far do the analogies go between private competition and the competition of states? May we expect that systems competition works as well as the competition in private markets?

Theoretical analyses show that the answer to this question is likely to be "no". Since governments intervene where the market fails, we must fear that the reintroduction of the market on the higher level of state competition tends also to fail (selection principle). Thus we must expect, for example, that competition among social states results in competition of repulsion (United States), that competition with taxes and infrastructure leads in the end to subsidisation of capital input (east Germany) and that competition of bank regulation systems causes a dangerous increase in lemon-banking (Asian crisis).

For these reasons, globalisation must go hand in hand with a change in the framework of systems competition. It includes, for example, the proposals to integrate immigrants into the social system only after a certain delay, to harmonise taxes on capital earnings in Europe, to extend the EU ban of subsidies to the provision of infrastructure, and to harmonise bank regulation as planned by the Basle II agreement.

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THE NEW ECONOMY

eEUROPE: – CHALLENGES AND OPPORTUNITIES

ERKKI LIIKANEN*

The information society has been on the top of the EU agenda since the Lisbon summit more than a year ago. The conclusion of the summit was clear: economic growth is closely linked to the speed with which we get ready to use new technologies, especially in the information and communications field.

The term "we" means in this case all of us – businesses, citizens, government, everybody. Some, for example big companies, and research institutes had been quicker to adapt. Some had been slower, such as SMEs and governments. Some had not yet started, including the majority of citizens without access to the Internet.

The analysis of Lisbon was that the benefits of the information society can be realised only if the society as a whole adopts – and not only adapts to – the digital world.

Of course, since spring 2000 everything has changed. Or has it? I'm not so sure.

True, the stock markets – especially the high tech stock markets – have fallen. The US economy is stuttering, and as consequence the European economy has slowed down a bit, too. But look beyond short-term indicators and stock market headlines: the ground forces have remained the same.

- Internet penetration in Europe keeps rising at a very fast pace.
- The ICT sector keeps growing, both in absolute terms and relative to the rest of the economy.
- Businesses and governments keep integrating ICTs and the Internet into their normal work.

In short, the information society is progressing as expected, albeit not at an explosive speed, but only

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at a very very fast speed. And it remains our key task to set the right framework to allow growth to continue.

Telecoms liberalisation and the new framework

EU telecoms policy has one main objective: provide high quality services at low prices to European citizens. To do so, we have gradually liberalised all segments of the telecoms market. As you know, this process culminated in January 1998 with the full liberalisation of services and infrastructures in all Member States.

I underline "in all Member States". Throughout the entire liberalisation we have managed to keep everybody on board the same ship, in marked contrast to the electricity liberalisation.

I do not point this out to say that we were more efficient than our colleagues in the electricity sector. The times were different in the early 1990s. There was not as much mistrust towards common solutions as in the last years. But I believe recent developments have convinced even many sceptics of the necessity of a degree of harmonisation of the European market.

Thanks to liberalisation together with some harmonisation,

- telecoms services have become the fastest growing sector of the European economy, with an overall growth rate of 12.6% in 2000.
- competition keeps intensifying, leading to lower prices, more choice and better quality of service.
- incumbent operators have turned themselves into innovative companies that expand internationally.

We have achieved a lot, but much remains to be done to create a level-playing field for all competitors. This is particularly the case in local communications, which are still largely dominated by former monopolies.

Furthermore, the EU telecoms market remains fragmented along national lines. This was illustrat-

Full telecoms liberalisation achieved in 1998

ed by the incoherence in the licensing process for third-generation mobile services.

Therefore, our aim is to create a genuinely unified and coherent market, where rules are applied in a harmonised way all across the EU. Proposals for a new regulatory framework for electronic communications were tabled last summer. Let me briefly remind of three key features:

- Simplification. The new telecoms package streamlines the existing framework, reducing the number of Directives from 28 to 8.
- Convergence. It adapts the existing framework to the Internet-driven convergence between telecoms, computers and the media, where any content can travel over any network to any terminal. Currently a video on your TV is subject to one set of rules, the same video on your computer is subject to another.
- Spectrum. The telecoms framework incorporates a new area of responsibility: spectrum. Radio spectrum, which is, for instance, used for wireless telecoms or broadcasting, is of growing economic importance. This requires a co-ordinated EU approach, both at the European and international levels.

The target was that this new telecoms package should enter into force in early 2003, including one year of transposition by Member States. I am glad to report that significant progress has been made since. We are still on target.

The legislation to unbundle the local loop already came into force in January 2001 after one of the fastest adoption procedures in EU history. As a result we expect, in particular, to rapidly see the emergence of competition in flat-fee, high-speed Internet based on ADSL – a technology which allows for fast Internet access over regular telephone wires.

The other Directives deal both with the regulation necessary ensure effective competition and with the rights of customers. Consequently, they cover a vast array of issues, going from dominant positions over licensing conditions all the way to universal service and data protection.

Despite this very ambitious scope, most of the package is already subject to agreement, thanks to very intensive discussions in the European

Parliament and in the Council of Ministers. True, some differences subsist, notably:

- on the level of co-operation in remedying competition problems, i.e. whether the Commission can intervene to guarantee that remedies do not create problems for the internal market;
- on how to deal with spam, where a majority of Member States and the Commission support opt-in, while a minority prefers opt-out;
- on retention of traffic data, where necessities of law enforcement and right to privacy require a very delicate balance indeed.

However, I'm confident that solutions will be found rather sooner than later.

Concerning our other legislative activities I am happy to report that we have made significant progress on the dot.eu regulation. A common orientation by Member States has been found, and the European Parliament has given a largely positive opinion. We are on good course for adoption before the end of the year.

Network and information security

However, competition alone will not be enough to ensure widespread Internet take-up in Europe. It must be complemented by a high level of security and privacy on the Internet. Indeed, this concern is getting more and more important for users. According to our surveys, the number of Internet users encountering security problems has leapt from 18% last year to 31% this year.

The EU has already taken several initiatives in this respect:

It has fully liberalised the trade of encryption technologies between Member States. These are key to securing confidentiality.

It has also adopted legislation to ensure the lawfulness and mutual recognition of electronic signatures between EU countries. These are key to securing the integrity and authentication of electronic data.

However, more needs to be done, for three reasons.
- Firstly, networks and information systems have become critical for the proper functioning of

our societies as more and more of our economy relies on them.

- Secondly, the amount of data flowing between countries and between continents is still growing on a daily basis. As a consequence, security threats, such as virus attacks, can in principle be launched from any place on earth against any network or information system on the globe.
- Thirdly, network and information security is nowadays a commodity bought and sold on the market and part of the contractual agreements between parties. Policy measures should reinforce this market process.

Therefore, the Commission has recently published a Communication on network and information security. On the basis of the analysis in this Communication we will start discussions with Member States and the European Parliament on which measures need to be implemented.

Let me highlight some of the policy proposals we have made in this document:

- In order to raise awareness, public information and education campaigns should be launched and best practices should be promoted.
- A European warning and information system is needed to strengthen the activities of Computer Emergency Response Teams (CERTs) or similar entities and improve the co-ordination amongst them.
- Examine how to best organise at European level pro-active measures to develop forward looking responses to existing and emerging security threats (e. g. an Information Security Observatory).
- Concerning the legal framework, we will set up an inventory of national measures, which have been taken in accordance with relevant Community law.

Our objective is to table a comprehensive strategy on the security of electronic networks before the end of the year. On the basis of this strategy, security is likely to be one of our priorities for the next two years.

Access for all: skills and inclusions

Liberalisation leads to lower prices; security leads to more trust; both lead to a quicker uptake. The growth rates of Internet use in Europe are already higher than for any other new technology in histo-

ry, with on exception – mobile telephony. Some simple figures show how far they have spread in only a couple of years:

- 65% of the European population have a mobile phone.
- 45% of Europeans use a computer at work.
- More than 36% of EU homes had an Internet connection in June 2001, up from 28% eight months earlier.

However, cheap and secure telecoms services by themselves are not enough. People also need the ability to use them. There are four segments of the skills question where we must intervene to fully exploit the potential of the Internet:

- First, schools must provide all young Europeans with the essential digital skills they need to live, work and be responsible citizens in the digital age.
- Second, we need to ensure the employability of people already in the job market. Many of them need to adapt their skills or acquire new ones. This is exacerbated by two factors: the ageing of Europe's workforce, and the accelerated outdating of skills due to the fast pace of technology development. This calls for the promotion of life-long learning for all Europeans.
- Third, we must provide a sufficient supply in IT-skilled workers. To do so, we have to adapt higher education and encourage more young people to embrace scientific and technological carriers.
- Fourth, we should not forget people needing special help to join the information society, whether sick, elderly, disabled or otherwise inhibited. Modern technology provides them with new opportunities to be better integrated in society – oversize keyboards, voice-enabled websites and so on. Investments in developing adequate technologies for their needs not only keep them from being excluded from the *information* society, but also integrate them better into society at large. Applications such as e-health will enable them to participate more actively in everyday life. The information society does not only have economic benefits, but social ones as well.

Getting everyone on board is a very important point which I never tire of underlining. Currently, growth rates are very high, and are likely to stay that way for some time. We might imagine that with

Skill improvement for Internet use

these growth rates everybody sooner or later will be online. However, there will be a time (at 60% penetration? at 80% penetration? who knows?) when growth slows down and it will become clear who will not join the bandwagon by themselves.

It will be our duty to make sure that we help those on the outside to join the rest. And not only for reasons of social cohesion. Although social cohesion by itself would be a sufficient reason to do so, among other things because it is one of the key policy objectives of the European Union. But in addition, it is in our economic interest, even if it costs some money.

Take for example mail. If all customers of a given company have e-mail, the company can migrate its entire billing system online. However, if some of its customers are not online, it will have to maintain a double billing system at a much higher cost.

However, it is not only quantifiable effects we are talking about. Before we go to public services, a prime example of efficiency increases which are only possible if everybody is online, think for a moment about what effects for example on-line registration for social aid can have: by applying for social aid via a computer in an Internet café or at a Public Internet Access Point, the social stigma associated with going to the office for public assistance is greatly reduced, making life much easier for people in need.

On-line public services

As the number of connected citizens grows, so will the incentive for government to offer efficient and diversified on-line public services. Much progress has already been achieved regarding the use of the Internet by governments.

Access to public documents and legislation is improving. That's good for openness and transparency. But it is only a first step. What is still missing is real interactivity, which is the essence of the Net.

It is all very well to be able to find administrative forms on-line and to download them. But having to print them out, fill them in, and then send them back by regular mail is not yet an e-government. The real change will be true interactivity in public services. A major reform of public services will

Comprehensive inclusion is in our economic interest

then become possible. Responsiveness, citizen-friendliness and quality of service will become new standards for public services.

In parallel, government will become more efficient. Old and expensive service delivery methods will be replaced by more carefully tailored and targeted services – with important cost-savings and increased efficiency.

In the spring of this year, the EU defined a list of twenty basic public services such as delivering driving licences or granting building permits, for which we will measure the progress which public administrations in all Member states make.

A first study is underway, and we expect the results in time for our key conference on e-government on 29/30 November in Brussels. This will be the first analysis of e-government based on empirical and not on anecdotal evidence.

In parallel, the European Commission has committed itself to address the need to revise its procedures to better exploit digital technologies in the context of a wider reform of Commission structures. The Reform White Paper identified the eCommission as one of the fundamental pillars for the successful delivery of reform. The three principal aims are:

• Modernisation of internal administration
• More efficient communication with external partners
• Better public service to citizens and businesses.

Internet regulation

Another issue I would like to touch upon is the question of how much regulation of the Internet is needed. I know that it is a highly contentious one, but it cannot be ignored due to its increasing importance.

The Internet is a highly dynamic sector of the economy, thanks partly to the absence of excessive regulation. Nevertheless, a minimum of public regulation is necessary if it is to fulfil its potential, especially if e-commerce is to bloom.

But setting rules in cyberspace is complex: it is a realm that ignores borders and is based on tech-

nology in constant evolution. Therefore, government should focus on essential issues such as privacy, legal responsibility, cybercrime etc.

As for self-regulation, it should fill in the gaps in regulation. It should apply mostly in the field of e-commerce, for instance through codes of good conduct or alternative dispute resolution mechanisms. Industry may also be in a better position to choose the most suitable technology to upheld certain rights.

Regulation and self-regulation are complementary. They must go hand in hand and not simply side by side. This implies real co-operation between government and industry, in each other's interest, leading to a kind of co-regulation.

Let me take an example: privacy. Its handling will largely determine the future of retail e-commerce. On-line retailers need to collect data about their consumers and track their purchasing patterns to target their sales and sell this information to direct marketers.

At the same time, they have to respond to growing consumer demands for control over their private data. Yet consumers may find it useful to receive targeted commercial information. Therefore, a trade-off can be found.

The EU approach could set an example. Based on a close collaboration with all parties, it secures important, yet balanced user rights, in a technology neutral way. EU legislation grants individuals the right to access and correct their personal data. For sensitive data, such as race and religion, explicit consent is required.

The new telecoms package contains simple rules on the confidentiality of communications, on the right to determine what personal information can be included in a public directory, or on how unsolicited commercial communications can be domesticated. It is up to industry to develop technological mechanisms to enforce these rights.

A further difficulty is linked to the global nature of the Internet. No individual government can regulate the Internet in isolation. At the same time, creating a consistent global framework will prove very difficult considering the diversity of political and cultural values. However, governments should at least agree on minimum rules at international level. To this end, and whenever possible, EU legislation embeds international co-operation mechanisms, for instance for the mutual recognition of electronic signatures.

Enlargement

It is imperative that we start integrating the candidate countries in our policies. At the Göteborg Summit in June this year, the Heads of Government of the Candidate Countries launched the so-called eEurope Plus Action Plan. This means that they share our political commitment to embrace the challenges of the information society.

As the name indicates, the eEurope Plus Action Plan is inspired by our previous eEurope Action Plan, but adapted to the particular needs of the candidate countries. It intends to accelerate reform and modernisation of the economies in the candidate countries and to encourage capacity and institution building.

In particular, eEurope Plus recognises that there is a basic need to ensure that all citizens are offered the possibility of access to affordable communications services. Consequently, it is based on four objectives:

- accelerate the putting into place of the basic building blocks of the Information Society
- a cheaper, faster, secure Internet
- investing in people and skills
- stimulate the use of Internet

and a whole range of actions in areas like e-commerce, education, e-health, e-government, transport, and environment.

Each candidate country is preparing its own action plan to translate eEurope Plus. It is expected that the plans will incite substantial private sector investment in the candidate countries.

Nevertheless, however beneficial eEurope Plus will be, it is crucial that candidate countries do not focus so much on it that they neglect their key task for telecommunications and electronic commerce: the adoption and implementation of the *"acquis communautaire"*. At the same time, eEurope Plus should have a positive impact on the adoption and

The eEurope Plus Action Plan intends to bring the information society to the candidate countries

implementation of the *"acquis communautaire"* in telecommunications and electronic commerce.

As in the EU's eEurope Action Plan, progress will be benchmarked. It is foreseen that a first progress report on eEurope Plus would be presented during a European Ministerial Conference which would be jointly organised by the candidate countries and the European Commission in the spring of 2002.

Conclusion

The spread of the information society all across Europe is in everybody's interest. It fosters economic growth, provides jobs, connects remote places to urban centres and increases living standards.

I have singled out what I believe are the key concerns we have to address in order for its growth to continue. We need cheap and secure networks, we need the dissemination of the necessary skills by the entire population, we need governments to provide public services online. And all of this we need throughout the EU of tomorrow, not only in the current Member States. Finally, we will have to face the question of Internet regulation at some time – maybe not tomorrow, but sooner than most people think.

POLICY IMPLICATIONS OF THE NEW ECONOMY

IGNAZIO VISCO*

Last year, when the US economy was still growing at a staggering pace, I asked myself whether it was fact or fiction.[1] I concluded that it was still too early to say for sure how much of the recent pick-up in productivity in the United States and a few other countries had to do with a new economy and how much of it was just due to a powerful cyclical effect. But I also observed that there was certainly something new in the role of information and communication technologies (ICT) on productivity, as well as a real possibility of important spillover effects linked to communications networks (the Internet). In this article I shall briefly consider the implications of a new economy for economic policies. This might perhaps be considered a sign of diminished agnosticism on the existence of a new economy. One needs, however, to be, to the extent possible, specific about what is meant by a new economy and the countries for which a higher productivity performance has been achieved. Thus, it seems proper to first say a few words on these issues and then speculate on how changes over the past decade, especially the latter half of the 1990s, may have led us to better understand how to improve the structural response of market economies to changes in the economic environment. In particular, how important are traditional framework conditions for the way markets operate? As it is also often pointed out that the rise in trend productivity levels, and possibly growth rates, especially linked to ICT changes, may have altered the characteristics of the business cycle, the implications this may have for stabilisation policies

are also worth considering. For instance, to what extent has faster growth expanded the scope to reduce taxes or accelerate the pace of fiscal consolidation? Does a new economy imply lower interest rates and, more generally, how should monetary policy respond?

Differences in growth performance

The OECD has just completed a two-year project exploring the causes of differences in growth performance in the OECD area and the institutions and policies which may promote increased productivity and output. In its published final report[2], the notion of a new economy is closely tied to the effects of technical progress on economic growth. In this respect what may be particularly new is the role played by rapid innovation and diffusion of information and communications technologies. It is not about, as some have proclaimed, the end of the business cycle or the so-called "death" of inflation. Indeed, recent economic developments have by now, I dare say, effectively killed such views.

The new OECD study confirms that information and communication technologies have contributed to more rapid growth. Three channels are identified. The first is through the ICT-producing sectors themselves, which contribute directly to overall growth by virtue of their own (increasingly efficient) output. The second channel is via higher ICT investment, which raises the capital intensity of production in the economy at large, reflecting sharp increases in quality and a fall in the prices of ICT equipment. The contribution to GDP growth in the United States through this channel is estimated to have doubled between the first and second half of the 1990s to reach about 1 percentage point (it has tripled, over the same period, for Finland; see Figure 1). The third channel is through so-called spillover effects, of which a prime example is the Internet and applications such as e-commerce and e-government. Statistical support for the first two channels is convincing, but the third – which would show

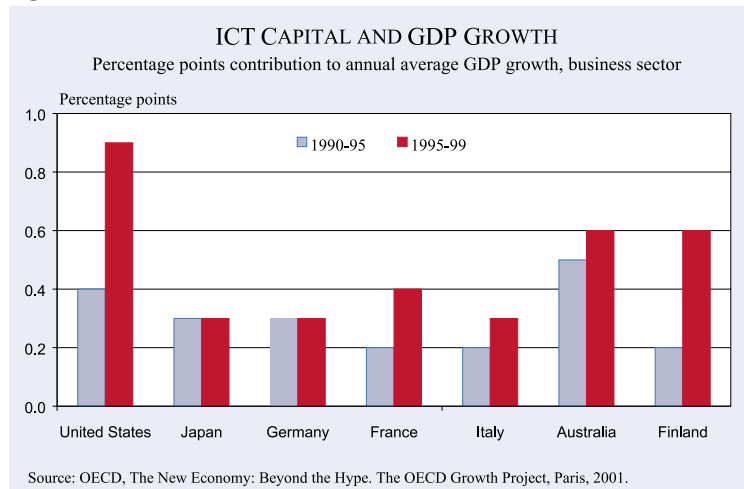*New OECD study confirms growth effect of ICT*

[2] OECD, The New Economy: Beyond the Hype, Paris, 2001.

Figure 1

ICT CAPITAL AND GDP GROWTH
Percentage points contribution to annual average GDP growth, business sector

Percentage points

[Bar chart with legend: 1990-95, 1995-99]

Categories: United States, Japan, Germany, France, Italy, Australia, Finland. Y-axis from 0.0 to 1.0.

Source: OECD, The New Economy: Beyond the Hype. The OECD Growth Project, Paris, 2001.

vance of research and development, together with that of strong links between science and industry. More generally, a considerable dynamism in the creation and expansion of firms seems essential. In this regard, the critical roles of regulatory and administrative frameworks, of effective financial systems and of an adequate degree of competition in product markets are emphasised.

The policy conclusions from this work are multifarious and summarised in the box below. Indeed, growth is not the result of a single policy or institutional arrangement, but of a comprehensive and co-ordinated set of developments and actions designed to create the right conditions for change and innovation.

up in the data as an acceleration in multi-factor productivity, MFP (the increase in that part of growth not accounted for by an increase in the quantity and quality of labour and physical capital used in the production process) – is less clear-cut.

However, differences in growth performance among OECD countries are not, by any means, solely because of differences in ICT diffusion and productivity gains in its production. Policies to bolster these technologies will not on their own steer countries on to a permanently higher growth path. In fact, a very important reason for superior growth performance in some OECD countries throughout the 1990s appears to be linked to the increased use and quality of traditional production factors, notably that of labour. The countries that were most successful in this area are predominantly those which had earlier implemented reforms in social benefit policies, labour taxation, education and training designed to strengthen the flexibility of the labour market.

Greater efficiency in how capital and labour are combined, that is higher multi-factor productivity growth, also played a significant role. In this respect, while ICT may have helped boost MFP, numerous other factors are relevant. In particular, the OECD report points to the important effects of innovation and technology diffusion, and highlights the rele-

Labour market reforms also played a major role

These conditions depend to a large extent on improving the quality of human capital and responding to the changing demands of the workplace and, more broadly, society. Enhanced adaptability of labour market policies and institutions is indeed key to harness the potential of faster economic growth and to limit the transitional costs implied by rapid structural changes. In particular, it is crucial to improve the school-to-work transition, to establish closer links between education and the labour market, and to put in place effective training systems to develop and adapt the skills of the labour force. But it is also critical to provide more

Key policy recommendations from the OECD growth project

1. *Strengthen economic and social fundamentals,* by ensuring macroeconomic stability, encouraging openness, improving the functioning of markets and institutions, and addressing the distributive consequences of change.
2. *Facilitate the diffusion of ICT,* by increasing competition in telecommunications and technology, improving skills, building confidence and making electronic government a priority.
3. *Foster innovation,* by giving greater priority to fundamental research, improving the effectiveness of public R&D funding, and promoting the flow of knowledge between science and industry.
4. *Invest in human capital,* by strengthening education and training, making the teaching profession more attractive, improving the links between education and the labour market and adopting labour market institutions to the changing nature of work.
5. *Stimulate firm creation,* by improving access to high-risk finance, reducing burdensome administrative regulations and instilling positive attitudes towards entrepreneurship.

Source: OECD, The New Economy: Beyond the Hype, The OECD Growth Project, Paris, 2001.

scope for risk-takers to explore the new business opportunities that come with economic change. In this regard, then, the importance of fundamentals has not lessened. Indeed, the significance of openness to trade, investment and ideas, as well as well-functioning economic and social institutions has been clearly reaffirmed in the OECD Report and the analysis on which it is based. It has also been forcefully established that stable macroeconomic policies aimed at fiscal discipline, low inflation rates and limited variability of inflation have a critical role to play in enabling economic changes which are conducive to higher growth of GDP per capita and MFP.

Before considering the possible new economy implications for macroeconomic policies, one further point should also be stressed. While it appears that ICT has played a significant role in fostering growth, having an important ICT-producing sector is not a prerequisite. What is crucial for benefiting from ICT is to focus on policies that foster its use, such as the removal of barriers to network access, rather than on incentives to encourage its production. It is, then, particularly important for markets to be able to respond effectively to changes and innovations and for regulatory frameworks to be adopted, which allow for these changes to take place at low costs for society. Indeed, if we consider the implications of a new economy for structural policy, a feature of many technological changes and innovations over the past decade or so is how quickly they have influenced and modified market structures and made certain regulatory frameworks redundant.

For example, breakthroughs in telecommunication technologies have undermined the rationale for state-run monopoly providers of telephony services. Most OECD economies have adapted their regulatory frameworks and today only a small minority maintain a monopoly. In fact, policies that intensify competition in the telecommunication sector have been identified as a spur to the diffusion of information technology and the development of e-commerce. There are also features of IC technology that pose new challenges to competition and competition policies: certain products become more useful as more people use them (e.g. networks or software) and economies of scale in their production can be large, both factors making it more difficult for other enterprises to enter a market where an incumbent is already established. These developments need to be

continuously monitored and competition policies adapted so as to ensure they remain supportive of competitive and innovative product markets.
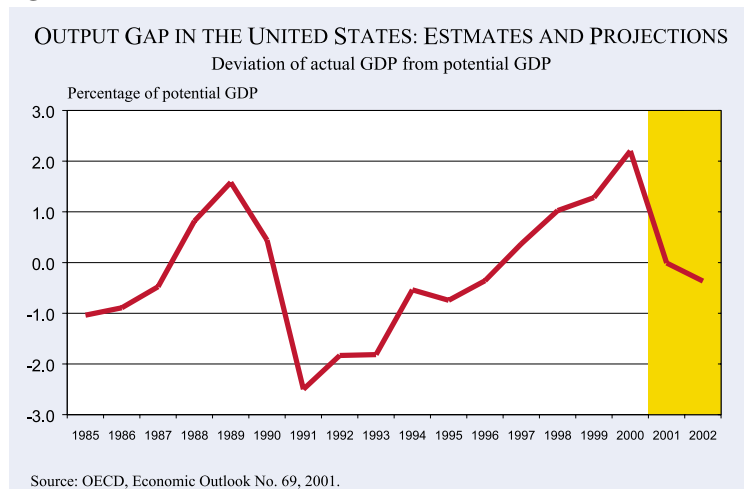
Policy implications

Let me now turn to a discussion of the implications of the new economy for the conduct of stabilisation policies. A number of arguments exist as to why structural and cyclical properties of economies may have changed, with possible consequences for the setting and operation of monetary policy. First, the diffusion of IC technologies is propitious for more efficient stock management, leading to lower inventories as a ratio of sales and possibly also modifying the stock-building cycle. (This of course did not prevent stock building from playing a role in the current U.S. slowdown.) In addition, the nature of innovations in information technology is such that substantial changes in the size and quality of the capital stock are quick to materialise due to its rapid depreciation. In the case of capital stock overhangs this should accelerate the process of adjustment towards the desired level of the capital stock. Finally, increased price competition in product markets, facilitated by the development of communication networks, may allow the economy to sustain more jobs without stoking inflation for a period of time. It might also put greater pressure on companies to curb costs and thereby modify the cyclical responsiveness of inflation.

Such arguments may have implications for the conduct of monetary policy. In particular, the last argument might appear, ceteris paribus, to bode well for an easier monetary stance, at least for a while. They depend, however, on a particular, not necessarily well-established assumption, that the increase in supply potential has not only taken place but it has also come without a substantial increase in actual demand. The output gap (the difference between actual and potential output) would in this case have moved upwards, and "testing the waters" in connection with the possible increase in the economy's inflation speed limits would actually make sense. But this is not what has happened for instance in the United States, where the new economy effects (through the stock market and the cost of capital) have in the second half of the 1990s very likely pushed up consumption and investment expenditures by a considerable extent, possibly above the already substantial

The case for easier monetary policy depends on the existence of an output gap

Figure 2

OUTPUT GAP IN THE UNITED STATES: ESTMATES AND PROJECTIONS
Deviation of actual GDP from potential GDP

Percentage of potential GDP

Source: OECD, Economic Outlook No. 69, 2001.

increase in potential (as can be appreciated by a simple glance at the estimated output gap; see Figure 2).

In this situation, the case for an initially easier monetary policy stance in the face of the "advent" of the new economy would be obviously much weaker. (Observe that this does not say anything with respect to counter-cyclical actions, such as the most recent cuts in interest rates in the face of the current cyclical slowdown: also in a new economy world, in fact, the business cycle seems well alive, even if possibly important modifications in its characteristics have still to be assessed.) Furthermore, a permanently higher return to capital investment implies an increase in the real interest rate and hence a period of adjustment towards the higher level.

Finally, considering fiscal policy, a virtuous development in a number of OECD economies in recent years has been the consolidation of fiscal imbalances. In the early 1990s the structural budget deficit in the OECD area was above 4 percent of potential GDP, but by the end of the decade the area budget was close to balance. Some of the biggest improvements were achieved in those countries which recorded increased growth over the period, notably in the United States. The US fiscal position crossed into a surplus in 1998
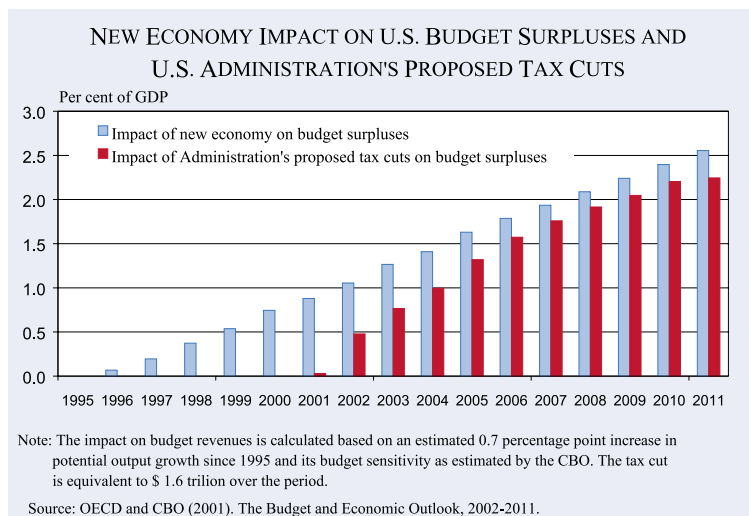
Higher tax revenues due to faster growth can be returned to the economy

and has since steadily increased, mostly due to an expansion of the tax base as a result of higher incomes and capital gains. To the extent that faster growth is mostly considered to be the result of a long-lasting structural improvement, further increases in tax revenues are expected. Indeed, early this year it was estimated that by 2010 the US fiscal surplus could be some $2^1/_2$ percent of GDP higher than a projection based on the lower rate of potential output growth prevailing through the first half of the 1990s (see Figure 3). The US administration has decided to distribute this new economy "fiscal dividend" through tax cuts and with a higher potential output growth may have scope to do so without jeopardising fiscal propriety. This is a political choice, even if there might be other possibilities. Higher tax revenues, as a result of faster growth, also provide an opportunity to increase expenditures in high priority areas such as health and education. Yet another option is to pay down the level of government debt.

But it is perhaps still premature to assess reliably whether output growth is now permanently higher. Also, the size and nature of spillover effects linked to communication networks remain uncertain. Moreover, capital expenditures on ICT, especially in the United States, have dropped sharply this year. If these lower expenditure levels were main-

Figure 3

NEW ECONOMY IMPACT ON U.S. BUDGET SURPLUSES AND U.S. ADMINISTRATION'S PROPOSED TAX CUTS

Per cent of GDP

■ Impact of new economy on budget surpluses
■ Impact of Administration's proposed tax cuts on budget surpluses

Note: The impact on budget revenues is calculated based on an estimated 0.7 percentage point increase in potential output growth since 1995 and its budget sensitivity as estimated by the CBO. The tax cut is equivalent to $ 1.6 trilion over the period.
Source: OECD and CBO (2001). The Budget and Economic Outlook, 2002-2011.

tained over the next couple of years, this would have a noticeable impact on the potential growth rate. Indeed this is an important reason for advocating a substantial degree of fiscal easing in a counter-cyclical stabilisation framework. Against this background, on the other hand, it will be crucial to see how economic developments unfold over the next couple of years, as structural changes to public finances will have to come to terms with the possible, but by no means certain, permanent increase in trend productivity growth.

Moreover, long-term fiscal sustainability pressures are expected to build over the coming decades, as low fertility rates and welcome improvements in life expectancy in the OECD area imply a declining and ageing population. This will lead to an increase in spending on old-age public pensions and health care. Projections of the fiscal impact of ageing populations for OECD countries over the next half-century, given current policies and institutions, suggest age-related spending could increase on average by about 6 percent of GDP and by considerably more in some countries over the projection period.[3] It is clear that substantial reforms will be required to address these pressures. Higher growth will certainly help to increase the scope and provide a window of opportunity to implement major public pension reforms while allowing the affected population to bear their burden more easily. But, perhaps contrary to what is sometimes claimed, faster growth in itself does not represent a response to the problem of ageing populations. To illustrate, under current institutional arrangements in 12 OECD countries, including most of the large economies, 1 percent a year higher output growth over the next 50 years is estimated to ease the increase in the level of pension expenditures to GDP by only about $3/4$ of a percentage point.

To conclude, yes, a permanent increase in productivity may have taken place because of ICT in the United States and a few other countries. Similar gains might be reasonably expected in other economies as well, in particular in the major European countries. Even some increase in trend growth from spillover effects of networks in communications might be in the making. But perhaps, as in Ludwig Wittgenstein's "motto" to his

Philosophical Investigations (1953), "It is in the nature of progress that it looks much greater than it really is"![4] This is certainly true for the implications of the new economy: "traditional" framework conditions for flexible and competitive markets are very much needed, as are sound macroeconomic policies, evolving, as necessary, in response to changes in our understanding and perception of the structural functioning of an economy. At the present time, and given the still extensive uncertainty as to the precise nature and implications of a new economy, this does not necessarily imply a change in the stance of monetary policy nor a substantial easing of fiscal conditions.

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[3] The June 2001 edition of the OECD Economic Outlook includes a special chapter on the fiscal implications of ageing populations.

[4] The motto comes from the 19th century play Der Schützling (The Protegé) by Johann Nestroy (act 4, scene 10).

American Economic Growth in the Information Age

Dale W. Jorgenson*

The resurgence of the American economy since 1995 has outrun all but the most optimistic expectations. It is not surprising that the unusual combination of more rapid growth and slower inflation in the 1990's has touched off a strenuous debate among economists about whether improvements in America's economic performance can be sustained. This debate has been intensified by the recent growth slowdown.

A consensus is building that the remarkable decline in IT prices provides the key to the surge in American economic growth. In the following section I show that the IT price decline is rooted in developments in semiconductor technology that are widely understood by technologists and economists. This technology has found its broadest applications in computing and communications equipment, but has reduced the cost and improved the performance of aircraft, automobiles, scientific instruments, and a host of other products.

Price indexes for IT that hold performance constant are necessary to separate the change in performance of IT equipment from the change in price for a given level of performance. Accurate and timely computer prices have been part of the U.S. National Income and Product Accounts (NIPA) since 1985. Unfortunately, important information gaps remain, especially on trends in prices for closely related investments, such as software and communications equipment.

In Section II I outline a framework for analyzing the role of information technology in the American growth resurgence. This framework treats IT equipment as part of the output of investment goods and capital services from this equipment as a component of capital input. A measure of capital services captures the impacts of rapidly growing stocks of computers, communications equipment, and software on the output of the U.S. economy.

A substantial acceleration in the IT price decline occurred in 1995, triggered by a much sharper acceleration in the price decline of semiconductors. Although the fall in semiconductor prices has been projected to continue for at least another decade, the recent acceleration may be temporary. This can be traced to a shift in the product cycle for semiconductors in 1995 from three years to two years as the consequence of intensifying competition.

The investment boom of the later 1990's was not sustainable, since it depended on growth in hours worked in excess of labor force growth. Nonetheless, growth prospects for the U.S. economy have improved considerably, due to enhanced growth of productivity in IT production and continuing substitution of IT assets for non-IT assets in response to falling IT prices. Section III concludes the paper.

The Information Age

A mantra of the "new economy" – *faster, better, cheaper* – captures the speed of technological change and product improvement in semiconductors and the precipitous and continuing fall in semiconductor prices. Modern information technology begins with the invention of the transistor, a semiconductor device that acts as an electrical switch and encodes information in binary form. The first transistor, made of the semiconductor germanium, was constructed at Bell Labs in 1947.

The next major milestone in information technology was the co-invention of the *integrated circuit* by Jack Kilby of Texas Instruments in 1958 and Robert Noyce of Fairchild Semiconductor in 1959.

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Sharp decline in IT prices is the key to the surge in economic growth

An integrated circuit consists of many, even millions, of transistors that store and manipulate data in binary form. Integrated circuits were originally developed for data storage and these semiconductor devices became known as *memory chips.*

In 1965 Gordon E. Moore, then Research Director at Fairchild Semiconductor, made a prescient observation, later known as *Moore's Law.* Plotting data on memory chips, he observed that each new chip contained roughly twice as many transistors as the previous chip and was released within 18–24 months of its predecessor. This implied exponential growth of chip capacity at 35–45 percent per year!

In 1968 Moore and Noyce founded Intel Corporation to speed the commercialization of memory chips. Integrated circuits gave rise to *microprocessors or logic chips* with functions that can be programmed. Intel's first general-purpose microprocessor was developed for a calculator produced by Busicom, a Japanese firm. Intel retained the intellectual property rights and released the device commercially in 1971.

The rapidly rising capacities of microprocessors and storage devices illustrate the exponential growth predicted by Moore's Law. The first logic chip in 1971 had 2,300 transistors, while the Pentium 4, released by Intel on November 20, 2000, had 42 million! Over this twenty-nine year period the number of transistors increased by thirty-four percent per year.

Semiconductor Prices

Moore's Law captures the fact that successive generations of semiconductors are *faster and better.* The economics of semiconductors begins with the closely related observation that memory and logic chips have become *cheaper* at a truly staggering rate! Chart 1 gives semiconductor price indexes employed in the U.S. national accounts since 1996. These are divided between memory chips and logic chips.

Prices of memory chips, holding performance constant, *decreased*

by a factor of 27,270 times or 40.9 percent per year between 1974 and 1996. Similarly, prices of logic chips that hold performance constant, available for the shorter period 1985 to 1996, *decreased* by a factor of 1,938 or 54.1 percent per year. Semiconductor price declines closely parallel Moore's Law on the growth of chip capacity.

Chart 1 also reveals a sharp acceleration in the decline of semiconductor prices in 1994 and 1995. The microprocessor price decline leapt to more than ninety percent per year as the semiconductor industry shifted from a three-year product cycle to a greatly accelerated two-year cycle. This is reflected in the **2000 Update** of the International Technology Road Map for Semiconductors[1], prepared by a consortium of industry associations.

Computer Prices

The introduction of the Personal Computer (PC) by IBM in 1981 was a watershed event in the deployment of information technology. The sale of Intel's 8086-8088 microprocessor to IBM in 1978 for incorporation into the PC was a major business breakthrough for Intel. In 1981 IBM licensed the MS-DOS operating system from the Microsoft Corporation, founded by Bill Gates and Paul Allen in 1975.

Mainframe computers, as well as PC's, have come to rely heavily on logic chips for central processing

Prices of semiconductors decreased rapidly

[1] On International Technology Roadmap for Semiconductors (2000), see: http://public.itrs.net/.

Chart 1

RELATIVE PRICES OF COMPUTERS AND SEMICONDUCTORS 1959 - 1999

Note: All price indexes are divided by the output price index.

Chart 2

RELATIVE PRICES OF COMPUTERS, COMMUNICATIONS,
SOFTWARE AND SERVICES   1948 - 1999

Log Scale (1996 = 1)

- Computers
- Communications
- Software
- Services

Note: All price indexes are divided by the output price index.

Technologies for transmission, such as fiber optics, microwave broadcasting, and communications satellites, have progressed at rates that outrun even the dramatic pace of semiconductor development. An example is dense wavelength division multiplexing (DWDM), a technology that sends multiple signals over an optical fiber simultaneously. Installation of DWDM equipment, beginning in 1997, has doubled the transmission capacity of fiber optic cables every 6–12 months.

The decline in computer prices follows the behavior of semiconductor prices – but at a slower pace
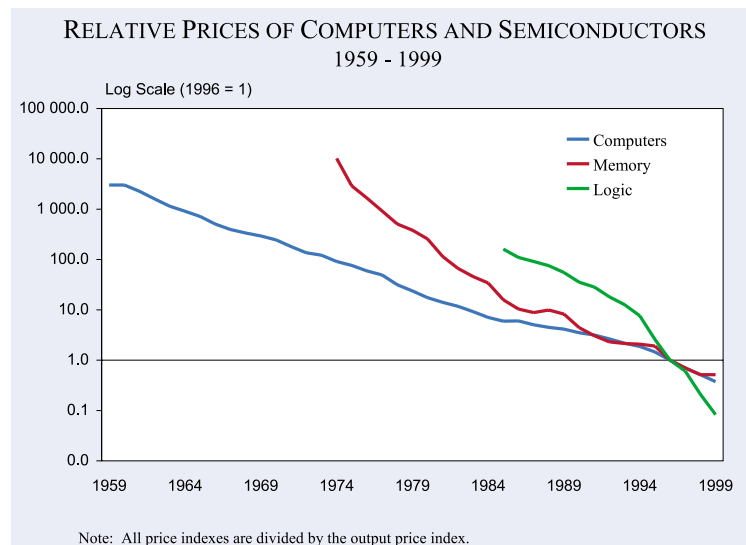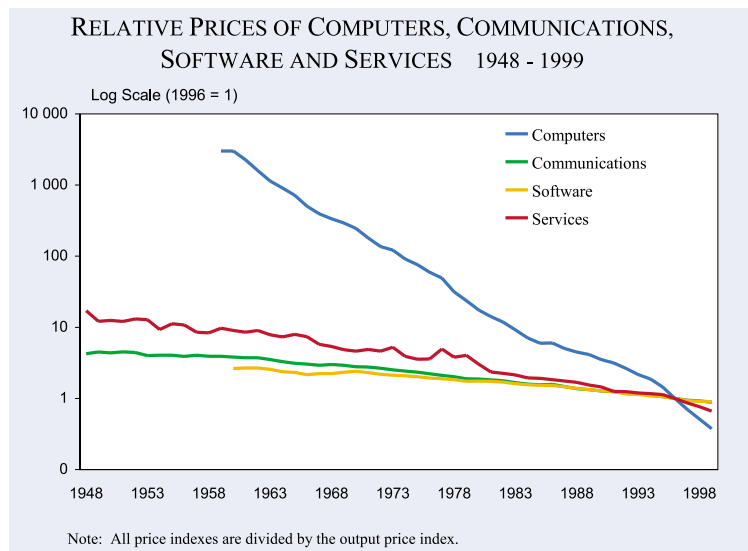
and memory chips for main memory. However, semiconductors account for less than half of computer costs and computer prices have fallen much less rapidly than semiconductor prices. Precise measures of computer prices that hold product performance constant were introduced into the U.S. National Income and Product Accounts in 1985.

Chart 2 gives a constant performance price index of computers and peripheral equipment and its components, including mainframes, PC's, storage devices, other peripheral equipment, and terminals. The decline in computer prices follows the behavior of semiconductor prices presented in Chart 1, but in much attenuated form. The 1995 acceleration in the computer price decline mirrors the acceleration in the semiconductor price decline that resulted from the changeover from a three-year product cycle to a two-year cycle in 1995.

Communications equipment and software prices

Communications technology is crucial for the rapid development and diffusion of the Internet, perhaps the most striking manifestation of information technology in the American economy. Communications equipment is an important market for semiconductors, but constant performance price indexes cover only switching and terminal equipment. Much communications investment takes the form of the transmission gear, connecting data, voice, and video terminals to switching equipment.

Both software and hardware are essential for information technology and this is reflected in the large volume of software expenditures. The eleventh comprehensive revision of the U.S. National Income and Product Accounts, released on October 27, 1999, re-classified computer software as investment.[2] Before this important advance, business expenditures on software were simply omitted from the national product, leaving out a critical component of IT investment.

Software investment is growing rapidly and is now much more important than investment in computer hardware. The revised national accounts now distinguish among three types of software – prepackaged, custom, and own-account software. Unfortunately, only price indexes for prepackaged software hold performance constant. Prepackaged software is sold or licensed in standardized form and is delivered in shrink-wrapped packages or electronic files downloaded from the Internet.

An important challenge for economic measurement is to develop price indexes that hold performance constant for all of telecommunications equipment and software. This has been described as the "trench warfare" of economic statistics, since new data sources must be developed and exploited for each type of equipment and software. Until comprehensive price indexes are available, our picture of the role of information technology in U.S. economic growth will remain incomplete.

[2] Moulton (2000) describes the 11th comprehensive revision of NIPA and the 1999 update.

The American Growth Resurgence

The American economy has undergone a remarkable resurgence since the mid-1990's with accelerating growth in output and productivity. My next objective is to quantify the sources of growth for 1948–99 and various sub-periods. My primary focus is the sharp acceleration in the level of economic activity since 1995 and, in particular, the role of information technology.

While semiconductor technology is the driving force behind the spread of IT, the impact of the relentless decline in semiconductor prices is transmitted through falling IT prices. Only net exports of semiconductors, defined as the difference between U.S. exports to the rest of the world and U.S. imports appear in the GDP. Accordingly, I focus on the role of computers, communications equipment and software rather than semiconductors in analyzing U.S. economic growth.

At the aggregate level IT is identified with the outputs of computers, communications equipment, and software. These products appear in the GDP as investments by businesses, households, and governments along with net exports to the rest of the world. The GDP also includes the services of IT products consumed by households and governments.

Economic Growth

The output data in Table 1 are based on the most recent benchmark revision of the national accounts, updated through 1999.[3] The output concept is similar, but not identical, to the concept of gross domestic product used in the U.S. national accounts. Both measures include final outputs purchased by businesses, governments, households, and the rest of the world. The output measure in Table 1 also includes the services of durable goods, including IT products, employed in the household and government sectors.

The top panel of Table 1 summarizes the growth rates of prices and quantities for major output categories for 1990-5 and 1995-9. The most striking feature is the rapid price decline for computer investment, 15.8 percent per year from 1990 to 1995. Since 1995 this decline more than doubled to 32.1 percent per year. By contrast the relative price of software fell only 1.6 percent per year from 1990 to 1995 and 2.4 percent per year since 1995. The price of communications equipment behaves similarly to the software price, while the price of information technology services falls between hardware and software prices.

The second panel of Table 1 summarizes the growth rates of prices and quantities of capital inputs for 1990-5 and 1995-9. In response to the price changes, firms, households, and governments have accumulated computers, software, and communications equipment much more rapidly than other forms of capital. Growth of IT capital services jumped from 11.51 percent per year in 1990-5 to 19.41 percent in 1995-9, while growth of non-IT capital services increased from 1.72 percent to 2.94 percent.

Table 1 describes the rapid increase in the importance of IT capital services, reflecting the impact of growing stocks of computers, communications equipment, and software on the output of the U.S. economy. In 1995-9 the capital service price for computers fell 24.8 percent per year, compared to an increase of 36.4 percent in capital input from computers. As a consequence, the value of computer services grew substantially. However, the current dollar value of computers was only 1.6 percent of gross domestic income in 1999.

The rapid accumulation of software appears to have different

The drop in prices has induced a higher accumulation of computers

Table 1

Growth Rates of Outputs and Inputs				
	1990-95		1995-99	
	Prices	Quantities	Prices	Quantities
Outputs				
Gross Domestic Product	1,99	2,36	1,62	4,08
Information Technology	-4,42	12,15	-9,74	20,75
Computers	-15,77	21,71	-32,09	38,87
Software	-1,62	11,86	-2,43	20,80
Communications Equipment	-1,77	7,01	-2,90	11,42
Information Technology Services	-2,95	12,19	-11,76	18,24
Non-Information Technology Investment	2,15	1,22	2,20	4,21
Non-Information Technology Consumption	2,35	2,06	2,31	2,79
Inputs				
Gross Domestic Income	2,23	2,13	2,36	3,33
Information Technology Capital Services	-2,70	11,51	-10,46	19,41
Computer Capital Services	-11,71	20,27	-24,81	36,36
Software Capital Services	-1,83	12,67	-2,04	16,30
Communications Equipment Capital Services	2,18	5,45	-5,90	8,07
Non-Information Technology Capital Services	1,53	1,72	2,48	2,94
Labor Services	3,02	1,70	3,39	2,18

Notes: Average annual percentage rates of growth.

[3] See Jorgenson and Stiroh (2000) for details on the estimates of outputs and inputs.

sources. The price of software services declined only 2.0 percent per year for 1995-9. Nonetheless, firms have been accumulating software very rapidly, with real capital services growing 16.3 percent per year. A possible explanation is that firms respond to computer price declines by investing in complementary inputs like software. However, a more plausible hypothesis is that the price indexes for software investment fail to hold performance constant, leading to an overstatement of inflation and an understatement of growth. This can be overcome only by extending constant performance price indexes to cover all of software.

Although the price decline for communications equipment during the period 1995-9 is comparable to that of software, investment in this equipment is more in line with prices. However, constant performance price indexes are unavailable for transmission gear, such as fiber-optic cables. This leads to an underestimate of the growth rates of investment, capital services, and the GDP, as well as an overestimate of the rate of inflation. High priority should be assigned to the development of constant performance price indexes for all of communications equipment.

Accounting for Growth

Growth accounting identifies the contributions of outputs as well as inputs to U.S. economic growth. The growth rate of the GDP is a weighted average of growth rates of the outputs of investment and consumption goods. The *contribution* of each output is its growth rate, weighted by its share in the value of the GDP. Similarly, the growth rate of input is a weighted average of growth rates of capital and labor services and the *contribution* of each input is its weighted growth rate. Total factor productivity (TFP) is defined as output per unit of input.

The results of growth accounting can also be presented in terms of *average labor productivity* (ALP), defined as the ratio of output to hours worked. The

growth in ALP can be allocated among three sources. The first is *capital deepening,* the growth in capital input per hour worked, reflecting capital-labor substitution. The second is improvement in *labor quality* and captures the rising proportion of hours by workers with higher productivity. The third component adds a percentage point to ALP growth for each percentage point of *TFP growth.*

Massive increases in computing power, like those experienced by the U.S. economy, have two effects on growth. First, as IT producers become more efficient, more IT equipment and software is produced from the same inputs. This raises productivity in IT-producing industries and contributes to TFP growth for the economy as a whole. Labor productivity also grows at both industry and aggregate levels.

Second, investment in information technology leads to growth of productive capacity in IT-using industries.[4] Since labor is working with more and better equipment, this increases ALP through capital deepening. If the contributions to aggregate output are entirely captured by capital deepening, aggregate TFP growth is unaffected since output per unit of input remains unchanged.

Sources of Growth

Table 2 presents results of a growth accounting decomposition for the period 1948-99 and various sub-periods, following Jorgenson (2001). Economic

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[4] Economics and Statistics Administration (2000), Table 3.1, p. 23, lists IT-producing industries.
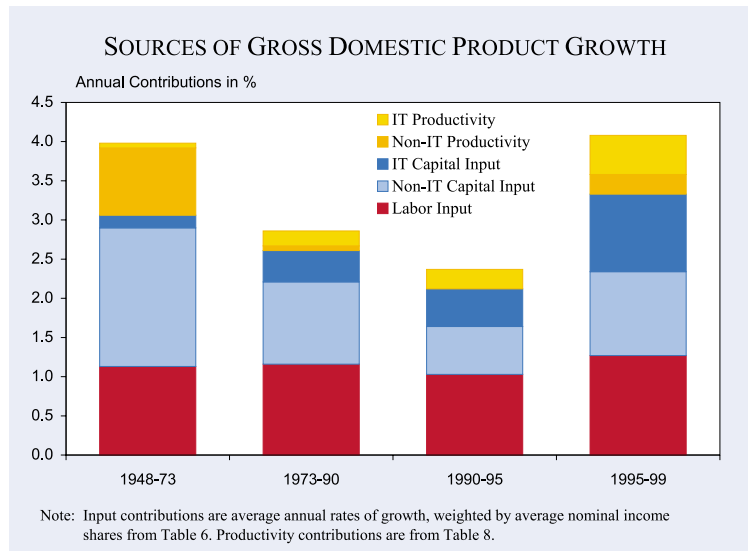
Table 2

Sources of Gross Domestic Product Growth

	1948-99	1948-73	1973-90	1990-95	1995-99
Outputs					
Gross Domestic Product	3,46	3,99	2,86	2,36	4,08
Contribution of Information Technology	0,40	0,20	0,46	0,57	1,18
Computers	0,12	0,04	0,16	0,18	0,36
Software	0,08	0,02	0,09	0,15	0,39
Communications Equipment	0,10	0,08	0,10	0,10	0,17
Information Technology Services	0,10	0,06	0,10	0,15	0,25
Contribution of Non-Information Technology	3,06	3,79	2,40	1,79	2,91
Contribution of Non-Information Technology Investment	0,72	1,06	0,34	0,23	0,83
Contribution of Non-Information Technology Consumption	2,34	2,73	2,06	1,56	2,08
Inputs					
Gross Domestic Income	2,84	3,07	2,61	2,13	3,33
Contribution of Information Technology Capital Services	0,34	0,16	0,40	0,48	0,99
Computers	0,15	0,04	0,20	0,22	0,55
Software	0,07	0,02	0,08	0,16	0,29
Communications Equipment	0,11	0,10	0,12	0,10	0,14
Contribution of Non-Information Technology Capital Services	1,36	1,77	1,05	0,61	1,07
Contribution of Labor Services	1,14	1,13	1,16	1,03	1,27
Total Factor Productivity	0,61	0,92	0,25	0,24	0,75

Notes: Average annual percentage rates of growth. The contribution of an output or input is the rate of growth, multiplied by the value share.

Chart 3

SOURCES OF GROSS DOMESTIC PRODUCT GROWTH

Annual Contributions in %

Legend:
- IT Productivity
- Non-IT Productivity
- IT Capital Input
- Non-IT Capital Input
- Labor Input

(Bar chart with categories: 1948-73, 1973-90, 1990-95, 1995-99; vertical axis 0.0 to 4.5)

Note: Input contributions are average annual rates of growth, weighted by average nominal income shares from Table 6. Productivity contributions are from Table 8.

growth is broken down by output and input categories, quantifying the contribution of information technology to investment and consumption outputs, as well as capital inputs. These estimates are based on computers, software, and communications equipment as distinct types of information technology.

Capital input contributes 1.70 percentage points to GDP growth for the entire period 1948 to 1999, labor input 1.14 percentage points, and TFP growth only 0.61 percentage points. Input growth is the source of nearly 82.3 percent of U.S. GDP growth of 3.46 percent per year over the past half century, while growth of output per unit of input or TFP has accounted for only 17.7 percent. Chart 3 depicts the relatively modest contributions of TFP in all sub-periods.

A look at the U.S. economy before and after 1973 reveals familiar features of the historical record. After strong output and TFP growth in the 1950's, 1960's and early 1970's, the U.S. economy slowed markedly during 1973-90, with output growth falling from 3.99 percent for 1948–73 to 2.86 percent for 1973-90 and TFP growth declining from 0.92 percent to 0.25 percent. Growth in capital inputs also slowed from 4.64 percent to 3.57 percent.

Although the contribution of IT has increased steadily throughout the period 1948–99, there was a sharp and easily recognizable response to the acceleration in the IT price decline in 1995. Relative to the early 1990's, output growth increased by 1.72 percent in 1995-9. The contribution of IT production almost doubled, but still

accounted for only 28.9 percent of the increased growth of output. More than 70 percent of the increased output growth can be attributed to non-IT products.

Capital investment has been the most important source of U.S. economic growth throughout the postwar period. The relentless decline in the prices of information technology equipment has steadily enhanced the role of IT investment. The rising importance of this investment has given additional weight to highly productive components of capital.

Between 1990-5 and 1995-9 the contribution of capital input jumped by 0.95 percentage points, the contribution of labor input rose by 0.24 percent, and TFP accelerated by 0.51 percent. The contribution of capital input reflects the investment boom of the late 1990's. Businesses, households, and governments poured resources into plant and equipment, especially computers, software, and communications equipment. The jump in the contribution of capital input since 1995 has boosted growth by nearly a full percentage point and IT accounts for more than half this increase.

After maintaining an average rate of 0.25 percent for the period 1973-90, TFP growth continued at 0.24 percent for 1990-5 and then vaulted to 0.75 percent per year for 1995-9. This increase in output per unit of input is an important source of growth in output of the U.S. economy as depicted in Chart 3. While TFP growth for 1995-9 is lower than the rate of 1948-73, the U.S. economy is definitely recuperating from the anemic productivity growth of the previous two decades.

The accelerating decline of IT prices signals faster productivity growth in IT-producing industries. In fact, these industries have been the source of most productivity growth throughout the 1990's. Before 1995 this was due to the decline of productivity growth elsewhere in the economy. The IT-producing industries have accounted for about half the surge in productivity growth since 1995, far greater than the 4.26 percent share of IT in the GDP. Faster growth is not limited to these industries and

The jump in the contribution of capital has boosted growth by nearly a half percentage point

Table 3

Sources of Average Labor Productivity Growth

	1948-99	1948-73	1973-90	1990-95	1995-99
Gross Domestic Product	3,46	3,99	2,86	2,36	4,08
Hours Worked	1,37	1,16	1,59	1,17	1,98
Average Labor Productivity	2,09	2,82	1,26	1,19	2,11
Contribution of Capital Deepening	1,13	1,45	0,79	0,64	1,24
Information Technology	0,30	0,15	0,35	0,43	0,89
Non-Information Technology	0,83	1,30	0,44	0,21	0,35
Contribution of Labor Quality	0,34	0,46	0,22	0,32	0,12
Total Factor Productivity	0,61	0,92	0,25	0,24	0,75
Information Technology	0,16	0,06	0,19	0,25	0,50
Non-Information Technology	0,45	0,86	0,06	-0,01	0,25
Addendum					
Labor Input	1,95	1,95	1,97	1,70	2,18
Labor Quality	0,58	0,79	0,38	0,53	0,20
Capital Input	4,12	4,64	3,57	2,75	4,96
Capital Stock	3,37	4,21	2,74	1,82	2,73
Capital Quality	0,75	0,43	0,83	0,93	2,23

Notes: Average annual percentage rates of growth. Contributions are defined in Equation (3) of the text.

there is evidence of a productivity revival in the rest of the economy.

Average Labor Productivity

Output growth is the sum of growth in hours and average labor productivity. Table 3 reveals the well-known productivity slowdown of the 1970's and 1980's and depicts the acceleration in labor productivity growth in the late 1990's. The slowdown through 1990 reflects reduced capital deepening, declining labor quality growth, and decelerating growth in TFP. This contributed to the sluggish ALP growth revealed in Table 3 – 2.82 percent for 1948–73 and 1.26 percent for 1973–90.

The growth of ALP slipped further during the early 1990's with a slump in capital deepening only partly offset by a revival in labor quality growth and an up-tick in TFP growth. A slowdown in hours combined with slowing ALP growth during 1990–95 produced a further slide in the growth of output. In previous cyclical recoveries during the postwar period, output growth accelerated during the recovery, powered by more rapid growth of hours and ALP.

Accelerating output growth during 1995–99 reflects growth in labor hours and ALP almost equally. Growth in ALP rose 0.92 as more rapid capital deepening and growth in TFP offset slower improvement in labor quality. Growth in hours worked accelerated as unemployment fell to a

Acceleration of average labor productivity was due to capital deepening and faster TFP growth

30-year low. Labor markets have tightened considerably, even as labor force participation rates increased.
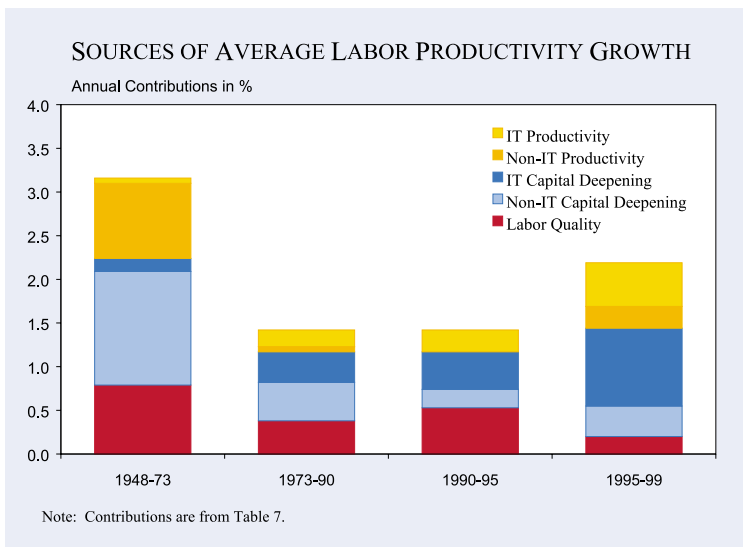
Comparing 1990–95 to 1995–99, the rate of output growth jumped by 1.72 percent – due to an increase in hours worked of 0.81 percent and another increase in ALP growth of 0.92 percent. Chart 4 shows the acceleration in ALP growth is due to capital deepening as well as faster TFP growth. Capital deepening contributed 0.60 percentage points, offsetting a negative contribution of labor quality of 0.20 percent. The acceleration in TFP added 0.51 percentage points.

The difference between growth in capital input and capital stock is the *improvement in capital quality.* This represents the substitution towards assets with higher productivity. The growth of capital quality is slightly less than twenty percent of capital input growth for the period 1948–1995. However, improvements in capital jumped to 44.9 percent of total growth in capital input during the period 1995–99, reflecting very rapid restructuring of capital to take advantage of the sharp acceleration in the IT price decline.

The distinction between labor input and labor hours is analogous to the distinction between capital ser-

Chart 4

SOURCES OF AVERAGE LABOR PRODUCTIVITY GROWTH

Annual Contributions in %

Legend:
- IT Productivity
- Non-IT Productivity
- IT Capital Deepening
- Non-IT Capital Deepening
- Labor Quality

Note: Contributions are from Table 7.

vices and capital stock. The growth in labor quality is the difference between the growth in labor input and hours worked. Labor quality reflects the increased relative importance of workers with higher productivity. Table 3 presents estimates of labor input, hours worked, and labor quality.

As shown in Table 1, the growth rate of labor input accelerated to 2.18 percent for 1995–99 from 1.70 percent for 1990–95. This is primarily due to the growth of hours worked, which rose from 1.17 percent for 1990–95 to 1.98 percent for 1995–99, as labor force participation increased and unemployment rates plummeted. The growth of labor quality declined considerably in the late 1990's, dropping from 0.53 percent for 1990–95 to 0.20 percent for 1995–99. This slowdown captures well-known demographic trends in the composition of the work force, as well as exhaustion of the pool of available workers.

The acceleration in U.S. economic growth after 1995 is unmistakable and its relationship to information technology is now transparent. The most important contribution of IT is through faster growth of capital input, reflecting higher rates of investment. More rapid growth of output per unit of input also captures an important component of the contribution of IT. The issue that remains is whether these trends in economic growth are sustainable.

Long-term Outlook

Falling IT prices will continue to provide incentives for the substitution of IT for other productive inputs. The decline in IT prices will also serve as an indicator of ongoing productivity growth in IT-producing industries. However, it would be premature to extrapolate the recent acceleration in productivity growth into the indefinite future, since this depends on the persistence of a two-year product cycle for semiconductors

The key assumption for long-term projections is that output and capital stock must grow at the same rate. Under this assumption the growth of output is the sum of the contributions of hours worked and labor quality, the contribution of capital quality growth, and the rate of TFP growth. So long as the two-year product cycle for semiconductors continues, the growth of TFP is likely to

average 0.75 percent per year, the rate during 1995–99.

The long-term growth of hours worked and labor quality will average 1.5 percent per year. Growth of hours worked will slow considerably in order to remain in line with future growth of the labor force of 1.2 percent per year. Growth of labor quality will revive, modestly, to 0.3 percent per year, reflecting ongoing improvements in the productivity of individual workers. The overall contribution of labor input will be 0.9 percent per year, reflecting the growth rate of labor input of 1.5 percent per year and the proportion of labor input in the GDP of 59.3 percent in 1999.

The rapid substitution of IT assets for non-IT assets in response to declining IT prices is reflected in the contribution of capital quality. The growth of capital quality will continue at the recent rate of 2.2 percent per year, so long as the two-year product cycle for semiconductors persists. Weighting this growth rate by the proportion of capital input in the GDP of 40.7 percent in 1999 generates a future contribution of capital quality of 0.9 percent per year.

The long-term growth rate of the U.S. economy is 3.4 percent per year, a drop of 0.7 percent per year from the 1995–99 average of 4.1 percent per year. Although the boom of the late 1990's was not sustainable, the growth prospects for the U.S. economy have improved considerably from the average of 2.9 percent per year from 1973–90 and 2.4 percent from 1990–1995. However, reversion to a three-year cycle for semiconductors could eliminate 0.25 percent per year from the TFP growth rate and 0.6 percent per year from the contribution of capital quality, resulting in a long-term growth rate of 2.9 percent per year, close to the 1973–90 average.

The economic forces that underlie the two-year product cycle for semiconductors reflect intensifying competition among semiconductor producers in the U.S. and around the world. Over the next decade persistence of this rapid rate of technological progress will require exploitation of new technologies. This is already generating a massive research and development effort that will strain the financial capacities of the semiconductor industry and its equipment suppliers.

The two-year cycle for semiconductors is a key prerequisite for higher long term growth

Economics on Internet Time

I conclude by underlining some of the uncertainties that still surround the development and diffusion of information technology. Highest priority must be given to a better understanding of markets for semiconductors and, especially, the determinants of the product cycle. Improved data on the prices of telecommunications and software are essential for understanding the links between semiconductor technology and the growth of the American economy.

The semiconductor industry and the information technology industries are global in their scope with an elaborate international division of labor.[5] This poses important questions about the American growth resurgence. Where is the evidence of a new economy in other leading industrialized countries? Another conundrum is that several important participants – Korea, Malaysia, Singapore, and Taiwan – are "newly industrializing" economies. Developing countries like China and India are now beginning to play an important role in the industry.

Information technology is altering product markets and business organizations, as attested by the huge and rapidly growing business literature[6], but a fully satisfactory model of the semiconductor industry remains to be developed. Such a model would have to derive the demand for semiconductors from investment in information technology and determine the product cycle for successive generations of new semiconductors.

As policy-makers attempt to fill the widening gaps between the information required for sound policy and the available data, the traditional division of labor between statistical agencies and policy-making bodies is breaking down. For example, the Federal Reserve Board has recently undertaken a major research program on constant performance IT price indexes. In the meantime monetary policy-makers must set policies without accurate measures of price change. Similarly, fiscal policy-makers confront on-going revisions of growth projec-

tions that drastically affect the outlook for future tax revenues and government spending.

The unanticipated American growth revival of the 1990's has considerable potential for altering economic perspectives. In fact, this is already foreshadowed in a steady stream of excellent books on the economics of information technology.[7] Economists are the fortunate beneficiaries of a new agenda for research that could refresh their thinking and revitalize their discipline.

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[5] The role of information technology in U.S. economic growth is discussed by the Economics and Statistics Administration (2000); comparisons among OECD countries are given by the Organisation for Economic Co-operation and Development (2000).
[6] See, for example, Grove (1996) on the market for computers and semiconductors and Christensen (1997) on the market for storage devices.

[7] See, for example, Shapiro and Varian (1999), Brynjolfsson and Kahin (2000), and Choi and Whinston (2000).

Changing Patterns and Determinants of Growth

Thomas Andersson*[1]

The concept of a "new economy" gained enormous attention in the late 1990s with the US boom which, late in the business cycle, occurred with a virtual absence of inflationary pressure and at levels of unemployment far below what used to be viewed as compatible with price stability. US monetary policy adjusted to a partly new set of conditions. More recently, the concept has taken on rather different connotations as the value of technology stocks has crumbled along with a general economic downturn. What then was the new economy concept built on, and is it of any lasting relevance?

In terms of macroeconomic performance, the US surge of the 1990s was truly spectacular. The duration of the boom outlasted any previous experience, and unemployment fell to about 4 percent without giving rise to inflationary pressures. Although it had already attained the highest productivity levels in most respects, the United States further increased its gap to most other countries. There were signs of dynamism elsewhere as well. Central banks around the world sensed the presence of change in micro-macro relationships and there was talk of an enhanced potential for long-term growth. However, there never was evidence of any general uptake in productivity growth. Of course, growth may now be more difficult to measure, e.g. as the service sector has become more prominent and because of rapid quality improvements and shifts towards new products. The fact remains that, as far as we can measure, irrespec-

tive of whether one controls for the cycle or not, only about a fourth of the OECD countries displayed higher growth rates in the 1990s on average than they did in the previous decades. The US belonged to this group, but its record was actually only marginally better than it had been in the 1980s.

The concept of a "new economy" was in any case doomed from the start. What is "new" today will be "old" tomorrow, and what could be viewed as "new" in the first place appears a *philosophical* rather than an *economic* question.[2] What does matter is to what extent, and in which respects, significant changes are occurring in the fundamentals of growth, and what these entail for individual countries. This applies not least to the EU, which belongs to the most advanced economic regions of the world but has experienced generally sluggish growth for decades. Partly building on recent work at the OECD (OECD, 2001a; OECD, 2001b), this article offers some reflections on these issues.

Patterns of growth

An examination of growth performance in OECD countries, and how it has evolved in recent years, indicates that two types of major changes are indeed taking place. One is in the area of growth patterns. Since World War II, countries at initially lower income levels have generally been observed to grow faster, i.e. they are "catching up" through learning effects and the transfer of technologies from those countries that are leading the race (Fagerberg, 1994). Broadly speaking, however, the spread of growth rates in GDP increased across the OECD in the 1990s, as some of the leaders surged further ahead. Within the EU the trend was more varied, with growth picking up in several small, fairly advanced countries, notably Denmark,

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[1] The author is grateful to Dirk Pilat of the OECD, for assistance with examination of data.

[2] This was a focal point already for some of the earliest Greek philosophers. Thales (545 BC.) believed that everything emanates from an essential substance (water) which never changes; it simply takes on new shapes. Herakleitos (540–480 BC.), on the other hand, perceived the world as being in a state of constant flux.

Ireland, the Netherlands and Norway, while slowing in France, Germany and Italy. Towards the end of the decade, Finland, Iceland and Sweden also experienced a revival in growth.

With respect to the composition of growth, it is true that traditional considerations such as labour utilisation – and unemployment – remained important in the 1990s. In the United States, the number of persons employed grew by 1.3% a year over the 1990s, a level matched only by the Netherlands and Ireland among the countries in the EU. Whether countries grew rapidly or not, however, the largest part of growth in per capita income came from higher labour productivity, which depends on capital deepening, i.e. the services provided by capital to each worker, and on multi-factor productivity (MFP).[3] Capital deepening played a significant role in the 1990s, but occurred in a limited number of sectors. Despite measurement problems, MFP stood out as the most important determinant of labour productivity growth. This was increasingly so towards the end of the decade, and precisely in that rather small group of countries whose performance rose markedly from already high productivity levels.

ICT in growth

The other significant change concerns the factors in growth. It has long been recognised that traditional investment and labour input could explain only a minor part of the overall variation in growth rates. Solow (1957) lumped together the remaining factors in a residual referred to as "technical progress", viewed by many as a black box of undefined, exogenously determined factors. While some studies showed the importance of better measurement of the various inputs of growth (Jorgenson and Griliches, 1967), and other work, such as the "new growth theory" (Romer, 1990) explicitly sought to unravel endogenously determined processes, the problem of capturing the fundamental determinants of growth has remained, and in some respects has become even more difficult to solve. Psacharoulos (1994) found that a sizeable share of cross-country variation in growth performance over the last decades could be put down to education. In the 1990s, however, several studies

(Barro and Lee, 1996; Nehru et al., 1995) cast doubt on the robustness of this relationship.

Solow's remarks in the 1970s that information and communications technology (ICT) seemed observable "everywhere except in the productivity statistics" might thus not have been surprising. In recent years, however, the focus on the evasive influence of ICT was replaced by a conviction that it played a major role in an acceleration of US productivity growth which gave rise both to higher employment and lower inflation. New data and methodologies suggested that the impacts came not only out of production, but from the use of ICT as well (Ohliner and Sichel, 2000; Whelan, 2000). Meanwhile, a first cross-country examination controlling for differences in measurement methodologies (Schreyer, 2000), found an increasing impact of ICT investment on output growth during the 1990s in all G7 countries. In Canada, the United Kingdom and the United States, ICT equipment was responsible for about half of the entire growth contribution of fixed capital during 1990–96. In France, Germany and Japan, the effect was smaller, but remained significant. The fast pace of ICT investment brought widespread substitution for other kinds of investment, implying a rise in the marginal returns to other production factors. On the other hand, and although evidence from several countries indicates that the underlying productivity growth has remained strong in the subsequent downturn, there can be no doubt that, in retrospect, some of that investment in ICT turned out not to be well spent.

There has been much discussion about whether the impacts of ICT are on a par with what was observed in earlier "technological revolutions", such as those of the railways or electricity. Kranzberg (1985) noted that the development of new technology is always evolutionary in the sense that its point of departure is existing technology. A technological "revolution" is characterised by a series of complementary innovations accompanied by processes of social and institutional adaptation. David (1990) and Freeman and Perez (1990) argued that, in the past, such revolutions were characterised by stepwise developments in which productivity growth remained low for many decades – generally half a century or more – before taking off. ICT may be viewed as fitting this pattern, since partial impacts have been observed for decades whereas an up-take in overall productivity

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[3] Multi-factor productivity (MFP) can broadly be defined as the overall efficiency with which labour and capital are employed in the economy, see further OECD (2000a).

growth was identified only in the late 1990s. For various reasons, ICT may gradually come to exert a more rapidly accumulating impact than what has been seen in connection with new technologies in the past. There has clearly been an unprecedented fall in prices and increases in quality. Also, ICT is diffused with greater speed, particularly through the Internet, creating a potential for rapid network growth with associated externalities. Effects may become visible once certain thresholds of use have been passed. On the other hand, sceptics (Gordon, 2000) argue that ICT and the Internet have little content of their own and merely replace other technologies.
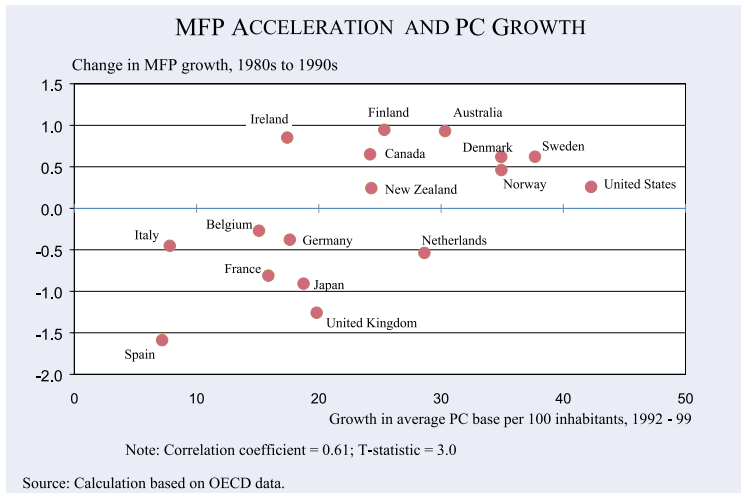
Complementary factors

While ICT appears to have a potential for significant reduction of transaction costs in markets and bottlenecks in economies, this impact may not be readily available. Above all, some aspects, such as the Internet and electronic commerce, are still in their infancy. Internationally agreed and transparent regulatory conditions need to be put in place and be implemented in order to enable secure transactions and well-functioning markets.[4] Apart from such direct influences, the effect of ICT so far has been interrelated with the structural changes in labour markets which took place notably in the US but to a varying extent elsewhere as well. Likewise, regulatory reforms in financial and product markets, along with globalisation, increased competition, pushed restructuring and put downward pressure on prices. This occurred in most OECD countries, including in the EU, but more so in some than in others.

Innovation and technological change more broadly must fur-

Figure 1

MFP ACCELERATION AND PC GROWTH

Change in MFP growth, 1980s to 1990s

Growth in average PC base per 100 inhabitants, 1992 - 99

Note: Correlation coefficient = 0.61; T-statistic = 3.0
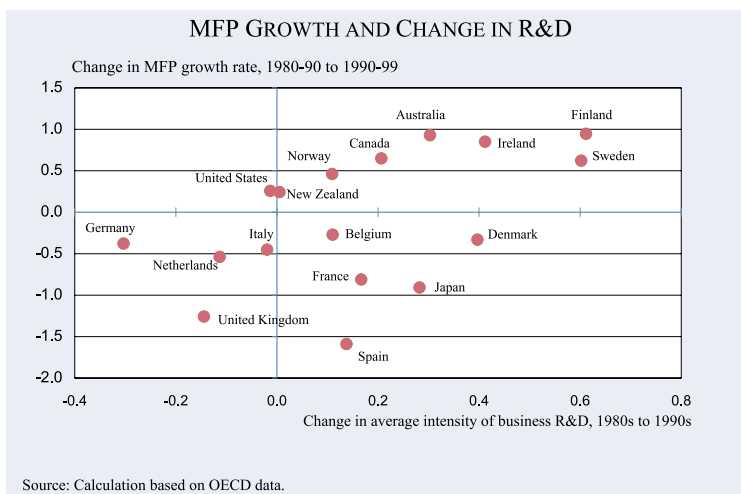
Source: Calculation based on OECD data.

ther be taken into account. The selective acceleration of MFP in the 1990s provides indications of what has occurred. Examining the correlation between the growth in MFP and that in the PC base across countries for the 1990s, as illustrated in Figure 1, a strongly significant relationship emerges. Countries found high up along the vertical axis include both those with large ICT-producing sectors, such as Finland and the United States, and those with almost no such production, notably Australia. As illustrated by Figure 2, however, there is a positive relationship also between R&D and MFP growth.[5] Furthermore, rather than aggregate R&D, it is important to consider innovation, and how different elements interact in shaping innovative capacity. Noteworthy changes are under

Innovation and technological change push up MFP

[5] The relationship is statistically significant for various measures of R&D – including stocks, intensities and growth rates – and MFP (cf. Bassanini et al., 2000).

Figure 2

MFP GROWTH AND CHANGE IN R&D

Change in MFP growth rate, 1980-90 to 1990-99

Change in average intensity of business R&D, 1980s to 1990s

Source: Calculation based on OECD data.

[4] See, e.g., OECD guidelines for cryptography, for security of information systems, and for consumer protection.

way in the composition and funding of R&D, and in the linkages to innovation (Guellec and van Pottelsberghe, 2000). In the United States, the public research sector, and particularly universities, have played a major role in the overall surge in patenting – one indicator of the output of innovation. On the other hand, with the improved means of communication, the linkages from research through to marketing have evolved in both directions, providing a potential for more market-driven innovation processes, including in services (OECD, 2001d).
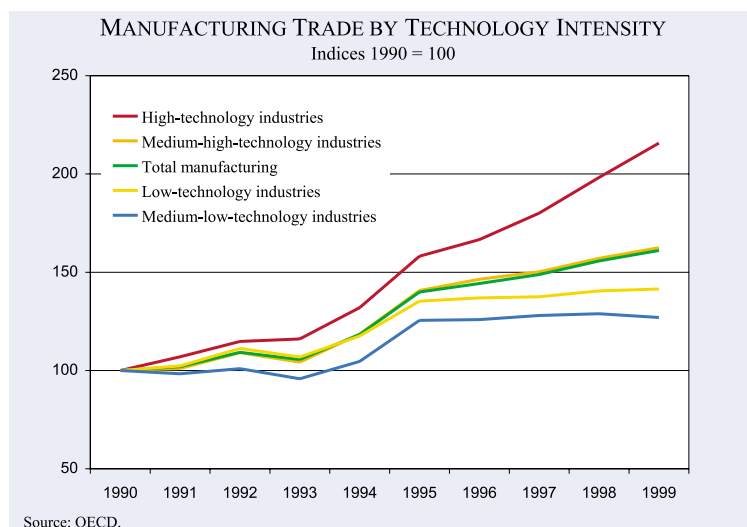
Meanwhile, education and skills remain essential. De la Fuente and Dmenech (2000) argue that the impact of human capital on economic growth probably has risen over time, but that understanding its role requires a better handle on the linkages to technical progress. Firm-level studies have found evidence of complementarity between technological change and human capital accumulation (Brynjolfsson et al., 1998). A number of surveys point to far-reaching organisational change within firms and workplaces in the 1990s towards flatter hierarchical structures, greater responsibility for individual workers, multiple tasks and stronger incentives for innovation, flexibility and on-the-job training. Such organisational change can serve as a crucial complement to R&D, ICT or investment in training (Black and Lynch, 2000; Bresnahan et al., 1999). With the key assets increasingly becoming intangible, however, appropriate evaluation and disclosure along with conditions that allow for effective risk-taking become essential. The provision of venture capital, which typically is superior

Human capital accumulation, organisational change and venture capital are additional growth factors

to bank lending in funding new business and new growth areas, increased strongly in almost all OECD countries in the late 1990s, but the US market has the greatest depth and accumulated experience. Also, many countries retain severe barriers to entry and exit of firms, and to entrepreneurship, locking resources into existing operations.

While capturing the benefits from the new growth factors thus will depend on a number of areas, a break down of trade, industry, or production statistics underscores that fundamental changes are under way. As seen in Figure 3, there has been a consistent expansion of the share of high-technology products in international manufacturing trade. An examination of industrial trends in the OECD area shows that those industries which are intensive in their use of technology and human skills have consistently increased their share of overall value added and production over the last decades (OECD, 2001c). Meanwhile, services –notably high-value-added services – are rapidly increasing their share of the economy. There seems to be less and less room to make a living out of specialisation based on low cost, and standardised production. While these trends were evident for quite some time before the pick-up of MFP-growth, the latter appears to have resulted where the most effective application of the new growth factors was taking place in the 1990s. The proliferation of knowledge and technology seems certain to remain with us beyond the short-term swings of the cycle, and the ability to respond to the opportunities as well as the challenges that it brings is likely to become increasingly essential.

Figure 3

MANUFACTURING TRADE BY TECHNOLOGY INTENSITY
Indices 1990 = 100

High-technology industries
Medium-high-technology industries
Total manufacturing
Low-technology industries
Medium-low-technology industries

Source: OECD.

The EU position

Monetary and budgetary policies undoubtedly go some way to explain the performance of the US in the late 1990s, which now might be seen as a classic example of a "bubble economy" (Cooper et al., 1999). There were substantial macroeconomic imbalances in the form of an expanding current account deficit, negative savings and the build-up of foreign positions in US securities and equities which fuelled "rocketing asset

prices". However, the wealth creation in equity markets, especially in technology sectors, explains neither the level and exceptional duration of the US productivity record, nor can it help explain the varying performances of other economies such as Australia, the Nordic region, or in continental Europe.

ICT is one area where the United States clearly holds the leading position. The Table shows a compelling US lead over the EU (and Japan) in most respects, although mobile users are an exception. One aspect – which is not easily measured – concerns the extent to which firms adopt ICT in a proactive and strategic way. There are indications that European firms are less aware of the need for a formal e-commerce strategy (PFA Research, 1999), as reflected in the absence of any correlation between use of the Internet and the adoption of a formal e-commerce strategy by European firms. In fact, there appears to be a slightly negative correlation between the rate of Internet adoption and the firm's perception that e-commerce plays a strategic role in their company. With the exception of the Nordic countries, and on the basis of a restricted sample, firms in European countries such as the Netherlands, Spain and the United Kingdom have been found to view electronic commerce as of relatively low strategic importance (OECD, 2001b).

While Europe lags behind the United States, the overall situation masks great variation. Those EU countries that are less advanced in ICT,

i.e. Greece, Italy and Spain, have recently undertaken heavy investment in business-to-business electronic commerce, and show signs of catching up. The Nordic countries and the United Kingdom are advanced in regard to PC penetration, number of Internet hosts per inhabitant or use of the Internet for commerce.[6] The penetration of mobile users, which exceeds two-thirds of the population in the Nordic region, is widely viewed as providing the EU with an edge in the start-up of mobile commerce. Related areas in which the EU may also enjoy an advantage *vis-à-vis* the United States include digital TV and methods for more secure communication, e.g. smart cards or the use of mobile telephones for identification. However, the development of the third generation of mobile networks, gradually under way, will exert a major impact on the preconditions for mobile commerce. Technologies, as well as institutions and regulatory conditions, are changing fast, and the scope for genuine competition will be decisive for the ability of producers and service providers to respond. Europe is still plagued by rather severe segmentation in terms of national markets, limiting genuine competition on a wider basis. The reliance on pre-paid users in most of the EU raises challenges with respect to applying effective price strategies for 3G mobile services and, unless there is an increase in competition, the required innovation may be slow in coming. The EU has already forfeited the lead in roaming, with costs coming down more quickly in North America than in Europe, and there are signs that US operators have become more active than European ones in developing new solutions for bringing down the price of Internet access via wireless. Further, the wave of auctioning access to third-generation networks on a national basis in the EU amounted to a substantial tax on future investment in this area, which tapped the supply of risky investment by turning it into public rents and raised the already high risks confronted by the industry.

These are merely a few illustrations of the prevailing mixture

Europe could reap advantages, but genuine competition is limited

Indicators of e-commerce readiness: Japan, Europe, United States

	Japan	European Union	United States
Internet hosts per 1 000 inhabitants Oct 2000	32.6	37.4	234.2
Secure servers per million inhabitants July 2001	62.8	65.3	315
Installed PC base per 100 inhabitants 1999	25	23	65
PCs per 100 white collar workers 1999	43	36	98
Employees using e-commerce enabling technologies 1999 (percentage)	60	49[a]	65
ICT expenditure/GDP (percentage) 1999	8.0	6.4	7.9
ICT in business sector R&D (percentage) 1999	31	19	22
Cellular mobile subscribers (percentage) 1999	45	40	30

[a] Average of France, Germany, Italy, and the United Kingdom.

Source: (2000i) and OECD Telecommunications database 2000. Host data from the Internet Software Consortium; secure Web servers data from Netcraft.

[6] See European Commission (1999) for detailed cross-country comparisons.

of opportunities and obstacles in the EU. In terms of actual performance, it is particularly the larger continental European countries that now appear stagnant, whereas several of the small relatively advanced EU states have demonstrated new signs of dynamism, indicating that size need not be the issue. But while the EU still belongs to the most advanced and dynamic regions in many respects, a number of barriers continue to hamper restructuring, risk-taking and new products or businesses.[7] With the new growth factors, the potential for global reach is bigger than ever, but so are the costs of rigidities and compartmentalisation. There is no doubt a remaining challenge for the European Commission as well as for the individual European Member states to progress in a more consistent and mutually reinforcing manner. There is a need of a more comprehensive strategy encompassing the key policy areas which together impinge on the incentives for capturing the benefits of the new growth factors, as was envisioned at the *Lisbon Summit*. As part of this, policy makers need to ensure – and publicly demonstrate – that ICT brings with it reduced prices, new services and skills upgrading, and that the benefits are spread broadly throughout society. This has to include addressing the social consequences that arise when some firms, and some jobs, are downgraded or destroyed by rapid technological and organisational change, while others prosper and new ones are born. It will be increasingly important, however, not to address these concerns in a way that compromises the incentives and options to learn, invest and innovate.

The EU must design strategies for capturing the benefits of the new growth factors

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[7] See Andersson (2001) for a discussion of issues and the direction of remedial measures as regards market segmentation, science-industry linkages, ICT infrastructure and services, labour markets and skills, financial markets, venture capital and entrepreneurship.

The Digital Divide

Daniel Piazolo[1*]

The new economy is sometimes seen as the herald of a truly borderless world, where everyone can profit from the blessings of the Internet regardless of his or her geographical location. However, since the Internet requires substantial prerequisites concerning technical infrastructure and human capital, some worry that the developing countries will be left behind. This contribution addresses the fear of a growing "technological apartheid" between the industrialized and the developing countries and looks at policies to overcome the digital divide. First, however, it clarifies the used concepts for the new economy.

Catchwords and concepts for the new economy

Various catchwords have been coined to capture the essence of the economy-wide consequences resulting from an increased use of processed digital information and from the application of the Internet for a wide array of services (software programming, webpage maintenance, ticket and hotel reservations, on-line information and support, ordering facilities, publishing, indexing or abstracting etc.) as well as transactions (delivering music, movies, documents, literature or software in digital form).[2] The following catchwords aim at different characteristics of this phenomenon but are frequently used as synonyms: "digital economy", "information economy", "knowledge-based economy", "weightless economy", "virtual economy", "Internet economy", "electronic commerce", "e-commerce", "e-conomy", or maybe more capacious "new economy". Some authors have tried to assign distinguishing concepts to this variety. For example, Kling and Lamb (2000)

suggest to use the term "information economy" to include all informational goods and services like publishing, research, legal and insurance services, entertaining, and teaching in all of its forms, and the term "digital economy" to address (only) the goods and services whose development, production, sale, or provision is critically dependent upon digital technologies. Furthermore, the term "new economy" is associated for them to the possible consequences of the information economy and the digital economy, namely high growth, low inflation, and low unemployment.

However, in many papers – including the present one – the concept of the "new economy" is wider and includes the characteristics of the "information economy" and of the "Internet economy" as subsets. In the following, the term "new economy" describes an economy where both final output and intermediate input predominantly consist of information and where the modern (digital) information and communication technologies provide world-wide access to almost any available information. These new technologies might have the potential to enable an increase in the productivity of conventional business practices, but also facilitate the establishment of new processes and products. Consequently, the evolution of the new economy should not be considered as being restricted to the information sector, but as a far reaching process that might alter and extend the products and production processes within the whole economy. This means also that the consequences of being excluded from the progress of the new economy might be rather detrimental for (developing) countries.

The digital divide between countries

The overall rise of the use of the Internet has been exponential. The Internet age has yet arrived only in some parts of the world. Table 1 presents the density of the five main tools of the communication and information era (television sets, telephone mainlines, mobile phones, personal computers and Internet hosts per 1,000 people) according to an

The new economy broadly defined

[2] Panagariya (2000) offers a concise listing of e-commerce services and their significance for developing countries.

income classification of countries. The classification of countries follows the World Bank (2001a): "Low income" are countries with a Gross National Product (GNP) of less than US$ 755 for the year 1999, "lower middle income" are countries with a GNP between US$ 756 and US$ 2,995, "upper middle income" are countries with a GNP between US$ 2,996 and US$ 9,265, whereas "high income" countries are the remaining ones with a GNP of more than US$ 9,266.

Table 1 shows that the gap between the low income and the high income countries increases considerably with the state of technology of the communication and information equipment. Whereas the low income countries achieve with their density of television sets 32 percent of the world average and with their density of telephone mainlines 16 percent, the gap is more pronounced in equipment using digital information: The density of mobile phones in the low income countries is only 3 percent of the world average, the density of personal computers is 6 percent and the density of Internet hosts is even less than half of one percent of the world average. This gap can be denominated "digital divide" (cf. OECD, 2001b). It is also interesting to note that the countries classified as upper middle income achieve quite high density values (above 89 percent) relative to the world average for four categories (television sets, telephone mainlines, mobile phones and personal computers

per 1,000 people) but fall to just 32 percent of the world average concerning the diffusion of Internet hosts. Since the Internet hosts contain the data that are world–wide available, the density of hosts in a country indicate how much this country can influence the contents of the Internet.[3]

Table 2 displays the regional distribution of Internet hosts and Internet users and underlines the assessment of a digital divide separating the high income countries from the rest of the world. 90 percent of all Internet hosts are in the EU, the United States, Canada and Japan. These countries have 59 percent of the world total of Internet users. Africa accounts only for 0.25 percent of Internet hosts and, 0.54 percent of the world total of Internet users.

Table 2 also shows that at 63 percent of the world total of Internet hosts and 26 percent of the world total of Internet users, the United States are the decisive country for the spread of the Internet. The United Kingdom and Germany, the two EU countries with the most Internet hosts and Internet users, have only a twentieth of the Internet hosts of the USA. The developing countries have a rather tiny share of the world total in

[3] However, it has to be noted that there is not yet a unique definition of internet hosts and that the methodology of collecting the data about internet hosts still differs significantly from one statistical source to another.

Table 1

The Arrival of the Information Age – by Region

Region	Television sets per 1,000 people		Telephone main-lines per 1,000 people		Mobile phones per 1,000 people		Personal computers per 1,000 people		Internet hosts per 1,000 people	
	1999	in per-centage of world average	1999	in per-centage of world average	1999	in per-centage of world average	1999	in per-centage of world average	2000	in per-centage of world average
Low Income (GNP per capita less than US$ 755)	**85**	**32**	**26**	**16**	**3**	**3**	**4.4**	**6**	**0.05**	**0.3**
Lower middle income (GNP per capita between US$ 756 and 2,995)	273	102	102	65	**33**	**38**	**17.7**	**26**	**0.36**	**2**
Upper middle income (GNP per capita between US$ 2,996 and 9,265)	304	113	190	120	136	158	60.9	89	**4.85**	**32**
High income (GNP per capita more than US$ 9,266)	693	259	583	369	377	438	345.9	506	98.17	644
World	268	100	158	100	86	100	68.4	100	15.25	100

Note: The bold figures include the data with density values of less than 50 percent of the world average for this indicator.

Source: Own calculations, World Bank (2001a), World Bank (2001b), World Bank (2001c).

Table 2

The World-Wide Distribution of Internet Hosts and Internet Users, August 2001

	Population	Number of Internet Hosts			Number of Internet Users		
	1999 in thousands	August 2001 in thousands	in percent of world total	per 1000 people	August 2001 in thousands	in percent of world total	per 1000 people
EU	**292 751**	**20 197**	**16.85**	**68.99**	**141 231**	**21.15**	**482.4**
Germany	82 100	4 221	3.52	51.41	31 311	4.69	381.4
UK	59 501	4 191	3.50	70.43	27 432	4.11	461.0
Italy	57 646	2 357	1.97	40.88	17 747	2.66	307.9
France	58 620	1 630	1.36	27.80	17 415	2.61	297.1
Netherlands	15 805	1 906	1.59	120.62	10 248	1.54	648.4
Spain	39 410	1 045	0.87	26.51	7 623	1.14	193.4
Sweden	8 857	1 592	1.33	179.76	6 752	1.01	762.3
Austria	8 092	690	0.58	85.30	4 631	0.69	572.3
Belgium	10 226	618	0.52	60.48	4 488	0.67	438.9
Greece	10 538	186	0.16	17.64	4 431	0.66	420.4
Denmark	5 326	534	0.45	100.31	3 807	0.57	714.8
Finland	5 166	958	0.80	185.51	2 913	0.44	564.0
Ireland	3 752	132	0.11	35.21	1 336	0.20	356.0
Portugal	9 989	137	0.11	13.71	1 097	0.16	109.8
NAFTA	**405 307**	**81 778**	**68.21**	**201.77**	**200 270**	**30.00**	**494.1**
USA	278 230	75 682	63.13	272.01	172 391	25.82	619.6
Canada	30 491	5 638	4.70	184.91	24 719	3.70	810.7
Mexico	96 586	458	0.38	4.74	3 160	0.47	32.7
Asia	**3 143 097**	**10 438**	**8.71**	**3.32**	**254 505**	**38.12**	**81.0**
Japan	126 570	6 192	5.16	48.92	52 292	7.83	413.1
China	1 253 595	131	0.11	0.10	26 342	3.95	21.0
South Korea	46 858	520	0.43	11.10	18 567	2.78	396.2
Taiwan	22 092	1 983	1.65	89.75	10 974	1.64	496.7
Hong Kong	6 721	884	0.74	131.46	5 182	0.78	771.0
India	997 515	41	0.03	0.04	4 283	0.64	4.3
Singapore	3 952	261	0.22	66.13	2 343	0.35	592.8
Malaysia	22 710	70	0.06	3.09	1 453	0.22	64.0
Oceania							
Australia	18 967	1 735	1.45	91.48	10 268	1.54	541.3
New Zealand	3 811	409	0.34	107.21	1 705	0.26	447.5
South America							
Brazil	167 967	754	0.63	4.49	14 907	2.23	88.7
Argentina	36 580	264	0.22	7.23	1 529	0.23	41.8
Chile	15 018	90	0.07	5.98	744	0.11	49.5
Africa	**933 153**	**296**	**0.25**	**0.32**	**3 574**	**0.54**	**3.8**
Others	**1 203 664**	**3 756**	**3.13**	**3.12**	**37 097**	**5.56**	**30.8**
World Total	**5 977 972**	**119 884**	**100.00**	**20.05**	**667 622**	**100.00**	**111.7**

Note: The countries are ranked according to the number of internet users. No comparable data about internet hosts and internet users are available for Luxembourg.

Sources: Own calculations, Telcordia (2001b), World Bank (2001d).

The high income countries have 90% of the Internet hosts and 59% of Internet users

Internet hosts and Internet users. Even the two largest developing countries with about 1 billion inhabitants, China and India, own only 0.11 per- cent and 0.03 percent of all Internet hosts and are the origin of 3.95 percent and 0.64 percent of all Internet users.

The digital divide is also clearly revealed by the number of Internet hosts and Internet users per 1,000 people. Whereas there are 272 Internet hosts and 620 Internet users per 1,000 people in the USA and still 69 Internet hosts and 482 Internet users per 1,000 people in the EU, there are just 0.32 Internet hosts and 3.8 Internet users per 1,000 people in Africa. The corresponding features for China are 0.10 (Internet hosts) and 21 (Internet users) and for India 0.04 (Internet hosts) and 4.3 (Internet users) per 1,000 people.

Economic divide – digital divide

The existing economic divide between the industrialized and the developing countries is, of course, partly the reason for the digital divide between the high income countries and the rest of the world. Lack of computers, unstable electricity infrastructure, shortage of telephones and capacity of telephone lines aggravate the introduction of the necessary information technology for the digital economy. Furthermore, the fees for new software and Internet services are prohibitive for many users in developing countries.

The digital divide is related to growth of the Internet

This digital divide may be smaller than the gap for previous new technological developments (steam engines, telephones, electricity) five or ten years after these innovations came to the markets, since the connection to the world-wide web and the implementation of digital devices require fewer sunk costs than the former main technological waves. In that respect, it could be argued that the digital divide will also diminish with time until the gap in the density of computers and Internet hosts just reflects the different economic development stages during the catch–up process.

The threatening danger of the digital divide is connected to the rapidly rising importance of the Internet. A survey by UNCTAD (2000: 7) places the significance of on-line business for total cross-border trade flows at between a tenth and a quarter of world trade by the year 2003. This scope of forecast reveals the remaining tentativeness concerning the importance of on-line business, but stresses at the same time the overall expectation that e-commerce will become a major component of international business life even if the more guarded estimates turn out to be true. The federation of 67 multinational firms within the "Global

Business Dialogue on Electronic Commerce" (2001) foresees, for the year 2005, that on-line business to business will amount to more than US$ 7 trillion annually. Furthermore, the federation anticipates more than one billion Internet users by that date.

If the projected exponential rise of on-line business turns out to be true, the low participation rate of the developing countries in the Internet may impede these countries to profit from the growing total of business activities and will widen the economic gap between nations. Thus, the growing significance of the Internet in the industrialized countries within the last decade and the prediction about the enormous e-commerce potential of international trade highlight the necessity to reduce and overcome any "technological apartheid" that would reinforce the existing economic divide.

It could be argued that the very nature of the Internet allows more optimistic assessments. The latest technological innovations might enable developing countries to install fully digital wireless networks in order to leapfrog expensive analog terrestrial exchanges. For example, Hudson (2000) reports that in Uganda there are now more cellular customers than fixed lines, and that the African Communication Group installs wireless kiosks for Internet access to enable small business to get established in the global market place. There are some success stories where villages in developing countries were able to offer their products directly to consumers in the developed world, thanks to lower barriers to entry and improved contact facilities provided by the Internet. Furthermore, the rapidly increasing exports of software services from Indian firms to OECD countries have almost attained proverbial status in the discussions about the catching-up of developing countries.

The success of the Indian cities of Bangalore, Bombay, Hyderabad and New Delhi in exporting computer software services is based on the relatively advanced capital accumulation as embodied in the local infrastructure and a relatively high level of human capital for certain segments of the population. Yet, theses levels of physical and human capital accumulation are lacking in most other areas of India and also in many other developing countries. Some emerging markets like Brazil, China, Russia, Mexico, and South Korea will be able to establish comparable local hubs of

physical and human capital accumulation that have a comparative advantage in offering software and services for the Internet. Most regions in the developing world do not yet have a broad enough base of educated and trained people and lack until now the required infrastructure to compete in the new economy.

Unfortunately, it is quite likely that – despite some success stories and selective leapfrogging within the developing countries – the new technologies alone will not suffice to close or even significantly narrow the digital divide, since they are heavily dependent on physical capital (for infrastructure, hardware and software), human capital (for installation, maintenance, updates and efficient usage of the computers) and the general economic policy environment (for functioning payment systems, stability).

Strategies to overcome the digital divide between countries

To diminish the digital gap between countries, it is necessary to tackle various issues. On a quite general level – in order to foster overall international e-commerce – it will be important to build up a multilateral regulatory framework that does not discriminate against countries or companies of certain regions. As set out in Piazolo (2001), substantial reforms of the multilateral framework concerning standards, policy coordination and taxation are necessary to establish consistent, transparent, non-discriminatory, simple and enforceable rules. While such rules are desirable per se for international exchange, the new economy reinforces the need for their establishment.

On a more specific level, it is necessary to address the particular concerns that hinder developing countries to participate fully in the new economy. It is especially important to increase the participation of the population of developing countries in the new economy through computer-related education and training. This special training should not only aim at a quite general increase in the levels of human capital, but at the procurement of the required skills for the new economy. The focus on the relevant information technology abilities increases the chances for the occurrence of leapfrogging.[4] At least, the broadened base of computer skills will reduce the widening of the digital

divide if advanced applications are introduced that require already a certain level of computer literacy.

The government of India started to emphasize the building-up of engineering and computer skills in the 1950s and 1960s through its Institutes of Technology (cf. Mann et al., 2000: 185). This has laid the foundation for the present Indian export boom in software involving more than 600 specialized companies and employing 300,000 computer experts. Furthermore, some regions in India like Bangalore offer particular tax incentives to software exporters.

For physical capital a similar focus is also necessary, that should take into account the requirements of the new economy. Access to the Internet has to be ensured by taking care of various specific aspects like infrastructure, affordability and reliability. In the context of developing countries, there are various strategies to increase the access potential. Hudson (2000) proposes the use of service obligations, regionally differentiated subsidies, rural telecommunication funds, and the licensing of rural operators. The enhancement of access in rural, remote and low-income areas is not only desirable for the sake of equity, but advisable to ensure overall economic efficiency via network effects.

The OECD (2001b) stresses, too, that apart from general approaches to reducing the digital divide like extending the infrastructure, skills and information, it will be especially important to offer low cost access. With computers and Internet available at public institutions like libraries, post offices, local and regional government facilities, schools etc., individuals can build up familiarity with the information technology and develop important relevant skills. Especially, the provision of low-cost and subsidized access in schools will help to establish a sound foundation for computer literacy of the future workforce and will improve the diffusion of decisive knowledge for the new economy.

The developing countries can, furthermore, learn from the experience of the liberalization of telecommunication and information technology markets in the high-income countries. These experiences point to considerable growth and a sub-

Infrastructure, skills and low-cost access will narrow the digital divide

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[4] Of course, the chances for leapfrogging might diminish if the qualified computer specialists from developing countries are then recruited by the industrialized countries as for example through the German Green-Card-Initiative for software programmers.

stantial reduction in user costs in the liberalized market segments. There is now mounting evidence that within developing countries the enhanced competition in telecommunication markets has led to similarly beneficial effects as for example in the wireless telephone networks of several countries (OECD, 2001b). Since many telecommunication market segments within the developing countries are still heavily regulated and monopolized, there is considerable scope for market liberalization and associated economic as well as social benefits.

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THE DEUTSCHMARK IN EASTERN EUROPE, BLACK MONEY AND THE EURO: ON THE SIZE OF THE EFFECT

HANS-WERNER SINN *

AND FRANK WESTERMANN**

Since the announcement and the consummation of the marriage between the D-mark and the euro, the D-mark has lost a considerable part of its value, and during the same time, the share of D-mark currency in circulation in the total euro-11 monetary base (currency in circulation and banks' central bank deposits) has declined markedly (see Figures 1 and 2). In our opinion, these two facts are related, having to do with the D-mark stocks in Eastern Europe and Turkey and with the black money of the euro-11 countries. This paper discusses the magnitudes of the effects involved and their likely implications for the exchange value of the euro.[1]

According to Bundesbank estimates, one third of D-mark currency circulated outside Germany in 1995.[2] In today's circumstances this amounts to about €46 billion. Most of the D-marks were held in east and southeast Europe, where the countries
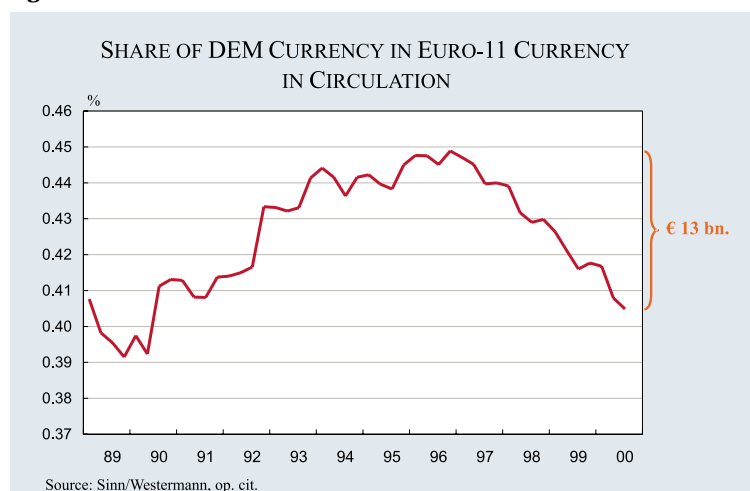
freed from the Communist yoke were eager to exchange their own currencies against hard D-mark, and in Turkey in whose inflation-prone lira the "guest workers" had no confidence. Part of the money has returned to Germany in recent years as confidence in these countries' own currencies has grown and interest of the currency holders in the dying D-mark has waned. Many people did not know what to expect and many still do not know. Some have heard that the euro will replace the D-mark. But they do not know the exchange rate, do not know who will do the exchanging, and fear to be cheated by excessive commissions. To be sure, earlier currency conversions in their own countries always went hand in hand with considerable exchange losses. That is why they switch to the dollar, the Swiss franc or back into their own currencies, and that is one of the reasons why the D-mark and the euro are weak.

The returned D-mark stocks arrived back at the Bundesbank via the international banking system. The Bundesbank purchased these stocks because otherwise interest rates would have fallen. This explains the dramatic decline of the D-mark currency stock as a share of euro-11 money supply as shown in Figure 2.

This kind of passive intervention by the Bundesbank prevented part of the depreciation which might otherwise have occurred, but only part. By purchasing the returning D-mark stocks, German treasury bills flowed back to the private sector, distorting investors' international asset portfolios. Investors reacted by moving to foreign assets. This kept the exchange rate of the euro sufficiently low to make sure that the increase in German treasury bills was absorbed by international portfolios.

The decline of the euro did not require foreign currency holders to have moved directly into dollars. It was reinforced, however, to the extent to which the declining demand for D-mark was matched by an additional demand for dollars, for this put either direct or indirect additional downward pressure on the euro. Direct pressure is created when the Federal Reserve

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1 See Sinn and Westermann (2001) for a formal discussion of the problem.
2 Seitz (1995).

Figure 1

SHARE OF DEM CURRENCY IN EURO-11 CURRENCY IN CIRCULATION

€ 13 bn.

Source: Sinn/Westermann, op. cit.

does not increase the money supply despite the additional demand for dollars. Indirect pressure is created if the Fed does provide the additional dollars demanded in order to stabilise interest rates and sells them to the banks for treasury bills. The increasing scarcity of American treasury bills in investors' international portfolios results in a rising dollar and thus in a further depreciation of the euro.

The appreciation of the D-mark after the fall of the Iron Curtain, from 1989 to 1995, may be explained by a similar mechanism.[3] At the time, the German currency was sucked in by east European countries whose monetary systems inspired little confidence during the transition crisis. The Bundesbank, which kept wondering why the money supply exceeded the set target range, was forced to increase the money stock in order to keep interest rates from rising to exorbitant levels. The run on the D-mark was so strong that it created upward pressure on the D-mark which led to the breakdown of the EMS in late 1992 and a dramatic depreciation against the D-mark of most other currencies. This effect is not covered by Figure 2 which only shows the price of D-mark in terms of dollars.

Our theory predicts generally a positive correlation of the foreign exchange value of a currency and the amount of this currency in circulation if the central bank targets the interest rate rather than the money supply. We tested for this relationship and found the correlation to be highly significant and robust. The currency crisis of 1992 with the ensuing D-mark appreciation and the recent depreciation of the D-mark or the euro, respectively, can be explained with the same approach.

It is remarkable that the turn-around in the demand for D-mark occurred in 1996. This may be due to the fact that the announcement of the Dublin summit eliminated last doubts about the introduction of the euro and thus the demise of the D-mark. The abandonment of the D-mark started with the

then emerging decisions and became stronger in later years when more and more market agents became aware of the political developments. The introduction of the euro on 1 January 1999 was only one link in a chain of events.
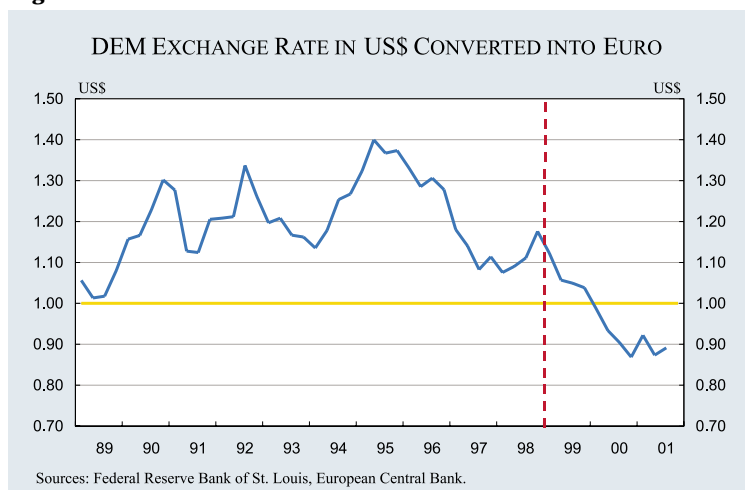
The uncertainty of foreign currency holders created by the demise of the D-mark is a fact supported by a great number of individual reports in the media and can no longer be denied. Unfortunately the Bundesbank does not have any exact statistics about the origin of the returning D-marks, but that the return flows are huge is an undeniable fact, and there is strong evidence that a considerable part originates in eastern Europe. The Ifo Institute published early on this.[4] At the beginning of 2001 the Ifo Institute also conducted a survey of 70 economic experts working in eastern Europe. A majority of the respondents reported about an increased uncertainty of the people in connection with the introduction of the euro and the modalities of the exchange as well as about a rising interest in other currencies. The Polish government warned its citizens against continuing to hold D-mark and recommended an exchange into sloty, but many people seem to be moving from the D-mark to other currencies than the sloty. Secret services report massive exchange transactions in Yugoslavia from the D-mark to the dollar.[5] Bundesbank President Welteke confirms the problem when carefully phrasing during a press conference on the topic:[6] "In all countries men-

4 See articles by Hans-Werner Sinn in Handelsblatt (6 Nov. 2000), Financial Times (4 April 2001), and Süddeutsche Zeitung (6 April 2001).
5 Washington Post and International Herald Tribune (7 May 2001).
6 Minutes of the Bundesbank press conference on 25 June 2001.

3 An alternative explanation is the enormous demand for capital following reunification (Sinn 1999). According to the present state of knowledge, however, it was money demand rather than capital demand which caused the appreciation.

Figure 2

DEM EXCHANGE RATE IN US$ CONVERTED INTO EURO

Sources: Federal Reserve Bank of St. Louis, European Central Bank.

tioned (Poland, Russia, Turkey and the successor states of the former Yugoslavia) there exists a certain uncertainty, according to our knowledge, about what will happen to the stocks of D-mark when the euro notes and coins arrive on 1 January 2002".

An extensive survey which the Austrian Central Bank has conducted over several years in Croatia, Hungary, Slovenia, the Czech Republic and Slovakia, confirms meanwhile that the decline of the share of D-mark in circulation in the total euro-11 money supply can be explained by the D-mark currency returning from abroad and that there was, in addition, a substitution of dollars for D-marks until the end of 2000. Surprisingly, the study revealed that as late as May 2001 no less than 41% of the holders of D-mark planned to exchange their stocks not into euro but into other currencies. The decline of the D-mark share in euro-11 money supply from 1997 to 2000, shown in Figure 2, corresponds to about €13 billion.[7] If this amount is deducted from the D-mark stock of €46 billion which, according to the Bundesbank, was held abroad, then at the beginning of 2001 about €33 billion of D-mark should have existed in eastern Europe. 41% of

this sum amounts to about €14 billion. This is the size of the D-mark currency stock which, according to the findings of the Austrian Central Bank and our own calculations, can be expected to be exchanged for dollars in the period from May 2001 to February 2002, when the physical conversion will be completed.[8]

The abandonment of the D-mark by the east Europeans and Turks is not the only reason for the euro weakness, however. Firstly, in eastern Europe other European currencies are also held like the schilling, the lira or the finmark. Secondly, there are considerable stocks of black money, which may amount to at least another €50 billion for the euro-11 countries.[9] The flight out of black money also contributes to euro weakness. Those who hold black money will hardly go to the bank teller in January and February 2002, show their identity card and answer the questions of the bank officer who is obliged to ask them because of money laundering laws. They must get rid of the money before then, and exchanging it directly for Swiss francs, British pounds or US dollars is best. In contrast to the eastern-Europe effect this effect will concern all European currencies and therefore does not show up in a shift of the share of D-mark notes and coins in the total euro-11 money stock.

Unfortunately we lack the data for directly estimating the joint eastern-Europe and black-money effect on all euro-11 countries. What we can estimate is the sum of the eastern-Europe effect and the black-money effect on the D-mark. Toward this end we estimated German money demand for the period 1966 to 2000 with the usual variables, i.e. money market interest rate, gross national product, and time and determined the residuals, i.e. the deviations from trend. The result is shown in Figure 3. The residuals seem to follow about the same pattern as in Figure 2 and fall below the two-sigma range which can

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[7] In order of magnitude, this number corresponds to the findings by Stix (2001). His Table 1 shows that in the countries under consideration the share of D-mark currency circulating there in total German money supply declined from 2.01% to 1.69% from 1997 to 1999, corresponding to a decline of D-mark currency abroad of 16% in two years or about 23% in three years. Taking this figure which was determined on the basis of a limited number of east European countries and relating it to the total D-mark stock outside Germany of €46 billion (Seitz 1995), yields an absolute decline of D-mark currency stock of around €11 billion in the years 1997 to 2000. The insignificant difference of €2 billion may be due to the countries surveyed by Stix not being completely representative of total D-mark stocks held abroad.

Figure 3

RESIDUALS OF DEM CURRENCY

Source: Sinn/Westermann, op. cit.

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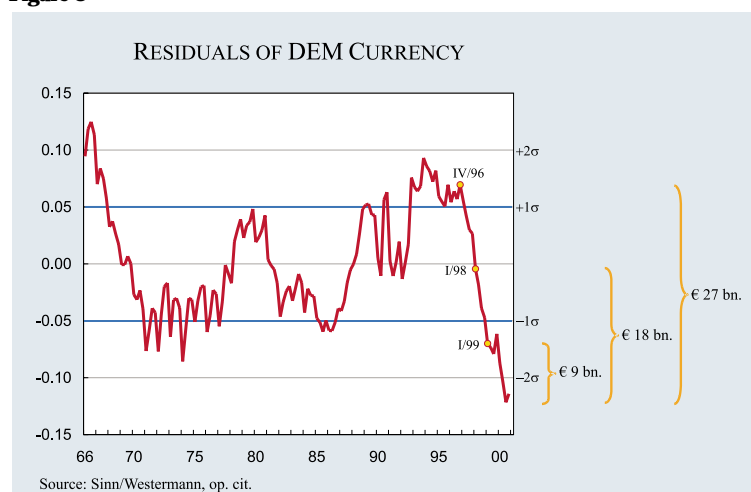
[8] From June 2000 to June 2001 the stock of circulating D-marks declined by €9 billion in absolute terms, and from January to June 2001, it declined by nearly €5 billion. The corresponding deviations from the growth trend which matter more are even larger.

[9] Schneider and Ernste (2000).

be considered – with 95% confidence – as an anomalous development.[10]

The sharp decline of the money supply from the first quarter 1997 to the last quarter of 2000 corresponded to an absolute decrease of the D-mark money demand against the trend in the amount of €27 billion. This is probably the joint effect of exchanged black money and returning currency from eastern Europe and Turkey.

Extrapolating this amount to all euro-11 countries is difficult because the eastern-Europe effect is unlikely to be distributed evenly among all currencies. The D-mark accounted for a share of 41% in total euro-11 money supply, as shown in Figure 1. If the eastern-Europe effect and the black-money effect were distributed evenly, the total effect on the euro-11 countries' currency in circulation would be a decline of €67 billion. This figure is certainly too high. A lower figure results if the change in proportions, which is shown in Figure 2 and which corresponds to an absolute amount of €13 billion, is interpreted as the return flow of D-marks from eastern Europe and if we further assume that this return flow is limited to the German currency. Assuming again a symmetrical black-money effect in all other euro-11 countries yields a total effect in the amount of €48 billion for the part of the euro-11 money supply which could have returned from eastern Europe, Turkey and black money coffers to the central banks of the euro-11 countries in the four years from 1997 to 2000.

This amount is only a rough and indirect estimate.[11] After all, part of the decline may have been

due to the introduction of electronic payment transactions. Furthermore, the share of notes and coins which may be considered black money could have been higher in the other euro-11 countries than in Germany.[12] And finally, the total does not include, as mentioned, the other euro currencies which are also returning from eastern Europe. Nevertheless, as the German decline in money balances against the trend is €27 billion, a euro-11-total of about €50 billion does not seem implausible.

Some have argued that the effect described by us, while being theoretically possible, is much too small to be able to explain a noticeable part of the actual exchange-rate movements. After all, they claim, that part of the money supply which is involved is very small relative to the size of international capital flows and also relative to the total stock of international assets. Indeed, €48 billion are only 14% of the euro-11 monetary base, only 2.4% of M1 (currency in circulation plus demand deposits), only 0.9% of M3 (currency in circulation, demand deposits, time and savings deposits) and an even smaller (by the tenth power) percentage of the total portfolio of assets including bonds, shares, property, works of art, etc., not to mention foreign exchange flows. The fact is clear, but nothing can be deduced from its observation alone. There are a number of reasons why the arguments put forth are without substance and why a change in money demand in the magnitude mentioned suffices to explain a substantial part of the exchange rate movements.

1) Stocks and Flows

A comparison of money stocks with trade flows in foreign exchange markets makes no sense as it compares apples with pears. Behind the €48 billion stands a multiple of annual transactions, as each individual coin and banknote changes hands several times. In Germany GDP amounts to DM 3,972 billion and – after deducting the D-marks held abroad according to Bundesbank estimates – currency in circulation amounts to about DM 180 billion. This corresponds to a velocity of 22. Applied to the figure mentioned, this yields a change in the volume of transactions achieved abroad with the help of the D-mark in the amount of at least DM 1,056 bil-

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10 In a multiple regression it is of course always possible to improve the fit of the cyclical movement by including additional variables like lagged values of the interest rate, GDP and exchange rate and thereby lower the residuals. From an economic point of view this would be a nonsensical procedure which would cloud the special features of the past development rather than highlight them. Time, the present interest rate and the present GDP are the variables which – according to economic theory – explain the demand for money, and perhaps also the present stocks of assets. Past values of these variables do not belong in the equation. For comparison, we did apply such a dynamic specification in the sense of a error correction model (Sinn and Westermann 2001). A comparison of the accumulated residuals did not yield qualitatively different results from the above. (Frequently the mistake is made in interpreting dynamic models to look at the simple instead of the accumulated residuals.)

11 We lack the data necessary for a more direct estimation. A preliminary analysis of the situation in France, Italy and Spain confirms the reduction in the currency in circulation relative to the trend which we found in Germany. In France which experienced a short-run reduction in the velocity of money circulation during the year 2000, the monetary base has fallen sharply in recent months. In June 2001 its absolute value was again as low as in 1997 although the economy had grown considerably in the meantime.

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12 At least this follows from the analysis of Schneider and Ernste (2000).

lion. Even this figure is too low because the true transactions volume behind GDP (gross production, which is unfortunately not measured for the aggregate economy) is still bigger. Since nobody knows the true velocity of money for different uses, trying to explain exchange rates with transaction flows makes no sense at all. Macro theory learned this half a century ago when it abandoned the Loanable Funds theory and trade theory learned it a quarter century ago from the Asset Approach.

2) Only Money Matters

In contrast to other models of this kind, the portfolio-balance model formulated by us differentiates between currency, bonds and shares in the international wealth portfolio.[13] It shows that the exchange rate depends only on the stock demand for money in the narrow sense, i.e. M1 or M0, and not M3 or other aggregates of interest-bearing assets. The demand for bonds or shares cannot affect the exchange rate directly but at most indirectly via the demand for money in the narrower sense of the word. By itself the demand for such assets is irrelevant, however big it might be. It explains asset prices and interest rates, but not exchange rates. In short: "Money matters!" even if stocks are small. The mere remark that money stocks are small is an irrelevant statement of fact, but certainly no counter argument.

That only money in the form of M1 can play a direct role is, by the way, not so much an implication of a specific model specification, but almost an implication of sheer logic. The exchange rate is not the rate of exchange between any two profitable assets, but between the currencies of different countries. For some unknown reason, this seemingly trivial fact is frequently overlooked.

In this connection it should be emphasised that only M1 is concerned here and not the "money supply" M3 which is the focus of the European

Central Bank. Since M3 also includes time and savings deposits which themselves are close substitutes for treasury bills which the Central Bank uses in its open-market operations, it hides much of the relevant effects resulting from the return of the eastern-Europe currencies or the fleeing black money.[14]

In order to keep interest rates constant, the European Central Bank is forced to absorb part of the returning currencies by selling treasury bills. Vice versa, the central banks of other countries are forced to sell part of the demanded currencies for treasury bills and similar assets in order to prevent the demand from raising interest rates. When the exchange is completed, fewer foreign treasury bills and more European treasury bills will be in the hands of the public which, in order to re-establish international portfolio balance, requires a lower exchange value of the euro. After such an action, fewer time and savings deposits and more currency will be available outside Europe whereas in Europe it will be just the reverse, but the "money stock" M3 has neither changed here nor there.

3) Central Bank Intervention would also be Negligible

If the mentioned money stocks were really too small to have noticeable exchange-rate effects, this would have consequences not only for our explanation. Any attempts of the European Central Bank to support the exchange rate by interventions would also be in vain. Although the ECB does not make public the volume of exchange-market intervention, inofficially mention is always made of only few billions of euro. If such intervention amounts are to be effective, then a return flow of some €50 billion, as identified by us, will also be effective.

Indeed, an intervention in the foreign exchange market at constant short-term interest rates, i.e. sterilised by an adjustment of the money supply, works via the same mechanism as the returning eastern-European and black money. It changes

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13 The portfolio approach permits only interest-bearing assets in the broader sense, and the monetary approach ignores that interest-bearing assets of different countries cannot be perfect substitutes if only because of the exchange-rate risk. We know of no other approach which combines the assumption of imperfect substitutability and the assumption that international investors hold different currencies. Both assumptions are necessary, however, in order to understand the complex effects of a change in the money demand, the reactions of a central bank pursuing an interest-rate target, and the exchange rate.

14 When the Bundesbank decided to change from M1 to M3 as the money aggregate to be targeted because M1 was too volatile, it might implicitly have reacted to the shift in the components of M3 caused by the Turkish and eastern European money demand. Because of the unknown development of the foreign money demand, money-supply targeting became inappropriate and was replaced in fact by interest-rate targeting.

the ratio of non-European and European treasury bills in the international asset portfolio and demands an exchange-rate adjustment in order to re-establish portfolio balance in the financial market. Despite sterilisation, exchange-market intervention does have exchange-rate effects.

4) Three Quarters Can be Explained

The important question is, however, whether a decline of the monetary base by about €50 billion can indeed cause effects large enough to be of practical relevance. Answering this question requires an empirical determination of the corresponding reaction coefficients. Recent contributions by Evans and Lyons (1999 and 2001) on the "micro structure of the exchange rate" conclude, on the basis of extensive empirical analyses, that each billion of additional sterilised dollar money demand raises the dollar exchange rate by one half cent. If about the same figure applies to the euro, then this means that our theory explains the depreciation of the euro by about 25 cents in the period 1979 to 2000. This is about three quarters of the actual depreciation which was 34 cents during this period.

The downward pressure on the euro will most likely continue in 2001, although speculative changes in expectations due to the attack on the World Trade Center may help the euro. The physical introduction of the euro in January and February of next year will eliminate the downward pressure. The euro will gradually become popular in eastern Europe and it will probably also find its way back to the black markets. The fall of the Iron Curtain bolstered the D-mark in the early 1990s, fear of its conversion into the euro has weakened it after 1997 and with it the euro itself. According to the same logic, a period of strength could begin for the euro once the conversion has occurred.

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Survey Results about Foreign Currency Holdings in Five Central and Eastern European Countries

Helmut Stix*

Introduction

Substantial amounts of currencies are circulating outside the countries in which they were originally issued. Estimates for the US dollar and the Deutsche mark range from one third to about two thirds of total currency in circulation (Seitz, 1995; Doyle, 2000). Large amounts of these currencies are being held in South America and Central and Eastern Europe. Particularly in the latter part of the world, the Deutsche mark is often co-circulating with the national currencies. However, little is known about the exact location or the extent of currency substitution in those countries. This note contributes to closing this gap by presenting evidence from a sequence of surveys on foreign currency holdings in five Central and Eastern European Countries.
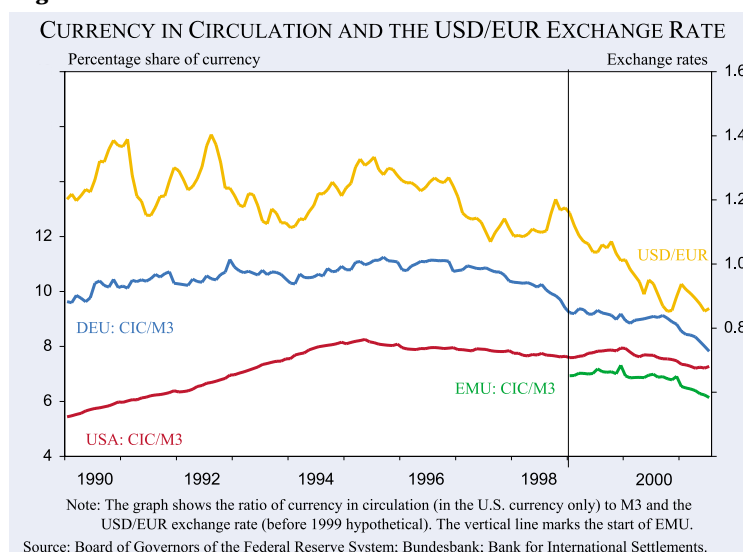
Knowledge of the extent of the usage of foreign currency is important for various reasons:

First, substantial amounts of co-circulating foreign currencies add uncertainty to the outcome of monetary policy as, for example, the money supply becomes endogenous and difficult to predict, etc. For the domestic economy, changes in money demand might be misinterpreted if the foreign demand component is wrongly estimated. Second,

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estimates about the size of foreign currency holdings are important for assessing the likely demand for euros and thus for ensuring a smooth changeover in the first months of 2002. Third, an estimate of the size of currency circulating abroad is of interest from both a foreign and domestic fiscal policy perspective: from a foreign perspective, because the extent of unofficial dollarization or markization is likely to be related to the size of the foreign black economy and thus to the degree of tax evasion (Feige et al, 2000); from a domestic perspective, because concise estimates of the amount of currency circulating abroad facilitate an assessment of the size of the domestic black economy. Finally, it has been claimed that foreign cash demand has important repercussions for the exchange rate and – thus indirectly – for the monetary policy of the ECB and the Fed. Recently, Sinn and Westermann (2001) have related the weakness of the euro vis-à-vis the dollar to an alleged flight out of the Deutsche mark into the US dollar caused by uncertainties in relation to the introduction of the euro as a physical currency.

Figure 1 shows the ratios of currency in circulation to M3 for the United States, Germany and the European Monetary Union (EMU) as well as the USD/EUR exchange rate. As is clearly visible, since 1997 the DEM's currency-in-circulation ratio has decreased from about eleven percent to less than eight percent, with the decline accelerating during the last year. Due to the large DEM share in the euro money stock, this observation directly translates into the eurozone cash-in-circulation to

Figure 1

CURRENCY IN CIRCULATION AND THE USD/EUR EXCHANGE RATE

Note: The graph shows the ratio of currency in circulation (in the U.S. currency only) to M3 and the USD/EUR exchange rate (before 1999 hypothetical). The vertical line marks the start of EMU.
Source: Board of Governors of the Federal Reserve System; Bundesbank; Bank for International Settlements.

M3 ratio, which has also been declining.[1] In contrast, the ratio of USD in circulation to M3 has remained roughly constant. As the USD/EUR exchange rate has also been trending downward since the beginning of EMU in 1999 one may be tempted to conclude that the correlation can be explained by a causal relationship between these two variables.[2] However, since the evidence on the decline in the demand for Deutsche mark that is presented by Sinn and Westermann is only very indirect it seems important to confront this argument with new data.

In this context, the first relevant question is whether the obvious decline in currency in circulation for the Deutsche mark is largely due to foreign or domestic demand (e.g. the liquidation of domestic hoardings). Should it be established that the foreign demand for marks is a substantial source of the decline then the second important question in connection with the exchange rate argument is whether Deutsche marks have been substituted for US dollars to a significant extent. The survey results presented in this study provide evidence that helps to shed light on both questions.

Conceptually, there are various methods – broadly categorized into indirect and direct methods – to estimate the amount of foreign currency holdings. Indirect methods like the "denomination displacement approach" or the "seasonal method" (Porter, 1996) rely on the analysis of domestic variables to project foreign demand. In contrast, direct methods rely on statistics "directly related" to the foreign currency demand as represented by, for example, customs reports or direct population surveys. Each approach has its advantages and disadvantages, and in general the estimates vary considerably across methods. In this note the results are based on population surveys.

Data Description

In 1997 the Oesterreichische Nationalbank commissioned Gallup to conduct regular representative surveys in Croatia, Hungary, the Republic of Slovenia, the Czech Republic and the Slovak

Republic. For each survey and in each country about 1,000 persons above the age of 14 years are interviewed in April/May and in October/November. The main focus of the surveys is to establish estimates foreign currency cash holdings in the respective countries. In particular, the respondents are questioned about their holdings of Austrian schillings (ATS), Deutsche marks (DEM), US dollars (USD), Swiss francs (CHF) and "other" currencies. Additionally, the surveys cover respondents' plans for the future as well as their motives for holding foreign currencies. Furthermore, the surveys contain questions about travel habits, about where people tend to exchange foreign currency, where they plan to exchange their holdings into euros, etc.

It is well known, that survey results always need to be treated with caution. In particular this holds for those questions relating to individuals' wealth where it is likely that respondents will not always reveal the truth. Furthermore, the surveys do not include commercial cash holdings (e.g. tourism) and certainly cannot measure criminal money. Therefore, it is likely that the estimated figures understate the true amount of currency circulating abroad. Nevertheless, if conducted repeatedly, the surveys provide valuable information because they allow to assess changes in the behavior of agents over time.[3]

Results

The percentages of private persons that hold foreign currency are summarized in Figure 2. The graph shows both the percentage of respondents holding some kind of foreign currency (red line) and also a breakdown by currency (DEM, ATS, USD, CHF and "other" currencies). As can be seen, in May 2001 the share of respondents that held some kind of foreign cash was high (> 50 percent) in Slovenia and Slovakia, slightly lower (> 30 percent) in the Czech Republic, about 20 per-

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1 The decrease in the currency in circulation is not only restricted to Germany. For example, M0 has also decreased lately in the Netherlands. In contrast, the amount of lira and schilling in circulation has increased (for the schilling only slightly).

2 There has been much debate about the relevance of this argument and many observers doubt whether the demand for cash can exert significant influence on exchange rates, in particular in light of the huge daily turnover in the foreign exchange market. For example, see the statements made by Issing ("Germany: ECB's Issing Downplays Cash/Capital Flow Effects on Euro FX", Market News Service, 30.05.2001) or by Welteke (Germany: ECB's Welteke – ECB Has Gained Credibility by Keeping Inflation Low", Market News Service, 04.05.2001). For an alternative view, see Schaller (2001).
3 Under the assumption that the "method bias" is constant over time.

Figure 2

FOREIGN CURRENCY HOLDINGS IN PERCENT OF RESPONDENTS

Note: Values on vertical axis correspond to the percentage of respondents that hold foreign cash. Total corresponds to the percentage of respondents that hold any foreign cash.

Source: Own calculations.

cent in Croatia and less than 10 percent in Hungary. Over time, this share has strongly declined in Croatia, Hungary, and lately also in the Czech Republic. In contrast, the share in Slovakia and Slovenia has shown little variation.

Split up across currencies, in May 2001 the mark share was the highest in all countries except Slovakia. The Austrian schilling was the second most important currency in all countries except

Croatia. In general, the holdings of foreign currency tend to be relatively dispersed across two or more currencies in all countries but Croatia, where the DEM has a predominant role leaving only marginal importance for the other currencies. Nevertheless, the results also show that the share of respondents holding DEM is higher in the Czech Republic and Slovenia than in Croatia. This result clearly reflects the fact that Croatians tend to use the DEM as a medium of exchange only for high and not for low

value transactions.[4] Typically, the USD is the third most important foreign currency. With percentages ranging from zero to five percent (more often at the lower end of this range), the CHF is only of little importance. Only the results for the Czech Republic show a slightly higher share of CHF holders, varying between five and seven percent. Because the number of respondents that hold CHF is so low, the results in relation to the CHF amounts are likely to be quite imprecise. Therefore, the CHF will be omitted from further analysis. Interestingly, "other" currencies which are summarized and questioned in one category play a substantial role in Slovakia (> 20 percent), in Slovenia (about 20 percent) and to some extent in the Czech Republic (between 10 and 20 percent). In Slovakia, other currencies play a more important role than the DEM, the ATS and the USD.[5]

The development of the median holdings of ATS, DEM and USD is depicted in Figure 3.[6] It is quite likely that the survey answers – and in particular those in relation to the amounts of foreign currency – display seasonality as well as random fluctuations over time. In order to prevent that outliers dominate subsequent analyses, two measures were taken: First, all observations that are two standard deviations away from the sample mean are eliminated. And second, the figures are averaged over time. Since we are interested in a comparison of the currency holdings before and after the start of EMU, the averages are taken over the period from May 1997 to November 1998 (blue bars) and from May 1999 to May 2001 (red bars). This procedure aggregates the effects of seasonality and limits the influence of outliers and thus yields a more accurate picture than the one obtained from comparing single surveys.

Since the start of EMU (Figure 3), the average of the median amounts of schillings held abroad have been in the range from ATS 440 (Slovakia) to 910 (Croatia). Median mark holdings are found to have been in the range from DEM 460 to 520 for Croatia and Slovenia and around DEM 170 for the remaining countries. Median dollar holdings have been

between USD 200 and 340 for the Czech Republic and Croatia and between USD 120 and 140 for Hungary, Slovenia and Slovakia. Interestingly, the Croatians hold the highest median amounts of all currencies and have even increased their holdings in each category. For Hungary, by contrast, the median amounts of all foreign currencies have decreased. In the Czech Republic the median USD and ATS holdings have increased, while DEM amounts have declined. In Slovakia the ATS amounts have risen while the other currencies have remained constant. In Slovenia, all median amounts have remained roughly unchanged.

Figures 2 and 3 taken together show that both the share of respondents that hold foreign currencies as well as the respective median amounts have varied over time. For example, in comparison to the first four waves, fewer Croatians held more DEM after the start of EMU. To get a measure of the absolute (net) amount of foreign currency that is held abroad – the number that is relevant from a monetary policy perspective – the weighted mean amount of foreign currency is calculated. This is done by weighting the class means of the categorized amounts with the percentage share of respondents that answered that their amount of foreign currency lies in the respective range.[7] Then, multiplying the resulting per capita average holdings by total population (older than 14 years) yields an estimate of the absolute amount of foreign currency. Once again, it should be mentioned that the resulting numbers yield just a crude picture – nevertheless, we consider changes over time as useful for projecting changes in the overall demand for the currencies analyzed.

The results are summarized in Table 1. The calculations yield that, since May 1999, on average about ATS 7.9 billion, DEM 4.1 billion and USD 1.5 billion have been held in the respective countries. These figures correspond to a share of currency in circulation of about 5.3 percent for the ATS, 1.7 percent for the DEM and 0.3 percent for the USD.[8] Furthermore, the results show that the highest amounts of ATS, DEM and USD among those five countries are held

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4 According to Feige et al. (2000), in Croatia only large transactions are effected in DEM whereas common purchases are quoted and conducted in kuna. If small value transactions were also carried out in DEM, the share of persons holding DEM would have to be much higher.
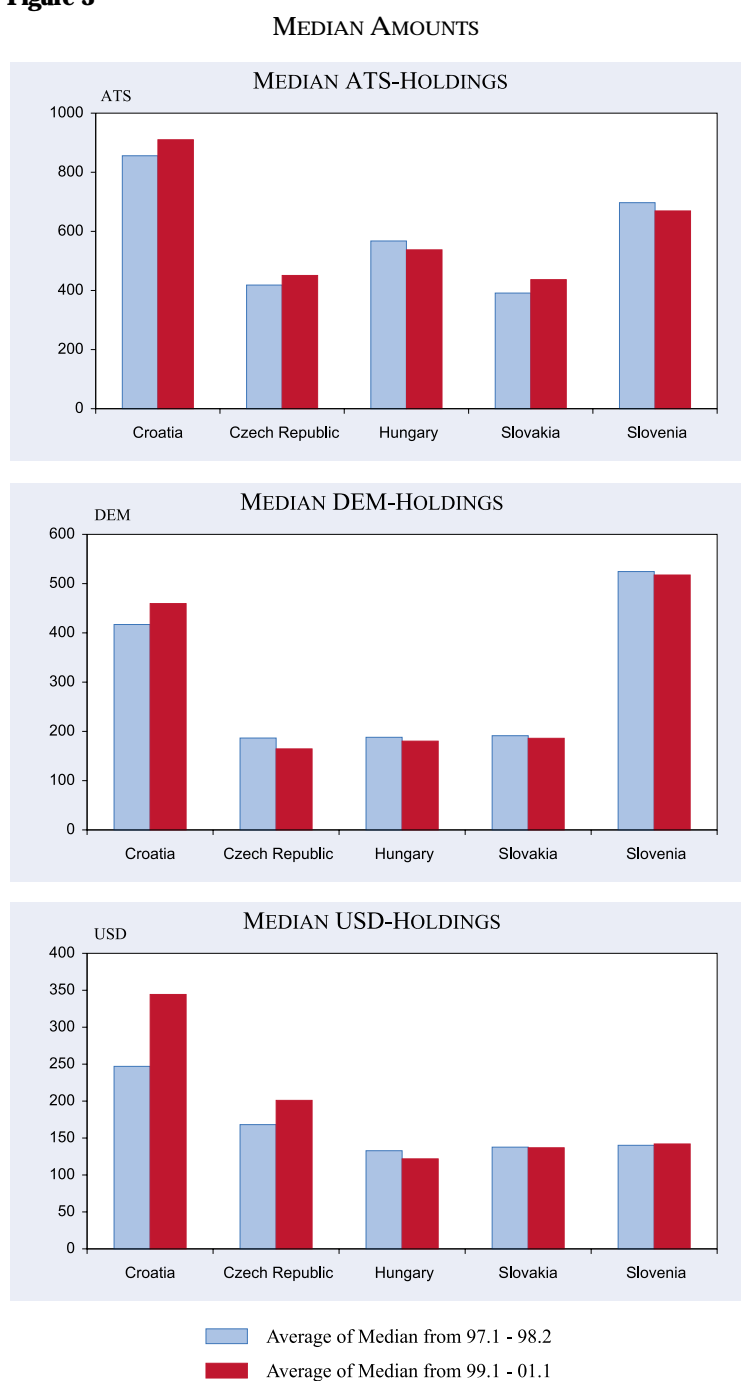5 Supposedly, this result is due to the holdings of Czech koruna and Hungarian forint.
6 Typically, the majority of respondents do not hold foreign currencies. Therefore, only respondents actually holding foreign currency are included in the calculation of the median.

7 The survey does not ask about the precise amount but rather about categorized amounts (< 100, < 500, etc.).
8 There are not many studies which provide comparable estimates. For Croatia, one such study has been conducted by Feige et al. (2000), who use an indirect method to project the extent of currency substitution in Croatia. Feige et al.'s estimates for the weighted per capita mean in Croatia are larger than ours by a factor of seven to eight. Admittedly, this difference is large. However, Feige et al. (2000) classify their estimates as »unusually high.« So, while the survey results might suffer from a downward bias, Feige et al.'s estimates might overstate the true figure.

Figure 3

MEDIAN AMOUNTS

MEDIAN ATS-HOLDINGS

ATS

MEDIAN DEM-HOLDINGS

DEM

MEDIAN USD-HOLDINGS

USD

■ Average of Median from 97.1 - 98.2
■ Average of Median from 99.1 - 01.1

Note: The graph shows the average of the median amounts. Only respondents actually holding foreign currency are included in the calculation of the median. The checkered bars show the average median for the four biannual surveys from 1997 (Nov.) to 1998 (Nov.); the solid bars the average median for the five biannual surveys from 1999 (May) to 2001 (May).

Source: OeNB.

in the Czech Republic, followed by Slovakia for the ATS and the USD and by Croatia for the DEM. As shown in Table 1, from Nov. 1997–Nov. 1998 to May 1999–May 2001 the average share of ATS has increased from 4.1 percent to 5.3 percent. This development can be largely traced to a substantial increase in the Czech Republic, whereas the average

ATS holdings in the other countries have declined slightly. The DEM holdings have decreased in each country, with the strongest decline in Croatia. Also, in the Czech Republic and in Hungary, the DEM holdings have declined quite substantially. Expressed as a share of total DEM in circulation, the holdings have declined from 2 to about 1.7 percent (a change of approximately minus 16 percent). In contrast, the size of the stock of USD has increased. This increase is driven more or less by the Czech Republic and, to a lesser extent, by Slovenia. In terms of currency in circulation, the share – which is very small anyway – decreased slightly to around 0.3 percent.

It might be argued that averaging over the last five waves masks and mitigates any recent downward trend for the DEM. In order to analyze the more recent development, the percentage change during the last year (from May 2000 until May 2001) in the absolute amounts of DEM and USD is summarized in Table 2. As shown, the sum of DEM in all five countries together has decreased by a remarkable 33 percent, in fact pointing to an accelerating downward trend in the foreign demand for DEM during the last year. However, decomposing this effect by country demonstrates that this result is largely driven by a substantial decline in the Czech Republic (minus 56 percent) and by Croatia (minus 25 percent).[9] Interestingly, the USD holdings have declined by about the same extent as the DEM holdings.

[9] The decline of minus 56 percent seems very large and may be caused by an outlier. However, the decline was also substantial from November 1999 to November 2000 (minus 17 percent). Anticipating the discussion below, it should be mentioned that the change for the USD during the same period also was substantial (minus 20 percent).

Table 1

Foreign Currency Holdings

		Croatia	Czech Rep.	Hungary	Slovakia	Slovenia	Sum	% of CiC
ATS	97.1–98.2	368	2,709	776	1,128	786	5,768	4.06
	99.1–01.1	317	5,058	744	1,104	647	7,807	5.25
DEM	97.1–98.2	1,325	2,027	374	453	700	4,901	2.01
	99.1–01.1	914	1,828	185	464	606	4,081	1.69
USD	97.1–98.2	143	737	87	287	31	1,467	0.35
	99.1–01.1	124	974	81	269	68	1,516	0.30

Note: Numbers represent the averages over the respective period and are in millions. % of CiC= percentage of currency in circulation.

Source: Own calculation.

Additionally, the change is also dominated by the Czech Republic with an individual decline of 56 percent. However, in contrast to the DEM holdings, the USD holdings increased by 16 percent in Croatia. Apart from Slovakia, the USD holdings also increased in the other countries.

Concerning the question about the existence of, and if so, about the extent of substitution between the DEM and the USD, the results do not allow to draw a clear conclusion. Overall, the comparison of the averages from 1997 until 1998 and from 1999 until 2001 unquestionably show that the demand for DEM has decreased both absolutely and expressed as a share of currency in circulation. In contrast, the absolute amounts of USD holdings have increased over the same period (but not to the same extent). This development points to the existence of some degree of substitution of DEM into USD. However, the development over a more recent period – from May 2000 until May 2001 – unveils that foreign demand has declined not only for the DEM but also for USD. In contrast to the longer-term perspective, this does not point to a

substitution. Bringing these two results together shows that there is evidence of the presence of substitution from 1999 to the beginning of 2000 but not thereafter.

The survey also looks into the motives of respondents for holding the respective foreign currencies.[10] Basically, the motive "shopping in my country" is of minor significance in all countries with one exception: in Croatia about 10 percent answer that the DEM and USD are held for domestic transactions. In turn, about 70 percent of the respondents answer that the DEM and USD holdings in Croatia have a store-of-value function.[11] For the remaining countries, the motives can be crudely summarized as follows: The ATS mainly serves as a medium of exchange for foreign transactions (holidays, shopping abroad). The USD is predominantly used as a store of value (except for Hungary where the motive "spending abroad" dominates). Finally, depending on the country, the DEM has an intermediary role as its holdings are motivated both by its store-of-value function and by its use as a transaction currency for spending abroad. For the countries in close proximity to Germany, like the Czech Republic, the transaction motive dominates. In contrast, in Slovenia and Croatia, the store-of-value function is more important.

As mentioned, the surveys also contain questions about future intentions. In particular, the answer to the question about planned conversions of schilling and mark should allow a rough assess-

Table 2

Recent Developments in DEM and USD holdings
(Percenrage Change from May 2000 to May 2001)

	DEM	USD
Croatia	– 25	16
Czech Republic	– 56	– 56
Hungary	– 8	135
Slovakia	– 7	– 5
Slovenia	3	61
Sum	– 33	– 32

Note: Numbers represent the percentage changes from May 2000 to May 2001 of foreign currency holdings in the respective country. Sum refers to the percentage change of overall DEM or USD holdings in all five countries together.

Source: Own calculations.

10 The exact question is: "For which reason do you keep this foreign cash mainly?" Three answers are possible: a) "shopping in my country", b) „spending abroad (holidays, shopping, etc.) and c) "a general reserve (emergency secure value of my savings, etc.)". See Stix (2001) for more detailed results.
11 Since large value transactions in DEM, for example the purchase of an appartement, take place only infrequently, it was expected that respondents in Croatia motivate their DEM holdings with the store of value function.

Table 3

Plans for conversion of ATS and DEM holdings into Euro

		Euro	Other (USD, CHF, etc.)
General	May 2000	58	42
	May 2001	58	42
USD-holders	May 2000	47	53
	May 2001	44	56
DEM-holders	May 2000	55	45
	May 2001	59	41

Note: Numbers in percent of the respondents who know in which currency they will exchange their foreign currency holdings. USD- and DEM-holders refers to those respondents that currently posses USD and DEM, respectively. E.g.: Among those who held DEM in May 2001 and knew already about their conversion plans, 59% answered that they will convert their ATS and DEM holdings into Euro.

Source: Own calculation.

suggests that the decline in the average stock of DEM is about 15 percent. Furthermore, recent data show that this trend has been accelerating over the last year.[15] If the results obtained for these particular five countries were representative for overall DEM demand in Central and Eastern Europe, then this finding would imply that the decline in overall DEM in circulation as discussed in the introduction could largely be explained by a decrease in the foreign demand component and not by a decrease in domestic demand, as the following crude calculation shows: If the estimates that about one third of DEM is located abroad are correct (Seitz, 1995), then a decline of 15 percent in the foreign demand for DEM translates into a decrease in overall German M0 of about 5 percent. In fact, this figure is close to the actual decline in German M0 from the second half of 1998 until the first six months in 2001 (about minus 3 to 5 percent).[16]

Second, while there was some evidence of a substitution of USD for DEM until the end of the year 2000, it is remarkable that recently the demand for both DEM and the USD has declined, leaving room for the interpretation that, from the end of last year, the relevant substitution did not occur between DEM and USD but between domestic and foreign currency (or foreign currency bank accounts). Indeed, there are many arguments in favor of this interpretation: The normalization after the war years in Croatia, increased political and financial stability, more confidence in the banking system, lower inflation rates in many Central and Eastern European countries would all explain such a development. For example, in Hungary, where the stock of all foreign currencies

ment of the confidence in the euro.[12] In general, it turns out that in May 2001 the majority still did not know (about 58 percent). The answers of those that knew already are summarized in Table 3: about 58 percent planned to exchange their ATS and DEM holdings into euros, whereas 42 percent planned to convert them into "other currencies", including USD and CHF. These figures have not changed from May 2000 to May 2001. Among current holders of USD, the majority planned to convert their ATS and DEM holdings into "other" (56 percent) and this number (insignificantly) increased during the last year. In contrast, among the DEM owners 59 percent opted to exchange their ATS and DEM stocks into euros – a significant increase from 55 percent in May 2000.[13] Even then, however, 41 percent of the DEM holders still did not plan to accept the conversion of Deutsche marks and schilling into euros, but rather planned to go into other currencies.

Implications and Conclusion

Despite the care one needs to apply when working with survey data, we think that the results allow several conclusions:

First, the results about the total sum of foreign currency that is circulating in the countries included in the surveys undoubtedly show that the *foreign demand for DEM has declined.*[14] In contrast, the demand for ATS and USD has increased. Comparing the pre- with the post-EMU results

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12 The exact question is: "In which currency do you plan to exchange your amounts of Austrian schilling and Deutsche mark?"
13 Those that hold DEM are much more relevant, in a quantitative sense, than those that hold USD (compare with Figure 1).

14 This also corresponds to the view expressed by Bundesbank President Welteke who noted that the recent decline of German cash in circulation could be related to the repatriation of the large foreign cash holdings of deutschemarks ("Germany: ECB's Welteke – ECB Has Gained Credibility by Keeping Inflation Low", Market News Service, 04.05.2001). At the same time, President Welteke also noted that this return has been too small to have any significant impact on the euro exchange rate.
15 Interestingly, the surveys capture the recent acceleration in the decline in German M0 as shown in Figure 1.
16 Of course, this is only a very rough calculation which neglects any trends in within-EMU demand for DEM.
For example, it could be the case that the recent growth in Lire-in-circulation is caused by Italians who now exchange their holdings of DEM into Lire.

has declined, the banking system is to a large extent controlled by foreign banks, signaling financial stability and giving Hungarians the possibility to open foreign currency accounts. As foreign currency accounts earn interest, it is difficult to see why someone should hold substantial amounts of foreign cash – apart from criminal reasons. In our view, the decreasing shares of those that hold foreign currencies (Figure 1) in Croatia, the Czech Republic and Hungary provide support for this argument.

And third, the results about the planned conversion of foreign currency holdings show that in May 2001 a substantial proportion of people that held DEM (41%) did not plan to convert their DEM and ATS holdings into euros (Table 3). Even though this percentage has decreased from May 2000 to May 2001, this finding could be caused by some lack of information and uncertainties in relation to the euro changeover, as claimed by Sinn and Westermann (2001). However, as the information campaigns in relation to the introduction of the euro as a physical currency intensify, we expect that common consent on the euro will rapidly increase.

What are the monetary policy implications of these results? For the European System of Central Banks, in general, the implications are only marginal in the sense that changes in the demand for DEM have limited consequences for the amount of euros in circulation. If one third of all DEM circulates abroad then this would correspond to about 12 percent of euros in circulation (May 2001). Therefore, a 15 or even 20 percent decrease in the overall share of DEM in circulation abroad – from about 2 to less than 1.7 percent (see Table 1) – translates into a decrease of only about 2.4 percent in the overall eurozone cash-in-circulation. For wider monetary aggregates (like M3), which are important from a monetary policy perspective, the implications are even smaller. Another potential consequence is a reduction of seignorage revenues due to a reduced demand for cash. However, a priori it is not clear that the seignorage revenues are lost to the United States. In case domestic currencies are getting more important, the development could also imply a process of normalization in which Central and Eastern European central banks are gaining back the seignorage they lost during the years of fading confidence in their currencies after the breakdown of the Iron Curtain.

Overall, one can argue that the level of, or changes in, the foreign demand for euro or DEM or ATS poses some challenges for the euro changeover from a logistical point of view. Furthermore, as the analysis of the answers concerning planned conversions into euro show, a majority of respondents have not yet made up their minds into which currency to exchange their current holdings, suggesting that the majority of DEM holders are in a wait-and-see position. Here, the ECB and the other national central banks are challenged to make sure that the information campaigns that are currently under way provide comprehensive and transparent information about the details of the euro changeover.

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THE IMPACT OF EURO NOTES AND COINS

FRANCIS BREEDON AND

FRANCESCA FORNASARI*

At the beginning of next year, euro notes and coins will be finally introduced into the euro area. Although this is likely to be a major upheaval for the euro-area economy, it does not have any obvious implications for the exchange rate. However, new research on exchange rate determination suggests an unexpected and powerful exchange rate impact of changes in currency demand. This implies that changeover could be strongly euro positive.

- The model explains much of the decline in the euro in terms of change in demand for Deutschmarks.
- It also explains some other puzzling currency moves such as the strength of sterling.

All in all, although the model should be used predominantly to gauge longer term movements in exchange rates, it does suggest the euro is currently undervalued. Indeed, it estimates that a more appropiate value for the single currency given the current monetary conditions is 0.99 cents. Furthermore, it predicts that, as a result of the introduction of euro notes and coins, the euro could rally by as much as 20 cents.

The augmented portfolio balance model

The portfolio balance model of the exchange rate, which attempts to explain the exchange rate in terms of asset demands, has, like most elegant theories of the exchange rate, an appalling track record in actually explaining currency moves. However, a recent extension of that model looks to have a far more impressive track record.[1] The extension is a simple one and is based on the idea

that currency demand has a significantly greater currency impact on the exchange rate than any other type of asset demand. The intuition behind the model is simple: Currency is the only asset whose price cannot change in local currency terms and so is much more important to the exchange rate.

Take the example of the U.S. and German equity markets. If investors in the U.S. start demanding more German equity but no more supply is forthcoming, there are three possible price adjustments that can bring back the balance between demand and supply:

- U.S. share prices can go down (making them cheaper and thus more attractive);
- German share prices can go up (making them more expensive and thus less attractive); or
- the DEM can rise against the dollar, making German shares more expensive to international investors relative to U.S. ones.

The same mechanisms are available to equilibrate the demand for bonds. Now look at an increase in demand for German notes and coins. The only direct price channel that can stifle that demand is a change in the exchange rate, as their price in DEM terms is necessarily fixed. As a result changes in the demand for notes and coins have a significantly greater impact on the exchange rate than any other asset demand since the exchange rate is the only equilibrating mechanism for changes in demand. Therefore, although the stock of notes and coins is tiny in comparison[2] with the stock of other financial assets, their exchange rate impact is significant.

Explaining exchange rate movements

While the dominant role of currency demand is an intriguing idea, in order to be taken seriously it needs to be able to explain actual exchange rate movements. Here the model does surprisingly well. Its first success is in explaining the fall in the euro. This it can explain easily as the prospective intro-

[1] Sinn and Westermann (2001). "Why has the euro been falling? An investigation into the determinants of the exchange rate" *NBER WP* 8352.

[2] For example in the U.S., there are about $ 600 bn notes and coins in circulation, while the size of the bond market in the U.S. is $ 8.5 tr and the size of the equity market in the U.S. is about $ 12 tr.
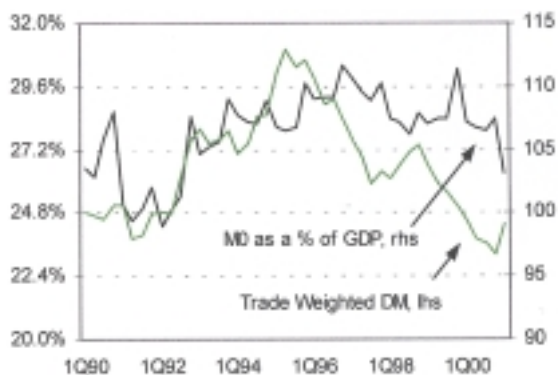
duction of Euro notes and coins has significantly reduced the demand for DEM in recent years – this change has been attributed to a reduced demand for currency, particularly in Eastern Europe.[3]

As the chart shows, this reduction in demand for DEM notes and coins has a remarkable correlation with the fall in the euro.

Unfortunately, this is not a very strong test since the theory was actually inspired in the first place as an attempt to explain the decline in the euro. As a stronger test of the theory, we have looked at a range of other countries which have not been analyzed in this framework before. The table below shows the estimated relationship between currency demand (Ms) and the exchange rate for a range of DEM cross rates and USD cross rates. The results are quite encouraging.

We proxy currency demand by the supply of notes and coins since almost all the countries we look at practice interest rate targeting which leaves the money supply demand determined (Japan currently and Switzerland historically are the only exceptions as they have practiced some form of money base growth rules).

We also control for other portfolio balance effects including relative share prices (SP), relative bond yields (YD) and relative price levels (P). Generally speaking, money demand has a significant impact on the exchange rate, with higher demand raising the exchange rate – just as the theory predicts. The two notable exceptions are Japan and Switzerland, which, as previously noted, have experienced periods when the supply of currency was not demand determined and so cannot be easily analysed in this framework.

As far as the euro is concerned, two main conclusions stand out, First, the model currently estimates the value of the euro should be $ 0.99, i.e., approximately 13% above its current value. Second, we estimate that, if the introduction of euro notes and coins return currency demand to pre-EMU levels, then the euro could see up to a 20 cent boost in its value.

Some caveats

The chart overleaf shows one specific example, the relationship between the demand for UK notes and coins and the rise and fall in sterling. The chart captures two of the key elements of this relationship:

- The relationship is long term not short term; deviations between cash demand and currency moves can last for years.
- The predictive power of cash demand is not totally reliable. In the late 1990's sterling started to move well before currency demand.

This means that the above mentioned model can be used as a long-term guide, and not to predict short-term currency movements.

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[3] For more details on the developments in the demand for DEM, see Sinn and Westermann (2001) as well as Eichengreen and Wyploz (1993) "The Unstable EMS" *Brookings Papers On Economic Activity* 51–143.

Portfolio Balance Regressions

	Coefficients					
	USD/ DEM	JPY/ USD	JPY/ DEM	GBP/ DEM	GBP/ USD	CHF/ DEM
Ms – Ms[f]	– 1,03**	1,48**	– 0,33*	– 1,12**	– 0,50**	0,01
SP – SP[f]	0,05	– 0,33**	– 0,13**	0,16**	– 0,05	0,01
YD – YD[f]	– 0,07**	– 0,04**	– 0,01	0,08**	– 0,01	0,02*
P – P[f)]	1,35**	3,39**	3,12**	0,37**	– 2,14**	1,49**
R^2	0,77	0,89	0,64	0,82	0,36	0,65

Regressions include a constant.
** indicates a 99% level of significance, * 95% level of significance.
The analysis uses monthly data between February 1983 and April 2001.
Furthermore, both the dependent and explanatory variables are in logs.
f superscript indicates foreign variable (i.e. DEM for columns 1, 3, 4 and 6 or USD for columns 2, 5 and 7.

CHART 2

UK CURRENCY DEMAND & STERLING EFFECTIVE
EXCHANGE RATE

The introduction of euro notes and coins

Although the evidence is not overwhelming, the support for this model is sufficient to make it worth watching. One prediction it makes is certainly intriguing. If the introduction of euro notes and coins sends total euro-area cash demand back up to pre-EMU levels – which it should if the fall in demand from East Europe was caused by a fear of currency changeover – then the euro itself could appreciate by up to 20 cents.

NEW EU ECONOMIC SENTIMENT INDICATOR AND IFO BUSINESS CLIMATE WEST GERMANY

In October the EU Commission published a new version of the Economic Sentiment Indicator (ESIN) which reflects, to a large degree, proposals made by the ifo Institute.[1] The most important features of the new EU Economic Sentiment Indicator are the following:

1. The share price index is no longer a component of ESIN. The volatility of share prices is only partly related to developments in the real economy. Apart from that, the construction of ESIN is based on trendless series. Thus, the share price index always had to be transformed into deviations from trend. This transformation causes ex-post revisions of ESIN which reduce the value of an overall leading indicator.

2. The retail trade confidence indicator is now used in the calculation of ESIN.

3. The consumer confidence indicator was modified. It now focuses exclusively on consumers' expectations and no longer includes assessments of developments in the past 12 months.

4. The weight of the components was changed. New ESIN: Industrial confidence (40%), consumer confidence (20%), construction confidence (20%) and retail trade confidence (20%).

As a result, the new ESIN is entirely based on business and consumer survey results, the main advantage being that the ESIN will no longer be subject to back revisions.

As Figure 1 shows, the new ESIN tracks the development of GDP growth in the Euro area relatively well though it is more coincident than leading. To be sure, even a coincident nature of this indicator is not a negligible advantage as the quantitative data (e.g. GDP or industrial production) are published with a significant lag and sometimes are subject to marked ex-post revisions. Thus, a good coincident indicator has an important lead at the very end of the time series.[2]

2 Moreover, it has to be taken into account that a series transformed into annual growth rates (like the GDP series in Graph. 1) will always show turning points earlier than the corresponding series of level data (e.g. GDP in form of an index). Thus, a transformation of the ESIN indicators into rates of annual changes will clearly improve the lead. However, due to this transformation the volatility of the indicator will increase, which suggests the use of some type of smoothing.
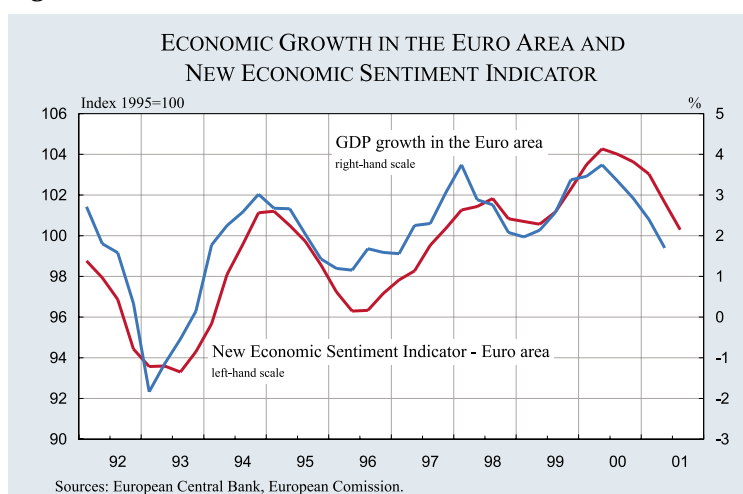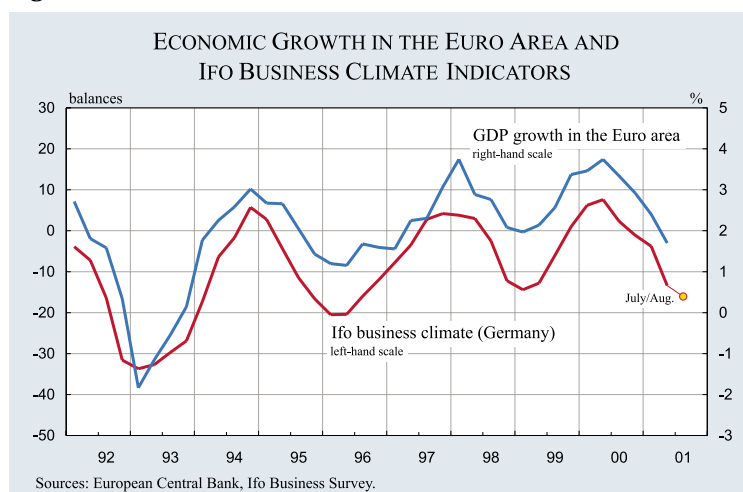
Figure 1

ECONOMIC GROWTH IN THE EURO AREA AND NEW ECONOMIC SENTIMENT INDICATOR

Sources: European Central Bank, European Comission.

Figure 2

ECONOMIC GROWTH IN THE EURO AREA AND IFO BUSINESS CLIMATE INDICATORS

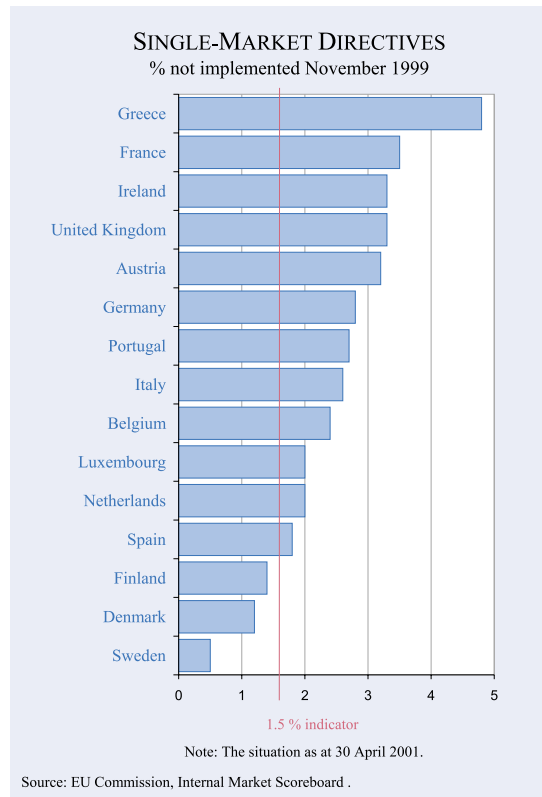Sources: European Central Bank, Ifo Business Survey.

However, even better than an information lead would be a factual one. Here, the Ifo Business Climate Indicator appears to have some advantage (see Fig. 2). This might be because the Ifo Climate Indicator focuses more on profit assessments and expectations which appear to contain more forward looking information than e.g. production plans. It is somewhat surprising that the German Business Climate Indicator is not only a good predictor of the economic trend in Germany but also of that in the Euro area, although Germany accounts for only about one third of the Euro area gross domestic product (GDP).

Both composite indicators, the new ESIN as well as the Ifo Business Climate, signal a continuation of the economic downward trend in coming months, although the Ifo indicator points to a softening of the decline. It will be interesting to see if this message will also be given by Ifo's September indicator which will be collected in the first half of October and thus will better reflect any impact of the tragic events in New York and Washington; Ifo's August survey only reflected these events in part as only about one quarter of the companies polled returned the completed questionnaires after September 11.   G.N.

# Implementing EU Legislation: Greece and France Remain at the Bottom of the League

"The Internal Market plays a key role in achieving the EU's objective of becoming the most dynamic economy in the world by 2010. It gives EU citizens a wider choice of goods and services, greater freedom to travel, work, study and live in other EU countries. It offers greater trading opportunities to our companies. But the Internal Market can only achieve its full potential if agreed Directives are effectively implemented by Member States," so European Commissioner Frits Bolkestein in his introduction to the 2001 *Internal Market Scoreboard.*

The *Internal Market Scoreboard* reveals that the EU's average implementation deficit for Internal Market Directives has shrunk to 2.5% in 2001 – down from 6.3% in 1997. However, only three Member States (Sweden, Denmark and Finland) meet the European Council's 98.5% implementation target set at Stockholm. Sweden ranks first and has been able to cut its already low deficit in half, to 0.5%. Credit also goes to Portugal and Luxembourg for having made great strides, both moving up four places in the overall rankings since November 2000. The Netherlands, Italy and Belgium have also made good progress. The worrying news is that Austria and the UK, whose deficits were already among the highest, are backsliding. Furthermore, Ireland, and Germany managed to improve their deficits only slightly. Greece and France remain firmly at the bottom of the overall

SINGLE-MARKET DIRECTIVES
% not implemented November 1999

1.5 % indicator

Note: The situation as at 30 April 2001.

Source: EU Commission, Internal Market Scoreboard .

ranking, although they have been able to reduce their deficits by about a quarter. Unless these countries make significant additional efforts, they risk missing the implementation target for the Barcelona European Council in March 2002.

Catching up requires Member States not only to tackle the current backlog, but also to deal with the directives whose implementation date is imminent. Greece, which is already faced with the task of reducing its backlog of 71 directives, will be required to implement an additional 43 directives, for a total of 114, in order to achieve full conformity (zero deficit). The comparable figure for France is 92, whereas for Sweden it is only 39.
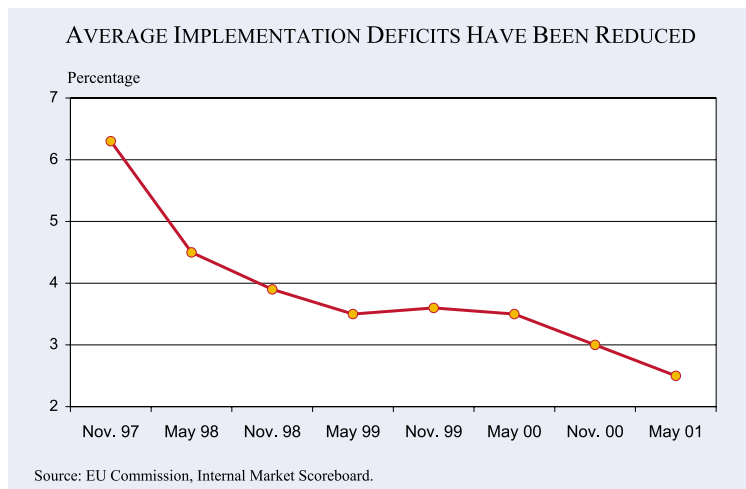
The Internal Market's legal framework remains seriously fragmented in the sense that more than 11% of legislation has not yet been implemented in all of the Member States. This seriously undermines the Internal Market's potential to create growth and jobs. In addition, after a significant initial improvement, this percentage has barely moved in

AVERAGE IMPLEMENTATION DEFICITS HAVE BEEN REDUCED

Percentage

Source: EU Commission, Internal Market Scoreboard.

the last two years. Of course, the picture differs considerably by sector. The most serious fragmentation occurs in the fields of transport and public procurement, where more than one third of directives have yet to be implemented in all Member States. As more than 10% of the European Union's GDP is spent on public procurement, the economic losses from fragmentation in this field are likely to be huge.

Because of the close correlation between the implementation deficit and the fragmentation factor, it should come as no surprise that Greece is responsible for a large part of the fragmentation. The fragmentation factor would also go down significantly, however, if France as well as Ireland and Germany were to improve their implementation deficits.   H.C.S.

DICE Reports*

The German Health Care System in an International Comparison: Assessment and Reform Options

Spending on health services in Germany is extremely high. Has this led to a correspondingly high level of health of the population or is the system basically inefficient? What reform measures have been introduced and what measures might be useful?[1]

Spending on health services as a percentage of GDP varies substantially among the fifteen European and several additional countries compared (Table 1). The percentages range from below 6% (U.K.) to nearly 14% (U.S.). Germany ranks second behind the U.S. at 10.5%, thus topping the list of European countries and clearly lying above the 8.4% average of the countries examined here. Is this high level of spending reflected in a corresponding good state of health of the German populace?

Health is a complex phenomenon and difficult to measure. That is why international comparisons often employ the category of "life expectancy at full health" measured in years.[2] To justify expenses on health services it is only natural that people expect longer life spans than would otherwise be the case.

Table 1

Health Spending and Years of Full Health

	Total health spending as % of GDP	Life expectancy at birth, in full health, in years
Belgium	8.0	71.6
Danmark	8.0	69.4
Germany	**10.5**	**70.4**
Finland	7.6	70.5
France	9.8	73.1
Greece	8.0	72.5
United Kingdom	5.8	71.7
Ireland	6.2	69.6
Italy	9.3	72.7
Luxembourg	6.6	71.1
Netherlands	8.8	72.0
Austria	9.0	71.6
Portugal	8.2	69.3
Sweden	9.2	73.0
Spain	8.0	72.8
Norway	6.5	71.7
Switzerland	10.1	72.5
Australia	7.8	73.2
Canada	8.6	72.0
New Zealand	8.2	69.2
Japan	7.1	74.5
United States	13.7	70.0
Average	8.4	71.6

Source: WHO, Health for all, Database 2000, Copenhagen 2000.

Life expectancy measured in this way shows a much smaller variation than expenses for the health care system. The lowest expectancy of the countries compared is registered by New Zealand, at 69.2 years, whereas Japan has the highest expectancy at full health, at 74.5 years. The difference is 8%, which in absolute terms is more than five years of full health. Is there a relationship between spending on health care and years of full health?

Such a relationship is not immediately apparent in Figure 1, whereas in Figure 2 the relationship becomes clear if the outliers on the lower right and upper left are ignored. The correlation is quite strong as depicted by the trend line.[3] This means that the higher the expenses on health care, the longer will be life at full health.[4]

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[3] The correlation coefficient without the outliers: 0.62.
[4] The correlation illustrated in the figure does not say anything about causality or the causes.
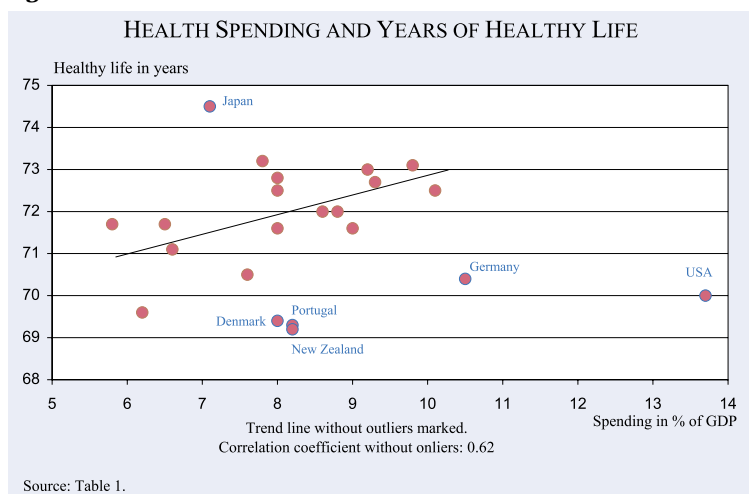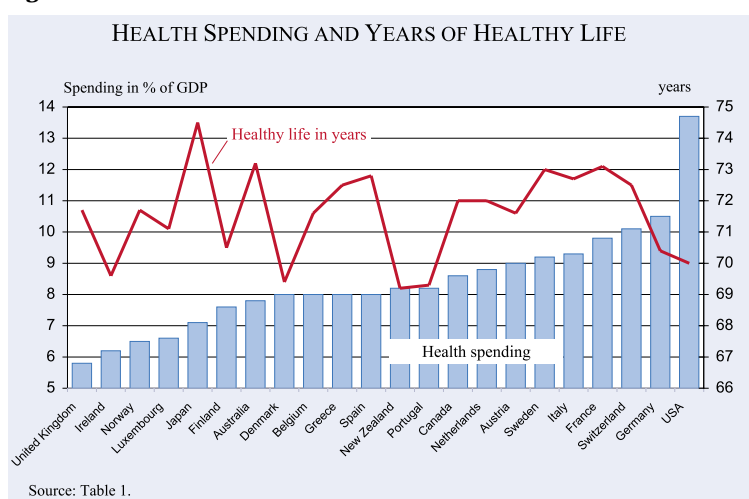
Figure 1

HEALTH SPENDING AND YEARS OF HEALTHY LIFE

Healthy life in years

Trend line without outliers marked.
Correlation coefficient without onliers: 0.62

Spending in % of GDP

Source: Table 1.

Figure 2

HEALTH SPENDING AND YEARS OF HEALTHY LIFE

Spending in % of GDP

years

Healthy life in years

Health spending

Source: Table 1.

The German health care system

Among the outliers, our interest focuses on Germany. With relatively high expenditures for the health care system the population reaches only a moderate life expectancy at full health. This can only have two causes: either the Germans have a particularly unhealthy lifestyle and thus need to spend more on health care or the health system is inefficient.[5]

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[5] Other factors are also conceivable such as the impact of the environment or workplace on health, the age structure of the population, or a tendency towards hypochondria. These are not taken into account here.

With regard to the aspects of lifestyle that are relevant to health, we can only look at the most common indicators. Table 2 shows that cigarette and alcohol consumption in Germany is significantly higher than the European average, whereas the consumption of fruit is below average. Only for the daily caloric intake, which above a certain level can also be harmful to health, are the values for Germany (slightly) above the average. To this extent, a portion of the high expenses for health care can indeed be attributable to the specific German lifestyle. Nevertheless, the differences in lifestyle to the other countries are not so great as to offer a satisfactory explanation for the high health care expenses. For this reason, a major cause for the high costs of the health care system must be sought in the inefficiency of the system.

Low level of cost-efficiency

This conclusion is also supported by a WHO analysis which

Table 2

Selected Lifestyle Indicators

	Cigarettes per person per year	Alcohol in litres per person per year	Calories per person per day	Fruit in kg per person per year
Belgium	1,212	8.9	3 606.0	258.0
Danmark	1,636	9.5	3 433.0	181.0
Germany	**1,907**	**10.6**	**3,402.0**	**195.0**
Finland	931	7.0	3 180.0	137.0
France	1,388	10.8	3,541.0	209.0
Greece	2,837	9.1	3,630.0	397.0
United Kingdom	1,353	7.5	3,257.0	176.0
Ireland	1,834	10.8	3,622.0	147.0
Italy	1,613	7.7	3,608.0	303.0
Luxembourg	2,140	13.3	3,606.0	258.0
Netherlands	1,058	8.1	3,282.0	231.0
Austria	1,928	9.2	3,531.0	195.0
Portugal	1,669	11.2	3,691.0	301.0
Sweden	711	4.9	3,114.0	174.0
Spain	2,271	10.1	3,348.0	256.0
Average	**1,632.5**	**9.2**	**3,456.7**	**227.9**

Source: WHO, Health for all, Database 2000, Copenhagen 2000.

measures the economic efficiency of the health care system in 191 countries by comparing the amount of health care spending with the years of life expectancy at full health. In the resulting country ranking Germany landed in 41st place.[6] Disregarding the costs and considering the standard of medical performance, again measured in terms of years of life expectancy at full health, Germany ranks better in an international comparison, but still takes only 22nd place.

Germany's WHO ranking is considerably better in terms of the quality of medical technology used, the accessibility of services, and the fairness of the financial burden of the actual or potential users of the health care system. Based on these indicators, Germany ranks among the top five or ten countries including the U.S., Switzerland, Belgium, Denmark, Ireland and Japan.

What are the causes of the low cost-efficiency of the Germany health care system? This question cannot be answered here systematically or in sufficient depth.[7] Considering at least several rough figures in an international comparison is revealing, however. In Table 3 these indicators are compiled, which – alongside others – are important for the costs of a health care system.

The average hospital stay for acute illness (Column 1) in Germany, at 11 days, is the longest of all observed countries and is more than four days above the average. Even taking into consideration that the definition of "acute" can vary from country to country and may be subject to further country-specific factors[8], the length of treatment for acute illnesses appears to be quite long in Germany.

Correspondingly, the number of hospital beds in Germany per 100,000 inhabitants (Column 2) is quite high. Although ranked third behind Luxembourg and France, Germany's 930 beds are far above the average (666) of the countries under comparison.

The average annual number of patients' visits to doctors (Column 3) is also important for the costs of a health care system. With twelve visits a year Germany is still far behind Japan (16) but still significantly ahead of the observed countries (7.3).

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[6] World Health Report 2000, Table 10. In this analysis the lifestyle and the age structure of the population are not taken into consideration as important co-determinants of health care costs. The modest ranking is attributable to the fact that in the treatment of particular diseases in Germany – e.g. heart attacks, breast cancer, diabetes and chronic pain – Germany does not have a leading international position.

[7] The methodological difficulties of comparing health systems in terms of their performance are presented in detail by Schumacher (1996).

[8] Such as the age structure of the population, the availability of out-patient treatment, and perhaps also here, the hypochondria of the population.

Table 3

Selected Health Cost Factors

	Average hospital stay for acute illness in days (1)	Number of hospital beds per 100,000 inhabitants (2)	Number of doctor-patient contacts per person and year (3)	Spending on dental care as % of total health spending (4)	Patient contribution for treatment of acute cases as % of total health spending (5)
Belgium	8.8	728	8	7.7	14.7
Denmark	5.7	449	5	5.0	15.7
Germany	**11.0**	**930**	**12**	**10.4**	**11.3**
Finland	4.5	756	k.A.	k.A.	19.3
France	5.6	1 050	8	6.0	20.4
Greece	k.A.	554	k.A.	6.2	31.7
United Kingdom	5.0	417	6	4.0	3.1
Ireland	6.8	363	k.A.	5.0	k.A.
Italy	7.1	501	k.A.	4.8	41.8
Luxembourg	9.8	1 100	k.A.	7.9	7.2
Netherlands	8.3	511	6	4.6	16.8
Austria	6.8	892	k.A.	8.4	23.6
Portugal	7.3	401	3	6.2	40.9
Sweden	5.1	522	3	9.0	22.0
Spain	8.0	413	k.A.	8.0	20.4
Japan	k.A.	1 320	16	7.6	19.0
United States	6.8	410	6	5.6	16.6
Average	**7.1**	**665.7**	**7.3**	**6.7**	**20.3**

Source: Column (3): Basys, 1998; all other columns: WHO, Health for all, Database 2000, Copenhagen 2000.

This is most likely attributable to the unlimited choice of specialists which is virtually unparalleled in industrial countries. In the German system – unlike most European countries – general practitioners no longer provide the function of referring patients to specialists as gate-keepers for the health care services.

A cost factor for the health care system on the whole is also the intensity with which dental care is provided (Column 4). Germany has the highest spending on dental care as a percentage of total health care spending. This high level – possibly in distinction to the indicators for hospital costs – is less indicative of the lack of efficiency of the system than the specific preferences of the patients, since dental treatment in many cases is more for aesthetic reasons than medical necessity.

The fifth indicator, the patients' contribution (out-of-pocket expenditures) for treatment of acute cases as a percentage of total health spending, is different. In Germany, patients have the third lowest out-of-pocket expenditures after the United Kingdom (which has a low value because of its primarily tax-financed state health care system) and Luxembourg. Out-of-pocket expenditures are particularly important for system costs since they make patients aware of the costs of their treatment.

Reform measures

The low cost-efficiency of the German health care system, which is also reflected in the high and rising contribution rates to the statutory health care system, is long-standing and well-known. Several reforms have been introduced in recent years (see Box). In 1993, cost reimbursement in (virtually) fixed DM amounts per out-patient treatment (point values) was replaced by a fixed budget for out-patient care. By expanding the number of treatments, the point value fell considerably – by 25% – between 1993 and 1997, whereas the income of doctors fell by 8% in nominal and by 16% in real terms (see Benstetter and Wambach, 2001).

Box

Selected Reforms in the German Health Care System since 1993

1993	Transition from cost reimbursement for individual, out-patient treatment measures to a fixing of a total sectoral budget for out-patient care
1994	Introduction of a risk-sharing system among statutory health insurance schemes
1996	Introduction of free choice of health insurance schemes with contract obligations for the health insurers
1997	Introduction of a limited budget for individual practices (practice budget) instead of a total sectoral budget; special budgets for medical prescriptions
1998	Begin of reform of hospital finance; goal is the introduction of case-based instead of daily based lump-sum payments
2000	Reform of the Social Security Code; health insurance schemes are given the option of building integrated supply networks with service providers; discussion on the abandonment of practice budgets and a return to one (or several) global budgets
2001	Restriction of the free choice of health insurance schemes; lifting of the threat of financial consequences for exceeding the budget for prescription medicine
since 1980:	More than 200 individual laws with the goal of reducing costs

Complied by the Ifo Institute from various sources.

On the whole, however, cost reduction was less than hoped for, so that additional reforms were necessary in 1997. Instead of the fixed budget for out-patient treatment as a whole, budget limits for each individual practice were set (practice budgets) by prescribing the maximum number of visits, which in turn made it possible to assign fixed point values. Among the widespread criticism of this reform was the reluctance of doctors to provide treatment, especially at the end of a quarter.

At the same time, doctors had to observe cost limits for prescription medicine under the threat of non-reimbursement if these limits were exceeded. This threat was never implemented; instead it has recently been publicly rescinded.

Since 1998, hospital financing reforms have been introduced. The goal is to lower costs by reducing the average length of hospital stays. The previous practice of paying a lump-sum per day of treatment is being gradually replaced by a case lump-sum payment, i.e. by paying a lump-sum for each illness treated independent of the length of stay in the hospital, similar to the practice in the U.S. and Australia.

Another new reform measure in Germany concerned opening the market for statutory insurance schemes, thus introducing more competition in this area. As a result, the contribution rates quickly drifted apart. This touched off a movement of the insured among the various insurance schemes, away from the regional health insurance funds (AOK) and towards company (or sector) health

insurance schemes, some of which were newly created. More competition was desirable but not competition for the "good risks"; recently, a lower limit for contribution rates was set and the options for changing schemes were restricted.

As a result of the undesired developments in the out-patient area after the reform of 1997, discussion is now focusing on a modified return to the system that prevailed before 1997. Plans are calling for a fixed budget that no longer applies to the individual practice (as now) or to each individual sector (as previously) but for all service providers (doctors, dentists, hospitals, laboratories) together (global budget). Hopes are that this will lead to a more rational and cost effective collaboration between out-patient doctors and hospitals.

Reform proposals

The difficulties that stand in the way of thorough, efficiency-oriented reforms are not only the result of pressure from influential organisations (doctors, hospitals, pharmaceutical companies) but also of the objective problems of the health care market. These result

- from the fact that the extent of market transactions in health-care services is largely determined – unlike the normal case in other markets – by the suppliers, the doctors (and hospitals); patients, on the demand side, have only a limited influence, and
- from the fact that the market is extremely complex, since, in addition to doctors and patients, the hospitals, the federation of health-service doctors, and the (statutory and private) health insurance schemes are all market agents.

For a system that sensibly regulates such a complex market like that of health-care, it is necessary in practice to make more-or-less acceptable compromises. Thus, it is all the more important to determine the basic principles for the regulation of such a market which are effective and can be implemented in the context of a reform of the German health care system.[9]

Since it is not realistic to let individuals decide on how they should cover their own health risks and

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[9] The following considerations are based on the analysis provided by the German Council of Economic experts in their annual expertise of 2000/2001.

pay for the health services they use and to let the market forces regulate the supply of such services, two reform strategies are conceivable:

- conversion of the present system to incorporate as many market solutions as possible with obligatory insurance for all, or
- the further development of the present system with the goal of enhancing efficiency by strengthened competition and improved regulation.

Both strategic orientations would have a favourable effect on the much-discussed contribution rates for health insurance. The long-term stability of these rates should not, however, under economic considerations, be a prime goal of the reform, since the total cost of the system and thus the contribution rate also depend on the age structure of the population as well as their health-care preferences. Instead, the goal of reforms must primarily be enhancing the efficiency of the system.

Market-based model with obligatory insurance for all

The system of obligatory insurance would primarily consist of the following elements:

- An insurance obligation that only includes basic coverage. Individuals would be free to take on additional insurance.
- The entire population must be included in the insurance obligation.
- The insurance contributions would only be dependent on age and gender, not on income.
- Free selection of insurance providers by the insured; insurers must be obliged to accept any applicant.
- All approved health insurance schemes (statutory and private) must probably be included in a risk-sharing scheme.

The fundamental systemic change that this would bring about is illustrated in the following consequences:

- The statutory insurance schemes would compete with private health insurers for basic and supplementary coverage. They would no longer have a redistribution obligation and no guaranteed membership.

- The present redistribution that takes place within the statutory health insurance funds – from rich to poor, from small families to large families, from young to old – would then have to be taken over by the government.
- The present employer contribution to health insurance premiums would have to be assumed in part by the employees. Prior to this, wages and salaries would have to be increased by this amount, an increase that must not affect income tax.
- The freedom of the insured to choose their insurance plans, and to change insurers, must be legally and also practically possible. For this it would be necessary to create the conditions – that currently seem to be lacking – for transferring the reserves built up for old age to other insurers
- The budgeting of sectors in the health care system or of individual medical practices would no longer be the task of government. The insurers themselves would have to find ways by which their insured could find suppliers of cost-effective health care services.
- The systemic change is considerable also because it would probably have to be implemented by a single major reform rather than many small measures.

As the Council of Economic Advisors has explained, such a market-based health care system would confront considerable practical problems, all of which could, however, be solved. But apart from these practical problems, it is the lack of political will to implement such far-reaching reform that makes the concept appear unrealistic. This, in turn, is probably due to the fact that in a more market-based system the influence of public and quasi-public agencies in the health care system would be weakened.

Further development of the existing system

The alternative to a market-based reform is a further development of the existing system with the goal of cost reduction and efficiency enhancement. Here, the following elements offer possible solutions:

- *Limiting the services covered by the statutory health insurance schemes:* Either a catalogue of basic services could be defined that would be available to all insured with services outside this catalogue paid for by the patients, or the current system of an open supply of services could be maintained but limited by a "negative list". As a supplement, a limited number of „treatment directives" could be formulated and distributed to doctors and patients; this idea has been successfully applied in the Netherlands.
- *"Positive lists" for medication:* Such lists, which are common in Europe, would contain all prescription medications that would be covered by insurance. This would in effect be a kind of second approval of the medication.
- *Expanding the contribution base:* This can be done in two ways. One way is to expand the obligatory membership in the statutory health insurance system by covering all gainfully employed persons, including the self-employed and civil servants. The obligatory membership would only include basic coverage. A second possibility is the inclusion of income on investments in the contribution base.
- *Limiting the freedom to choose a different insurer:* At present, people can choose among the various statutory funds, or if their income is above the contribution base, they can choose between a statutory fund and a private insurer. Although such a limitation may seem to be a step in the wrong direction, these freedoms have led to unintended and undesirable consequences. As a result, the government has already limited the freedom to choose among statutory funds.
- *Limiting unessential visits to doctors:* Among the large number of visits to doctors in Germany (see Table 3), a considerable number are for minor illnesses that heal themselves without special treatment. To make patients more cost-conscious, deductibles or premium refunds could be introduced. Or, as the Council of Economic Advisors has suggested, patients could be charged for the first visit per illness.
- *Capitation and case-based fees also in out-patient treatment:* For hospitals, the conversion from payment for individual services (based on the length of hospital stay) to case-based fees (each illness is one case) has already been implemented as an incentive for reducing the length of treatment. Such a system is also conceivable for out-patient treatment, with a possible combination of capitation and case-based fees, as practised in the U.S.

- *Stronger integration of medical care:* Here the hospitals would have a potentially important role. With a change in the Social Security Code, Book V[10], they would be able to offer contracts with lower premiums to patients who accept a limitation of their choice of doctors and a gate-keeper doctor acceptable to the insurance fund who would guide them in their choice of medical services and treatment.

These eclectic proposals also face the practical problem of political implementation. An important advantage of this approach, however, is that – unlike major reform – the steps could be introduced gradually.

A recent proposal

A discussion of the problems of the health care system should not only focus on long-term, strategic questions of the basic principles of reform, as presented above, but should also analyse the effects of the small reform measures. One example is the current question of a possible transition from a practice-budget system to a global-budget system. The global budget avoids a major disadvantage of the practice budget, namely an interruption of the provision of health care services if the budget is exhausted before the end of a quarter. On the other hand, with a global budget, doctors may well increase the number of treatments in order to achieve a higher share of the budget. This would lower the DM value per treatment (the point value) and provide new incentives for increasing the extent of treatments. Since these efforts would be ineffective financially because of the prescribed global budget, a tread-mill effect would be created.

In the analysis of regulating out-patient services, the current theoretical economic discussion (for example, Benstetter and Wambach 2001) seems to favour the following solution:

- A fixed overall budget, i.e. not for every individual practice. The question of whether this is a global budget for all groups and service providers together or whether each group would receive its own budget (as between 1993 and 1997) is of minor importance.

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[10] "Relations to health care providers in an integrated health care".

- This results in a variable DM value for individual treatments (variable point values) which are dependent on the number of all treatments of all doctors.
- The key element in this proposal consists of a guaranteed minimum point value. As a result, the "fixed" total budget would not be unconditionally fixed but could be expanded in some cases, namely if the number of treatments is correspondingly large.

Citing model calculations, some maintain that the guaranteed minimum point value would not be claimed and the originally fixed budget would not need to be expanded. The third element in the above "reform model of economists", namely the guaranteed minimum point value, is thus decisive to assure that the number of treatments – which are difficult to control from outside – are not expanded to counteract the lowered point value. Precisely because the number of treatments is not (excessively) expanded, because doctors rely on the minimum point value, the fixed budget need not be expanded. However, this effect depends on the reactions of the doctors and their confidence in the guaranteed minimum point value system.

If the above proposals were implemented, new market entry of providers of out-patient services, i.e. the establishment of new practices, would also make sense.

Summary

On the basis of recent WHO data on national health care systems, the German system performs well in an international comparison in terms of the quality of medical technology applied, the accessibility of health care services, and the fairness of financial burdens. There are deficiencies, however, in the treatment of certain diseases in an international comparison (heart attacks, certain types of cancer, diabetes, chronic pain).

Nevertheless, the cost efficiency of the German health care system is below the international average and strongly in need of reform.

There is no lack of discussion or reform measures in Germany. Many reforms, however, have proved to be insufficient, and many reforms have had to (or still will have to) undergo further reform.

A fundamental reform of the German health care system with more market elements is conceivable for economists but has little chance of political implementation, even in the medium term. Even a more eclectic approach that would preserve the character of the present system would require considerable reform efforts.

A meaningful concept for out-patient treatment is a fixed total budget, in place of the present practice budget, with variable point values and assigned minimum values.

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Benstetter, F. und A. Wambach (2001), »Strategic interaction in the market for physician services: The treadmill effect in a fixed budget system«, *CESifo Working Paper* No. 427, March.

DICE: ifo Database for Institutional Comparisons in Europe; erreichbar über www.ifo.de, dann ifo International, dann DICE Database; oder www.cesifo.de, dann DICE Database.

Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung (2000), Jahresgutachten 2000/2001, *Chancen auf einen höheren Wachstumspfad,* Stuttgart.

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Schumacher, H. (1996), »Die Leistungsfähigkeit von Gesundheitssystemen im Vergleich«, *Hamburger Jahrbuch für Wirtschafts- und Gesellschaftspolitik,* 1996.

World Health Organisation, World Health Report 2000; www.who.int; www.who.dk.

ECONOMIC SURVEY INTERNATIONAL

According to the latest Ifo survey (73rd ESI of July 2001 questioning 737 economists of multinational corporations in 79 countries), the world economic climate continued on the downward trend which had started in spring 2000. Since then, the indicator has lost a quarter of its value. Yet, the current level is still far above those reached in earlier international downswing phases like in spring 1998 (in the wake of the Asian crisis or during the world wide recession of the early 1990s. Furthermore, the latest decline was also less steep than in the preceding three quarters due to the improvement of the expectations component of the indicator.

In **Western Europe** the assessments of the current business situation deteriorated further, but expectations for the next six months improved slightly. The worst assessments came again from Germany and Portugal. Better than the European average were the current assessments for Norway, Ireland, the Netherlands, Finland, Spain, and Greece.

The current state of the **U.S. economy** was said to have deteriorated further, and was given much lower marks than that of Western Europe or the entire world average. Because the expectations for the next six months improved considerably, the cyclical trough may be reached very soon. The United States could therefore start its economic recovery ahead of the other industrialised countries.
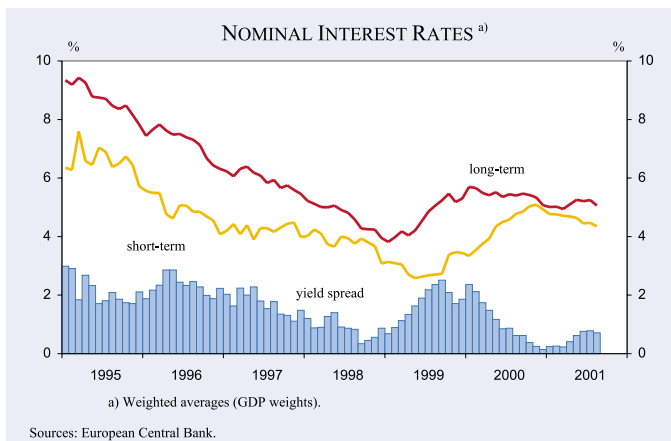
In **Asia** the economic situation deteriorated further and is generally considered unsatisfactory. The Asian economic climate has reached a lower level than any other region under consideration. The only exception is China where the positive assessments still predominate. Japan, the Philippines, Taiwan and Sri Lanka have been worst hit by the latest economic crisis.
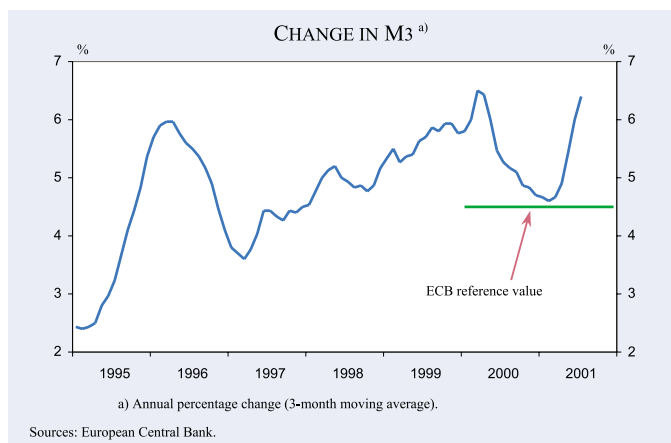
Present and Expected Economic Situation
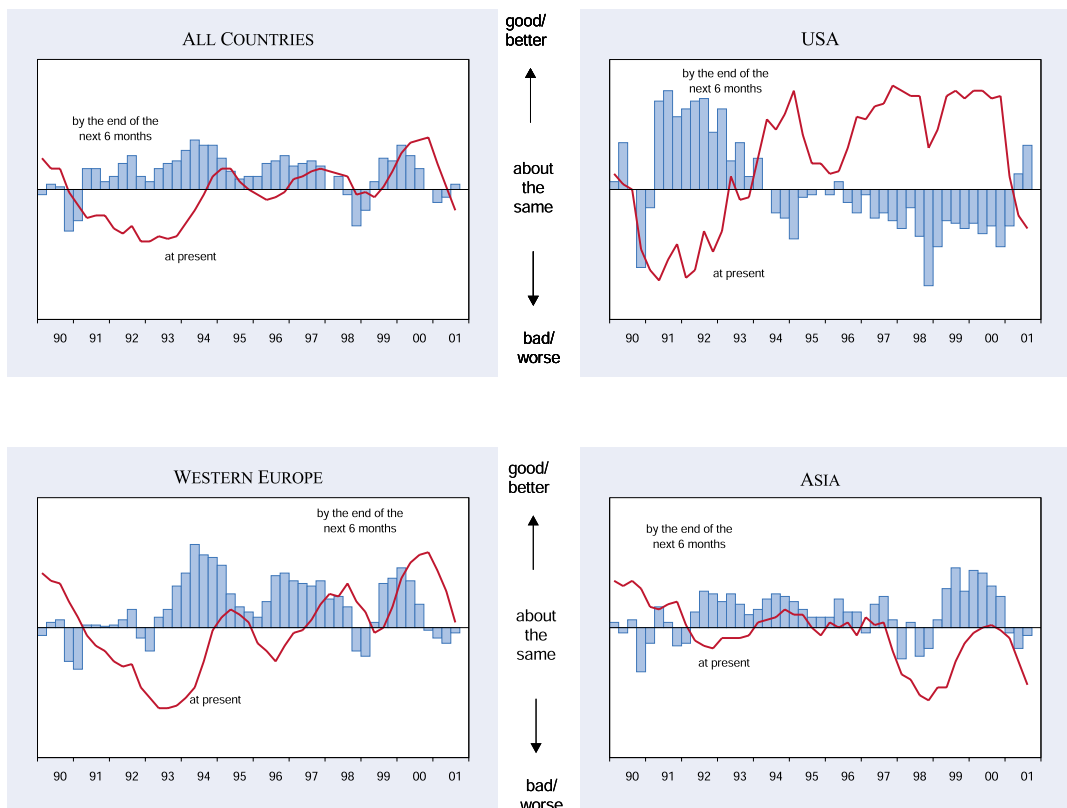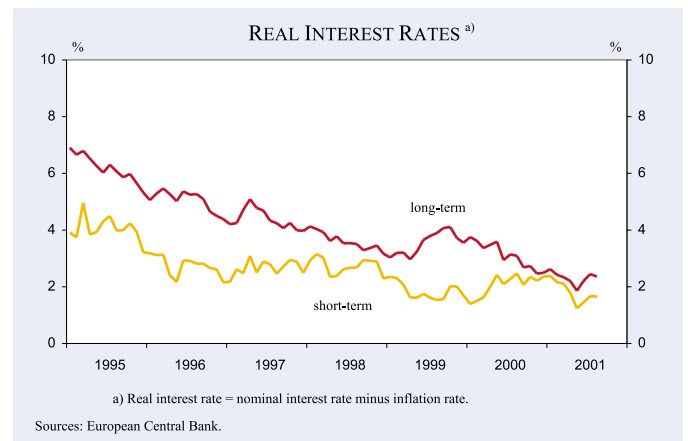

Source: ESI 73, 3/2001.

MONETARY CONDITIONS
IN THE EURO-AREA

NOMINAL INTEREST RATES [a]

a) Weighted averages (GDP weights).

Sources: European Central Bank.

REAL INTEREST RATES [a]

a) Real interest rate = nominal interest rate minus inflation rate.
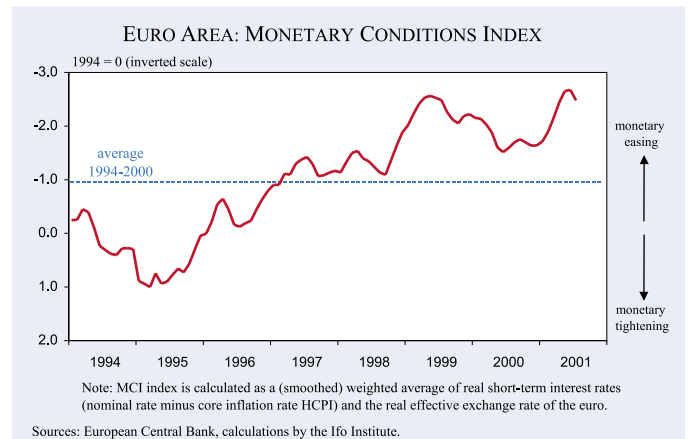
Sources: European Central Bank.

Money market rates continued to decline, reflecting increased expectations among market participants of reductions in the key ECB interest rates. In the aftermath of the terrorist attacks in the United States, the ECB did decide to lower its key rates by 50 basis points. Long-term bond yields have also fallen over the summer to levels last seen in March 2001. On 10 September the average euro area ten-year government bond yield stood at close to 5.1% which was about 20 basis points lower than at the end of June. As a result, the yield spread, which had widened until July, narrowed a bit again.

Euro-area real interest rates, which had come down sharply during the first half of the year, especially for short-term assets, rose again as inflation subsided, but have recently flattened out. They have now reached a comfortable level, at about 2%.

CHANGE IN M3 [a]

a) Annual percentage change (3-month moving average).

Sources: European Central Bank.

EURO AREA: MONETARY CONDITIONS INDEX

Note: MCI index is calculated as a (smoothed) weighted average of real short-term interest rates (nominal rate minus core inflation rate HCPI) and the real effective exchange rate of the euro.

Sources: European Central Bank, calculations by the Ifo Institute.

The annual rate of growth of M3 was 6.7% in August, up from 6.4% in July. The three-month moving average of the annual growth rates of M3 over the period June to August 2001 increased to 6.4% from 5.9% during the previous three-month period. According to the ECB, these developments reflect partly the relatively flat yield curve up to August and the weakness of the stock markets, which made the holdings of short-term deposits and marketable instruments included in M3 more attractive.

The monetary conditions index for September signaled some monetary tightening, reversing the easing throughout the earlier part of the year. While short-term real interest rates declined, the index was dominated by the rise of the effective real exchange rate of the euro.

EU SURVEY RESULTS

EU-11 GROSS DOMESTIC PRODUCT IN CONSTANT 1995 PRICES
Percentage change over previous year
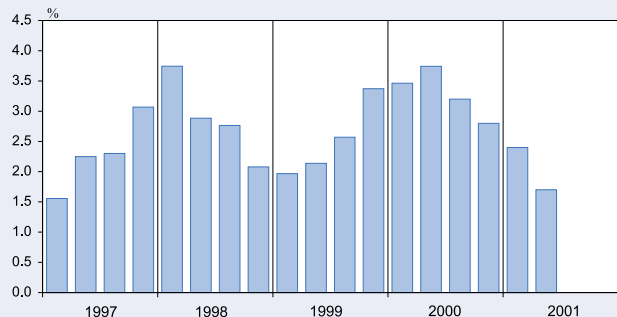
Source: Eurostat.

In the second quarter 2001, real gross domestic product rose by only 0.1% (seasonally adjusted) over the previous quarter and by 1.7% over the previous year (first quarter: 0.5% and 2.4% respectively). Consumer spending (+ 0.4% q-o-q) supported second quarter GDP, whereas investment declined by 0.4% and exports fell by 0.8%. Because imports also shrank, net exports rose by 2.4%, providing support to quarter-on-quarter GDP growth.

EU INDUSTRIAL AND CONSUMER CONFIDENCE INDICATORS
Percentage balances, seasonally adjusted
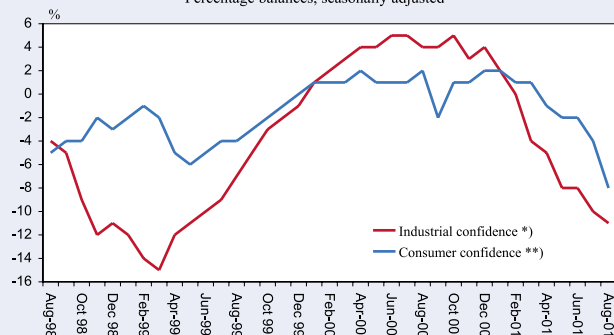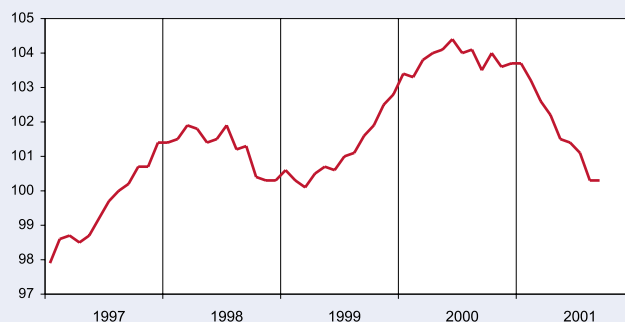

Source: European Commission.

* The industrial confidence indicator is an average of responses (balances) to the questions on production expectations, order-books and stocks (the latter with inverted sign).
** New consumer confidence indicators, calculated as an arithmetic average of the following questions: financial and general economic situation (over the next 12 months), unemployment expectations (over the next 12 months) and savings (over the next 12 months). Seasonally adjusted data.

The **industrial confidence** indicator went down in September by one point in the euro area. This was mostly due to the deterioration of production expectations and order books. Stocks remained unchanged. The most significant increases were displayed by Itlay and Luxembourg, whereas France and Ireland had large decreases.

In September, **consumer confidence** in the euro area registered a 1 point decrease reaching – 9, which is the lowest level since November 1997. The main declines were recorded by Sweden, Belgium, and France. Germany presented the most significant increase with 2 points, whereas the UK, Spain, Ireland, and Greece increased by 1 point.

EU NEW ECONOMIC SENTIMENT INDICATOR a)
### Index 1995 = 100, seasonally adjusted

Source: European Commission.

a) The new economic sentiment indicator is based on the industrial, construction, retail trade and consumer confidence indicators. Seasonally adjusted data.

This reconstructed economic indicator is described on p. 54 of this Forum. The economic sentiment indicator, which comprises the industrial, consumer, construction, and retail trade confidence indicators, had sharply declined throughout the year, but flattened out in September. Except for possible distortions due to the September 11 events, this my be a good omen for economic developments in coming months.
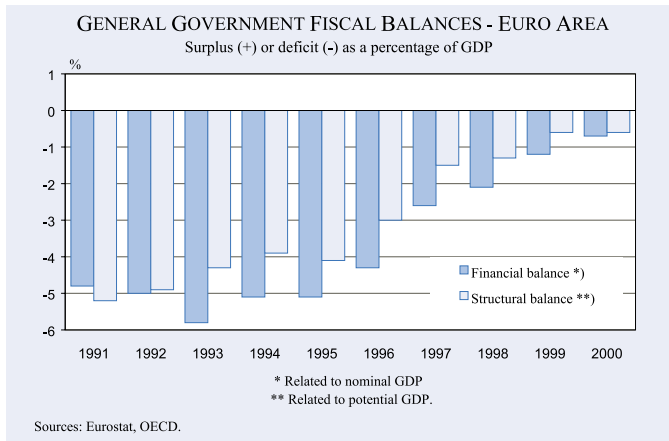
## EU CAPACITY UTILISATION AND ORDER BOOKS IN THE MANUFACTURING INDUSTRY
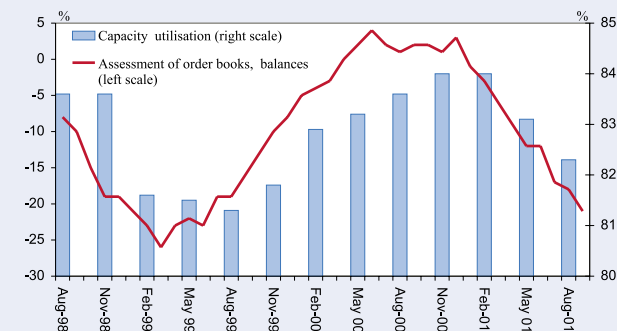
Source: European Commission.

Capacity utilisation went down for the second quarter in a row as manufacturing production contracted. This performance agrees with the continued deterioration of the assessments of order books.

EURO AREA INDICATORS

GENERAL GOVERNMENT FISCAL BALANCES - EURO AREA
Surplus (+) or deficit (-) as a percentage of GDP

* Related to nominal GDP
** Related to potential GDP.

Sources: Eurostat, OECD.

In 2000, the general government fiscal deficit of the euro area stood at 0.8% of GDP. The structural deficit was smaller, at 0.6% of potential GDP. Figures for 2001 are likely to reverse the trend of consolidation, reflecting the economic slowdown and the expansionary countermeasures of some governments.

EU UNEMPLOYMENT RATE
ILO definition, seasonally adjusted
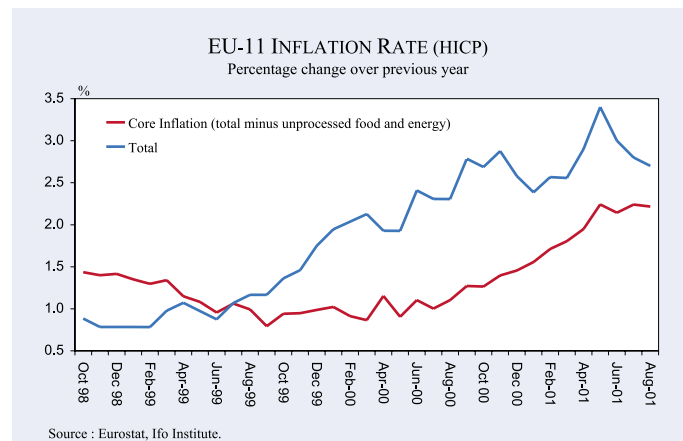

Source : Eurostat.
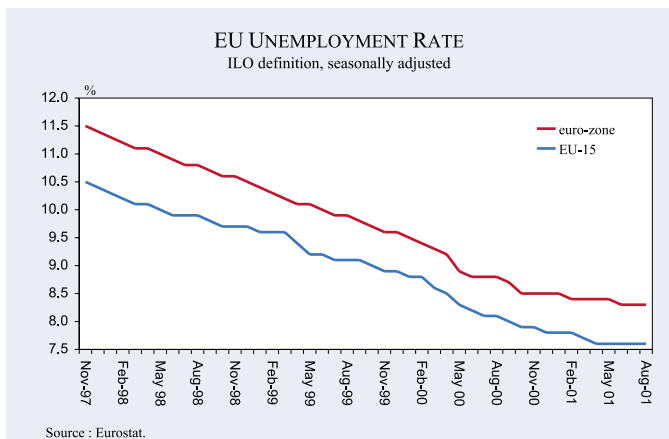
Unemployment in the euro-zone remained at 8.3% in August, unchanged from July. A year earlier it had stood at 8.7% of the labour force. The EU-15-countries recorded an unemployment rate of 7.6%, also unchanged from July. In August 2000 this rate was 8.1%. The lowest unemployment rates were achieved by the Netherlands (2.2%), Luxembourg (2.5%), Ireland (3.8%), Austria (3.9%), Denmark (4.3%) and Portugal (4.4%). At 13.0%, Spain continued at the top end of the range.

REAL EFFECTIVE EXCHANGE RATE OF THE EURO [a]

Source: European Central Bank.
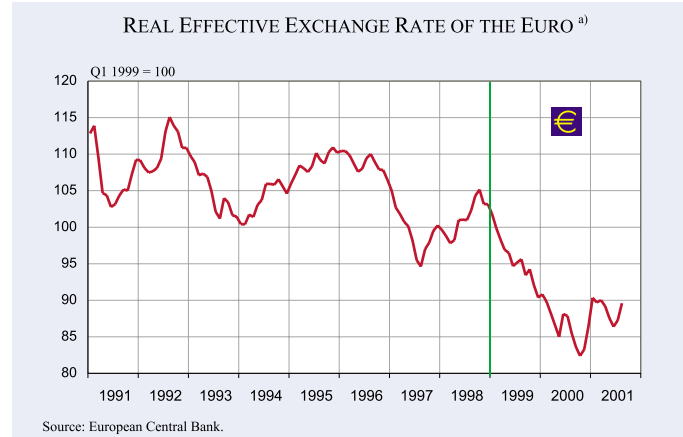
a) BIS calculations; to December 1998, based on weighted averages of the euro area countries' effective exchange rates; from January 1999, based on weighted averages of bilateral euro exchange rates. Weights are based on 1990 manufactured goods trade with the trading partners United States, Japan, Switzerland, United Kingdom, Sweden, Denmark, Greece, Norway, Canada, Australia, Hong Kong, South Korea and Singapore and capture third market effects. Real rates are calculated using national CPIs. Where CPI data are not yet available, estimates are used.

The appreciation of the euro against most major currencies, which had started in July, continued in August and September when the US dollar fluctuated rather erratically as a result of conflicting data releases on the U.S. economy and the terrorist attacks in New York and Washington, DC. In real effective terms, the euro has been approaching the level reached in the early months of the year.

EU-11 INFLATION RATE (HICP)
Percentage change over previous year

Source : Eurostat, Ifo Institute.

In the euro-zone, the annual inflation rate continued its decline from the peak in May (3.4%), receding from 2.8% in July to 2.7% in August, driven by falling energy prices. A year earlier it had stood at 2.3%. Core inflation (excluding food and energy) remained constant in August, at 2.2%. The highest inflation rates were recorded by the Netherlands (5.2%), Greece and Portugal (4.0% each). The lowest rates were achieved by France (2.0%), Denmark, Luxembourg and Belgium (2.5% each).

International Conferences

Conference	Date	Place	Submission Deadline	Programme Chairman
American Economic Association	4. Jan. – 06. Jan. 2002	Atlanta, GA, USA		
International Atlantic Economic Society	12–19 March 2002	Paris, France	15 Dec. 2001	
Tenth Annual Symposium of the Society for Nonlinear Dynamics and Econometrics	14/15 March 2002	Atlanta, GA, USA		
Royal Economic Society	25–27 March 2002	Coventry, UK	19 Oct. 2001	
Labour Market Institutions and Public Regulation	28–29 May 2002	Cadenabbia, Italy		www.cesifo.de
International Syposium on Forecasting	23–26 June 2002	Dublin, Ireland		Prof. John Haslett, T Trinity College Dublin john.haslett@tcd.ie
The Sloan Program for the Study of Business in Society	23–28 June 2002	Washington, DC, USA		
International Telecommunications Society	18–21 Aug. 2002	Seoul, Korea	31 Oct. 2001	
International Institute of Public Finance	26–28 Aug. 2002	Helsinki, Finland	31 Jan. 2002	Dieter Bös, University of Bonn iipf2002@wiwi.uni-bonn.de
Verein für Socialpolitik "Privatisierung, Deregulierung und Marktverfassung	17–20 Sept. 2002	Innsbruck, Austria		www.socialpolitik.org
14th international conference on Input-Output Techniques	10–15 Oct. 2002	Montreal, Canada	1 Nov. 2001	Erik Dietzenbacher Univ. of Groningen e.dietzenbacher@eco.rug.nl
The Economics of Organisation and Corporate Governance Structures	25–26 Oct. 2002	Munich, Germany	28 Feb, 2002	Urs Schweizer schweizer@uni-bonn.de
Spectrum Auctions and Competition in Telecommunication	22–23 Nov. 2002	Munich, Germany	15 March 2002	Gerhard Illing gerhard.illing@lrz.uni-muenchen.de

MUNICH LECTURES IN ECONOMICS

Oliver Hart

Harvard University, Cambridge (MA), USA

Firms versus Markets

Tuesday, 13 November 2001, 18.00, Große Aula, University of Munich

Prize Award "Distinguished *CES* Fellow 2001"

Tribute: Martin Hellwig, University of Mannheim, Germany

2nd and 3rd Lectures on Wednesday, 14 November and Thursday, 15 November at 18.00
in the Seminar room at CES, Schackstr. 4, 2nd floor.
The Munich Lectures are held in co-operation with MIT Press, Swiss Re Germany AG,
the Munich Alumni Club of Economists, and CESifo.

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