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Editorial Board

THOMAS APOLTE

Labour Markets in the New Economy: A Comparative View of Germany and the United States

Abstract

The new economy in the United States was associated with high rates of real growth, low rates of inflation and low rates of unemployment. In Germany, however, unemployment grew almost steadily during the 1990s and real growth was low. The contribution of IC-technology to growth and employment was low in Germany as compared to other countries. Also, the German labour market was obviously less able than labour markets in some other countries to absorb the structural shifts associated with the new economy. The result was high and growing rates of structural unemployment. On the basis of a simple model of a dual labour market, the divergent labour market performance of the 1990s is explained.

1. Introduction

To many observers, the new economy seemed to be history after the collapse of stock-market prices in 2001. Whether or not the new economy is back again after the economic recovery beginning in 2002, is clearly a question of how the new economy is defined. It may well be that long-term prosperity with high growth rates, low unemployment and low inflation rates in the United States remains unique, although this is anything but clear. Seen from the point of view of the ICT-revolution, however, there is no way back to a pre-new economy world.

When observing the second half of the 1990s, it becomes obvious that some countries clearly benefited from the new economy with respect to their labour markets while others did not. Perhaps the most extreme examples are the United States on the one hand and Germany on the other. Whereas unemployment dropped continuously over the 1990s in the United States, it rose almost steadily in Germany. This paper offers an explanation of the differences in the labour-market performance of the two countries. In the next section, some rough indicators of the economic development of the 1990s are presented. In the third section, a simple model of a dual labour market is applied in order to show the different ways in which the two countries dealt with the structural shifts associated with the new economy. With the help of this model, it can be explained why the new economy resulted in an employment boom in the United States while it merely boosted structural unemployment in Germany.

2. The New Economy in Germany and the United States: Some Indicators

The new economy is associated with the information and communication technology (ICT) sector, which makes direct and indirect contributions to overall economic performance. The direct contribution can, for example, be measured by the value added of the ICT sector as a percentage of total value added in the economy (see Daveri, 2002; Pohjola, 2003). The indirect contribution consists of the input of ICT technologies in almost every production sector, which raises overall productivity and creates new consumer products (Bassanini/Scarpetta, 2002). Table 1 gives an impression of the direct contribution of ICT to both value added and employment (see also Christensen, 2001; OECD, 2001). With 10.5 per cent of value added the U.S. ranks fourth behind Finland, Sweden and the UK. Germany ranks last with only 7.0 per cent, which is just slightly half of the volume in Finland (13.2 per cent). When measured by the share of employment, Finland again ranks first with 9.4 per cent. And again, Germany ranks last with 4.5 per cent, even less than half of the share in Finland.

Table 1. – ICT-SECTOR IN PER CENT OF VALUE ADDED AND EMPLOYMENT

	Germany	Finland	France	Italy	Sweden	UK	U.S.	Japan
Value Added	7.0	13.2	9.8	7.1	11.5	10.7	10.5	8.1
Employment	4.5	9.4	9.0	4.7	8.7	7.7	5.8	6.9

Source: Dehio *et al.* (2003), p. 60.

Nevertheless, the new economy has contributed to growth and employment in Germany, although less than in other countries (see table 2). Whereas value added in the non-farm private business sector, including ICT, grew by a nominal value of 2.4 per cent between 1995 and 2000, total ICT sector growth was more than double that at 5.6 per cent. In the U.S., however, nominal growth of the ICT sector was 10.6 per cent, while value added of the overall economy grew by 6.3 per cent. Although these are nominal values, the impression remains valid, since the rates of inflation were similar in both countries.

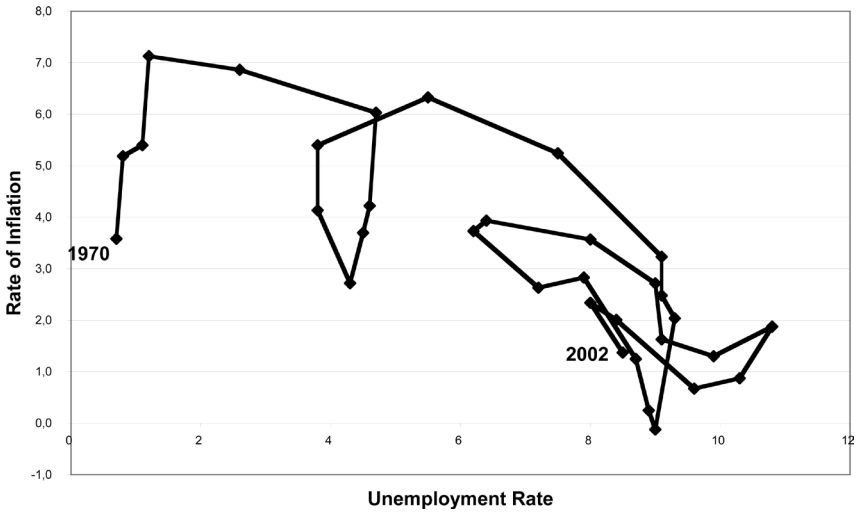
Table 2. – CONTRIBUTION TO GROWTH IN NOMINAL VALUE ADDED AND EMPLOYMENT, 1995 to 2000

	Hardware	Software	ICT total	Non-farm Private Business
Germany, Value Added	7.3	5.1	5.6	2.4
U.S., Value Added	8.9	11.2	10.6	6.3
Germany, Employment	-2.2	3.3	1.2	0.9
U.S., Employment	2.9	7.4	5.9	2.5

Source: *Dehio* et al. (2003), p. 61.

Even more impressive with respect to the labour market is that the ICT sector in Germany could not significantly help to mitigate German unemployment miseries. Employment in the ICT sector grew by just 1.2 per cent between 1995 and 2000, while it grew by almost 6 per cent in the U.S.

Figure 1. – PHILLIPS-LOOPS IN WEST-GERMANY

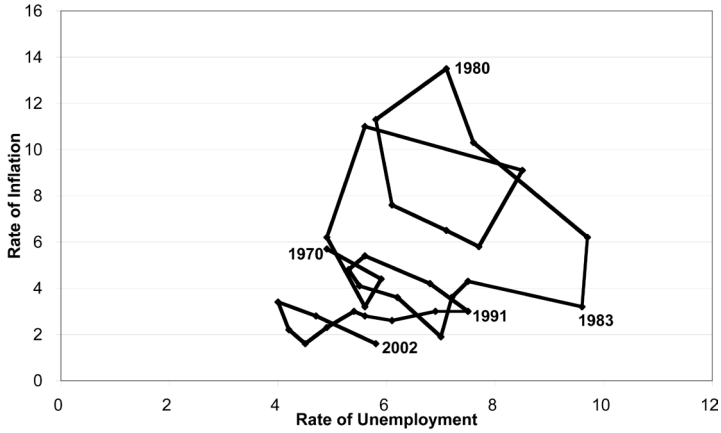


Source: *German Council of Economic Experts* (2003), Tables.

If we define the new economy, not as a sector of the overall economy, but as the time period between the early 1990s and the year 2001, there are again striking differences between the U.S. and Germany. After 1995 the rates of inflation were low in both countries, but the difference in performance with respect to economic growth and employment could hardly have been greater. The new economy picture of low inflation rates, high real growth and low unemployment was applicable for the U.S. but not for Germany. After the beginning of the 1970s, the well known Phillips-Loops carried Germany ever further away from full employment, although with lower rates of inflation (see Figure 1).

By contrast, the new economy brought the U.S. unemployment rates back to levels similar to those of the early 1970s. The rates of inflation, however, were significantly lower (see Figure 2) in the 1990s. Not only could the rates of unemployment be reduced, as compared to the high levels in the late 1970s. Employment itself grew at impressive rates in the U.S. during the 1990s, indicating that unemployment did not drop as a result of a reduction in the labour supply, but as a result of an increased demand for labour.

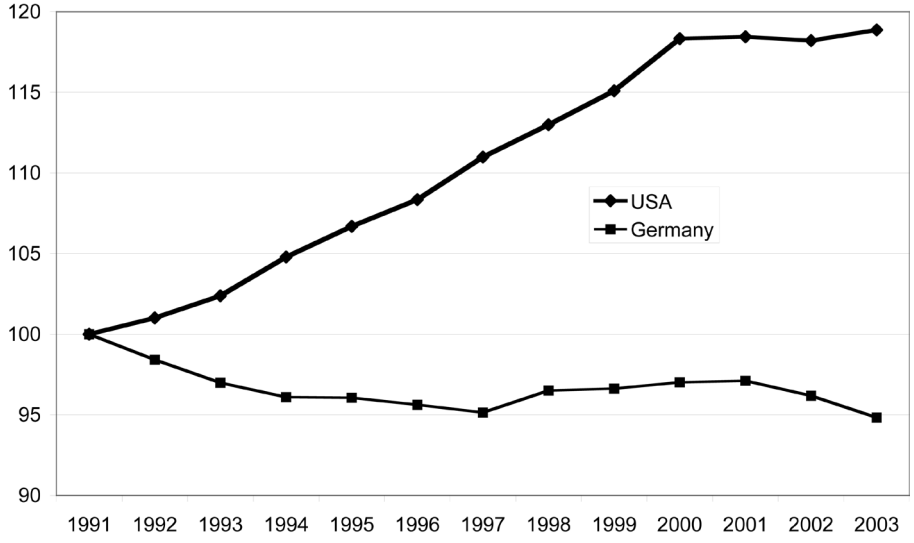
Figure 2. – PHILLIPS-LOOPS IN UNITED STATES



Source: *Economic Report of the President*, 2004, Tables.

Civilian employment grew by almost 19 per cent in the United States between 1991 and 2003, but it fell by almost five per cent in Germany (see figure 3). What is more, U.S. employment resumed its growth due to the economic recovery beginning in 2002, while in Germany it has continued to decline since 2001.

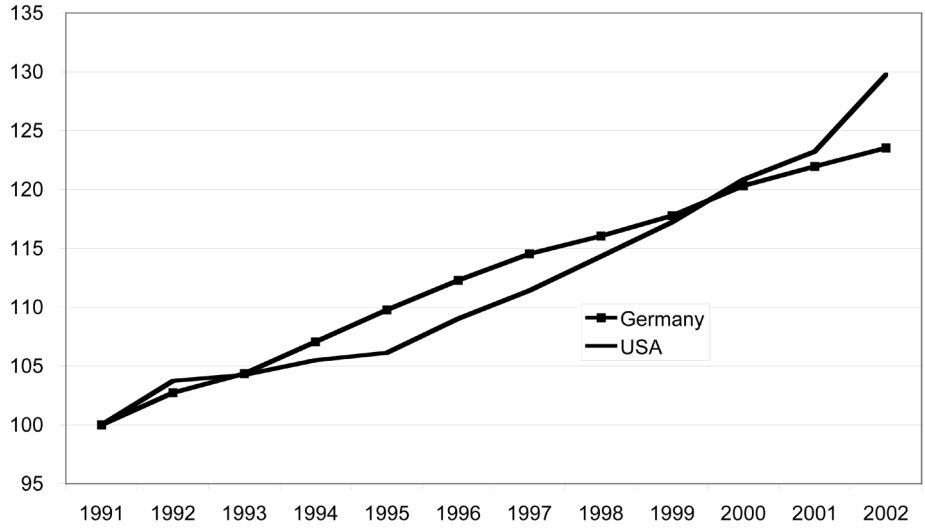
Figure 3. – INDEX OF CIVILIAN EMPLOYMENT, 1991=100



Source: *OECD,* Employment Outlook, 2004.

From the perspective of a neoclassical production function, employment growth is associated with a tentative fall in labour productivity in the short run, due to the law of diminishing marginal productivity. Other things being equal, a country with higher employment growth would experience lower growth in labour productivity than a country with lower employment growth.

Figure 4. – INDEX OF OUTPUT PER HOUR OF LABOUR, 1995=100

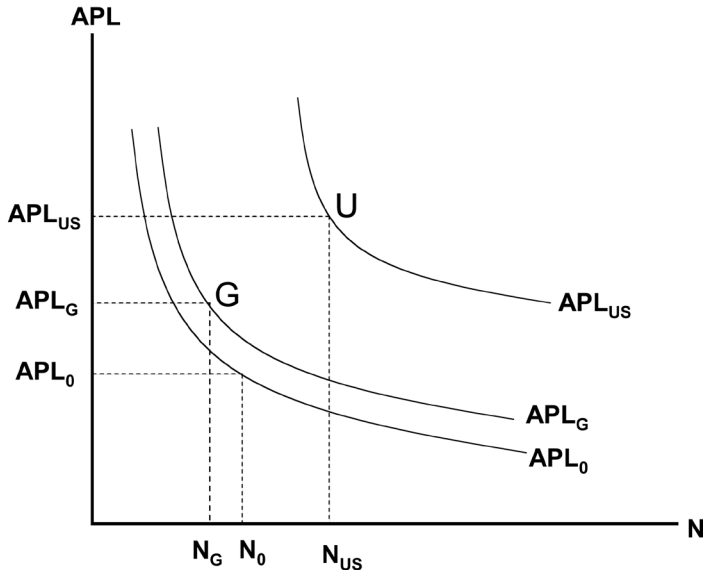


Source: *Economic Report of the President*, 2004, Tables; *German Council of Economic Experts*, Annual Report 2003/04, Tables.

Indeed, up to the mid-1990s, labour productivity was higher and it grew more rapidly in Germany than in the U.S. Since then, however, its growth rates have been much higher in the U.S. and its level eventually exceeded the German level (figure 4; see also Daveri, 2003). From 1995 to 2002, labour output per hour in the U.S. increased by 22 per cent as compared to only 13 per cent in Germany.

Higher employment growth and simultaneously higher growth in labour productivity imply that other factors have evolved differently in the two countries. See the illustrative Figure 5. Suppose that sometime in the early 1990s, Germany and the U.S. started on the same line of average productivity of labour (APL) and at the same initial levels of employment and labour productivity APL_0 and N_0, respectively. From that point, labour productivity in Germany increased somewhat, while employment decreased. Germany's situation can thus be characterised by a point like point G on the line APL_G.

Figure 5. – ILLUSTRATION OF PRODUCTIVITY AND EMPLOYMENT GROWTH



By contrast, labour productivity in the U.S. increased to a higher level than that of Germany. At the same time, employment rose from N_0 to N_{US}. Ultimately, the U.S. attained point U. Since that point lies on a higher average labour productivity curve, something must have shifted the APL curve of the U.S. farther away from its initial level than was the case for Germany. Either the quantity of some production factor such as capital increased more rapidly, or there was a better utilisation of new technologies. In any case, these contrasting developments require explanation, which I will try to give in the next section.

3. Explaining the Differences

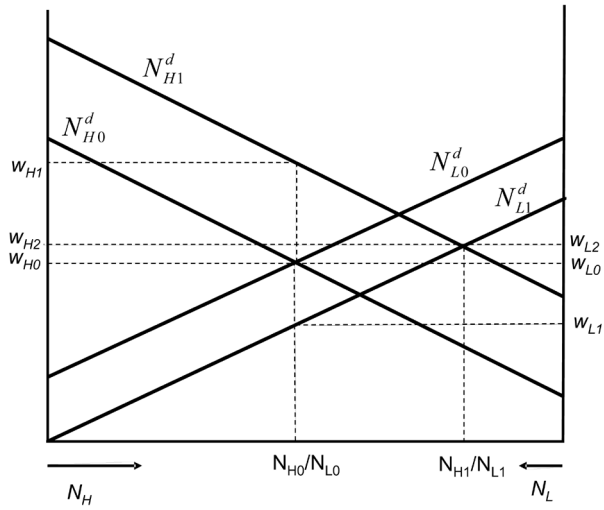
It is now common sense to most economists that the high and growing unemployment in Germany is due to structural problems in labour markets. At the same time, there is convincing evidence that structural unemployment in the U.S. has decreased over the last decade. The well-known Beveridge curve, which plots unemployment and vacancy rates, has clearly shifted inward in the U.S. This is not the case in Germany, where it actually shifted outward somewhat (*Christensen*, 2001), indicating that structural unemployment has increased.

Generally, the new economy has challenged the ability of labour markets to absorb structural shifts (Machin, 2003). The implementation of ICT technologies into the production process requires a critical mass of highly-skilled labour (Burda/Dluhosh, 1999; Autor, 2001; Kelly/Lewis, 2001; Acemoglou,

2002; *Freeman*, 2002). At the same time, demand for "old-economy employees" decreases. What is more, since ICT is applied in the old economy as well, employees in all sectors must be adaptable to changing skill requirements. If markets are unable to absorb such structural shifts, unemployment may result.

Figure 6 offers an exposition of a simple dual-sector model of the labour market (see Jones, 1987; Christensen, 2001). For the sake of simplicity, the labour supply is considered exogenous and non-elastic with respect to the wage rate. Reading from left to right, Figure 6 depicts employment in the new economy N_H (the "high-tech sector"). Reading from the right, employment in the old economy is depicted as N_L ("low tech"). Accordingly, the lines N^d_{H0} and N^d_{L0} represent labour demand. Since we assume competitive markets, the slopes of these lines also represent the marginal productivity of labour for both sectors. In equilibrium, there will be an equal wage rate $w_{H0}=w_{L0}$ for both sectors. The allocation of labour will be N_{H0} for the new economy and N_{L0} for the old economy. For the sake of simplicity we abstract from the costs of investment in human capital. Hence, there is no premium on the wage rate compensating for earlier human capital investment on the part of any employee.

Figure 6. – SHORT- AND LONG-TERM SCENARIO IN A DUAL LABOUR MARKET



Suppose now that the new economy shifts the structure of demand for labour. Demand for high-tech labour increases, shifting the demand curve outwards from N^d_{H0} to N^d_{H1}. At the same time, demand for low-tech labour drops, shifting the demand curve from N^d_{L0} to N^d_{L1}. We can now distinguish three different scenarios. In the first scenario wages are flexible but labour across sectors is immobile, i.e. labour suppliers cannot switch from the low-tech sector to

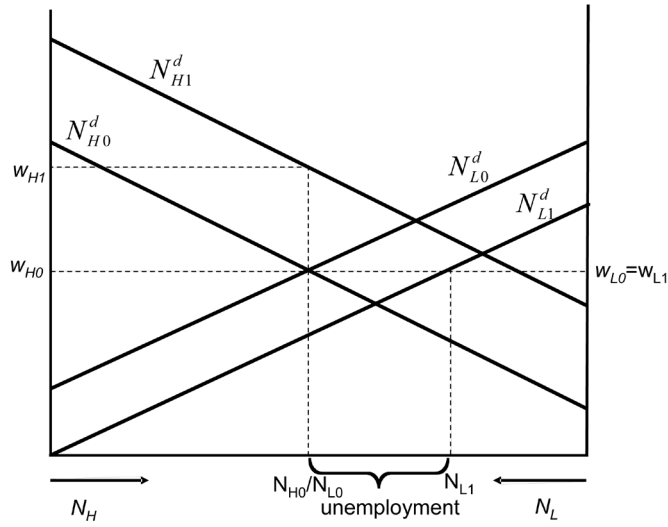
the high-tech sector. Let us call that the short-term scenario. In this scenario, the wage rate in the low-tech sector drops to a level of w_{L1}, whereas the wage rate in the high-tech sector increases to w_{H1}. This spread in the wage structure leaves the allocation of labour unchanged across sectors, but clears both sectors of the labour market nonetheless. There will be no unemployment in the short-term scenario but there will also be no reallocation of labour.

In the second scenario there are both flexible wages and labour supply mobility across the sectors. Let us call this the long-term scenario, since it takes time for labour to switch from the low-tech sector to the high-tech sector. Note that we still abstract from costs associated with investment in human capital. We assume that it simply takes some time to adjust qualifications. We can do so without any loss in generality. In the long-term scenario, the higher wage in the high-tech sector induces labour to shift from the low-tech to the high tech sector. Since we abstract from the costs of building human capital, employees will shift their labour supply until the wage rates in the two sectors are equalized at $w_{H2}=w_{L2}$. The new equilibrium will be associated with a reallocation of labour to N_{H1}/N_{L1}, *i.e.*, more employees will work in the high-tech sector and fewer in the low-tech sector. Again, the labour market will clear.

Finally, let us turn to the third scenario, which I call the German scenario. Here, wages are rigid and there is no labour mobility across sectors. More precisely, wages are inflexible in the downward direction. The implications are shown in Figure 7. The wage rate in the high-tech sector increases to w_{H1} whereas the wage rate in the low-tech sector remains constant. Employment in the low-tech sector drops from N_{L0} to N_{L1}. As a result, there will be a shortage of labour in the high-tech sector and, at the same time, structural unemployment to the extent of N_{H0}-N_{L1} in the low-tech sector. Hence, employment in the high-tech sector will fall short of what it would be with inter-sectoral mobility. Overall, employment will decrease. There is plenty of evidence that the wage structure in Germany is much more rigid than in the U.S. However, it is not quite clear why there is also greater labour immobility across sectors in Germany, as compared to the U.S. The reasons are manifold. One reason is wage rigidity itself. With rigid wages, structural shifts in labour demand will imply a less pronounced spread in the wage rates, which reduces incentives for labour to transfer from one sector to another. It is true that if the wage spread is not high enough to restore market clearing in both sectors, unemployment will result, which also induces people to switch.

This mechanism has also been hampered in Germany for a number of reasons, including, *inter alia*, regulations regarding legal requirements and formal qualifications for employees who apply for specific jobs; a dysfunctional so-called "active labour-market policy" that aims ostensibly at qualifying employees but, in practice, merely keeps employees in training programs and out of the unemployment statistics; unemployment and welfare benefits which are not only generous, but are also granted for unusually long time periods; and an extensive use of early retirement schemes. We cannot go into the details

Figure 7. – RIGID WAGES AND INTERSECTORAL IMMOBILITY IN A DUAL LABOUR MARKET



of all these mechanisms here. Each of them, however, works in the direction of lower inter-sectoral labour mobility. As a result, structural unemployment becomes persistent.

Until recently, Germany's public-policy approach to mitigating structural unemployment has been to reduce the labour supply. The most important mechanisms, open or hidden, reduce the age of retirement. They were applied extensively during the 1980s and 1990s. Since then, although the most openly-applied, official early retirement scheme has been abolished, other hidden mechanisms remain in place. Moreover, "excessive" labour supply has been removed from the official statistics by way of active labour-market policies. These policies consist mostly of governmentally monitored training programs which officially aim at reintegrating the participants into the labour market. Unfortunately, these programs have been rather ineffective in getting people back into jobs. Their main effect so far has been to keep participants off the unemployment records while employment actually decreased. The tragic part of the story, however, is that the unemployment *rate* increased. Let us consider now why the unemployment rate rose despite the reduction in labour supply (see Hamermesh, 1986).

Equation 1 is a linear-homogenous production function of a representative firm with the usual properties:

(1) $X(N,K)$, with: $X_N>0$; $X_K>0$; $X_{NN}<0$; $X_{KK}<0$; $X_{NK}>0$; $X_{KN}>0$,

where subscripts indicate partial derivatives. Assume now the following simple profit function of a representative firm:

(2) $$P = P \cdot X(N, K) - w \cdot N - P_K \cdot K$$

Here *Pr* is profit, *P* is the price in a competitive product market and P_K is the supply price of capital in a perfect capital market. A profit maximising labour input would then satisfy the usual first-order condition:

(3) $$X_N = \frac{w}{P},$$

which serves as the demand function for labour. Note that, because of the assumptions made in (1), the position of the demand curve for labour in wage-labour space depends on the amount of capital invested; a rising capital stock shifts the labour demand curve outward and *vice versa*. Let us now define the production per employee as $x \equiv X / N$ and the capital intensity as $k \equiv K / N$. We can then rewrite the profit function (2) as:

(3) $$P = P \cdot x(k) \cdot N - w \cdot N - P_K \cdot k \cdot N.$$

The first-order condition with respect to the profit-maximizing capital intensity k^* is:

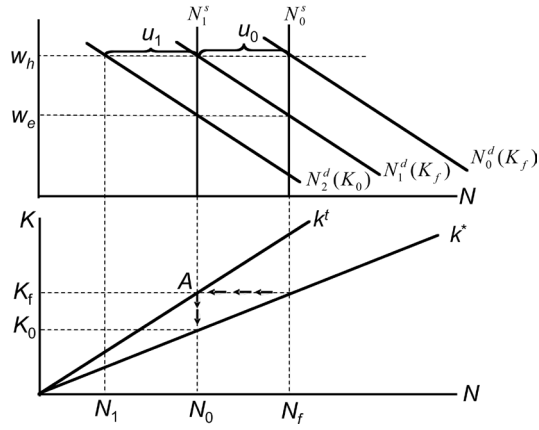
(4) $$x_k(k^*) = \frac{P_K}{P}.$$

In addition to condition (3) for an optimal labour input, a profit maximum also requires that, according to condition (4), the marginal return of an increase in capital intensity equals the real supply price of capital. Hence, given the properties of the underlying production function, there is but one capital intensity, k^*, which is compatible with a profit maximum. Now consider Figure 8, which represents the low-tech sector of the labour market. The initial equilibrium can be found in the upper part of the figure as the intersection of the demand curve, N_0^d, and the inelastic supply curve, N_0^s. Employment in this initial situation is as high as N_f, and there is no unemployment. At the same time, the optimal capital intensity, k^*, is realized, as can be seen in the lower part of figure 8. The straight line k^* through the origin represents all combinations of labour input *N* and capital input *K* that are associated with an optimal capital intensity k^*. In the initial equilibrium, labour input N_f is combined with the capital input K_f. Hence, a point on the k^* line is realised.

Consider now a decrease in the demand for low-tech labour, resulting from a shift in the demand structure for labour. The demand curve shifts inward from N_0^d to N_1^d. With flexible wages, the wage rate would drop to the new market-clearing level, w_e. With rigid wages, however, the wage rate remains constant, resulting in unemployment to the extent of u_0. Assume that, in order to remove unemployed persons from the unemployment statistics, government may reduce the labour supply to the level of N_0. Employment will then remain low, but the official unemployment rate will be reduced to zero. This, however, cannot be a stable equilibrium. The reason is that the reduced level of employment from N_f to N_0 increases the capital intensity, as can be seen in the lower part of figure 8. As long as the representative firm has not

yet adjusted its capital stock, point A will be realised, associated with a capital intensity of k^t. Since this capital intensity violates condition (4) for the profit-maximizing capital intensity, the firm will restore the profit maximum by reducing its capital stock from K_f to K_0.

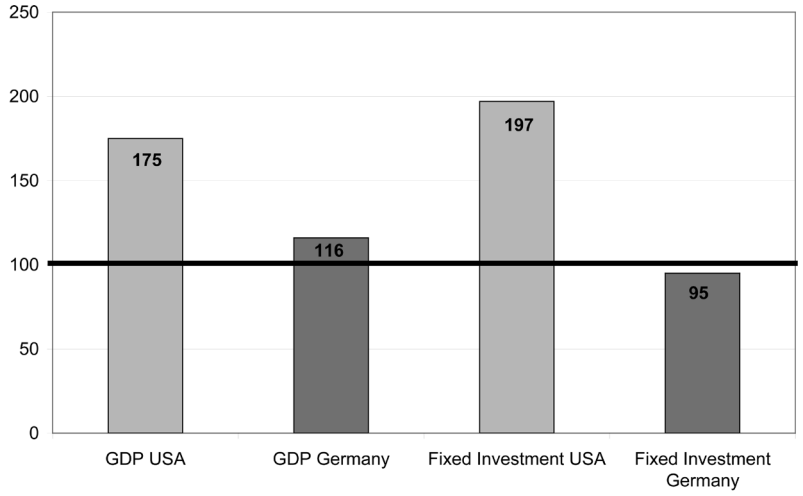
Figure 8. – THE REAPPEARANCE OF UNEMPLOYMENT



This reduction, in turn, will affect the demand function for labour in the upper part of the graph, since the demand function is equal to the marginal productivity of labour X_N and, by the assumption of equation (1), $X_{NK}>0$. Hence a decrease in the capital stock will shift the demand curve for labour further inward to N^d_2. Additional unemployment to the extent of u_1 will result. No matter how hard a government tries to hide unemployment by reducing the labour supply, it will always reappear as soon as the firms adjust their capital stock to the lower level of employment. What is worse, this vicious circle of increasing unemployment, decreasing employment and disinvestment will continue in ever new rounds unless wages move to the market-clearing level w_e.

The considerations above explain why employment in the United States increased steadily while employment in Germany declined. They also explain why, at the same time, labour productivity grew faster in the United States than in Germany. If this explanation is correct, we need to be able to identify empirical differences in the investment activity between the U.S. and Germany. We would expect to observe a process of disinvestment in Germany. In such a strict sense, however, this is only true in a static world. But even in the dynamic world of growing economies, we would have to be able to find differences in the investment dynamics between the two countries. Figure 9 shows this to be the case. From 1991 to 2003, real GDP rose by 75 per cent in the United States but only by 16 per cent in Germany. Over the same period, gross fixed capital investment grew by 97 per cent in the United States, whereas in Germany it decreased by five per cent.

Figure 9. – GDP AND INVESTMENT DYNAMICS IN GERMANY AND THE UNITED STATES, 1991 to 2003



Source: Economic Report of the President, 2004; *Deutsche Bundesbank*, Seasonally Adjusted Business Statistics, Statistical Supplement to the Monthly Report, August 2004.

This impressive difference in the investment dynamic underscores that high and growing unemployment went hand in hand with overall economic stagnation in Germany. If the explanation presented here is correct, the inability of labour markets to absorb the structural shifts has paralysed overall economic performance and prevented Germany from deriving benefits from the new economy. This is especially true for Eastern Germany where real growth rates have been below the rates in Western Germany for seven years in a row. At the same time, all new EU member states from Eastern Europe have enjoyed growth rates well above the EU average. Obviously, the adoption of Western German labour market institutions has done more harm to Eastern Germany than could ever be compensated by the tremendous financial transfers from Western to Eastern Germany, which amount to some 70 to 80 billion Euros per year.

4. Conclusions

The new economy has opened new horizons not only for consumers and firms who gain access to innovative consumption goods and production technologies. It has also brought about new opportunities for employment. However, since these opportunities are associated with structural shifts in the demand for labour, some employees are also threatened with loss of their jobs. The question as to whether a country benefits from the new economy depends critically on the adaptability of its labour markets. Germany and

the United States are two countries which could hardly be more different in that respect. While the United States enjoyed a period of low unemployment rates, increasing employment, high growth rates and low rates of inflation, Germany faced increasing rates of unemployment, decreasing employment and low rates of real growth.

All of this explains why labour markets in Germany were unable to adapt to the structural shifts brought about by the new economy. Wage rigidities associated with the inter-sectoral immobility of labour have led to structural unemployment. Moreover, the German policy approach of reducing the labour supply in order to mitigate the problem of unemployment has failed. In the simple neoclassical framework utilised, unemployment has reappeared as firms have adjusted their capital stock to the lower level of employment. The problem of structural unemployment tends to perpetuate itself unless wages adjust to the market clearing level.

The German population and their political agents are gradually beginning to realise that a number of far-reaching labour market reforms are indispensable. Germany needs to accept more flexible wages and a higher wage spread (Berthold/Fehn, 2002). In order to mitigate hardships of structural change, mobility across sectors of the labour market needs to be improved. More efficient and market-oriented schemes for training and education are needed (Atkinson, 2001), but this will not do without additional pressure on those who are affected by unemployment. Moreover, all kinds of senseless bureaucratic hurdles need to be dismantled in order to facilitate switching jobs and even professions. Last but not least, the retirement age needs to be raised. This is necessary for a number of reasons, not least because of the threat of a collapse of the public pension system. With respect to labour markets, however, investments in human capital need to become profitable, even for older employees. At this point, neither employers nor employees find it profitable to invest in retraining even 50-year-old employees.

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DIRK WENTZEL*

European Legislation on the New Media: An Appropriate Framework for the Information Economy?

Abstract

This paper analyses the legal framework for telecommunications and the new media in the European Union. The different levels of institutional interaction within EU media regulation are explored on the basis of an institutional economics model. Compared to the US, the European market seems to possess comparable human resources and technical infrastructure. Although the EU's regulation philosophy is less market-friendly in the field of digital media, the overall performance of the legal framework is also quite satisfactory. The reason for the relatively smaller impact of IT investment for economic growth in Europe is the less-market-oriented institutions in the surrounding business environment and strong restrictions on labour markets.

1. An Institutional Perspective on European Media Regulation

> "The term New Economy points at the fact that today's economic transformation is driven by the development of modern electronic-based information technology. The term emphasises that the ongoing shift is a change in structure and not primarily a macroeconomic or cyclical phenomena. The New Economy is a structural shift, bringing transformation and disruption. But it is not about macroeconomic landings, smooth growth, permanently rising stock prices, government budget surpluses, or permanently low rates of unemployment, interest and inflation."
>
> *Alan Greenspan*, 1999

The 1990s has been a decade of unprecedented technological and institutional innovation in the electronic media worldwide. The emergence of the *Internet* and the *World Wide Web* as a global medium of communication, information and entertainment brought about an interconnection of different countries and cultures. Technological innovation within the electronic media and telecommunications increased the capacity for various new services

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and products for companies and customers alike. E-commerce and e-business emerged as new fields for promising business transactions. Investment in information technology almost exploded worldwide: The "New Economy" was born, described by many scholars as a new, long business cycle, the so-called fifth Kondratieff wave, which would dramatically change the traditional patterns of trade.

The "New Economy" was actually anything but a "new" economy. The economic logic behind most transactions remained unchanged (van Hoose, 2003). "Globalisation" and "information society" became buzzwords for and in the media. Basically, globalisation is nothing more than traditional, albeit intensified, international trade (Wentzel, 1999). The information society is nothing more than a very strong reduction in transaction and communication costs. In fact, there were international trade and information exchanges before the Internet and e-commerce were born. The only small difference between the past and the present of international trade is the so-called "Internet Mantra" (Frieden, 2001: 23) which simply means that processes run faster, better, smarter, cheaper and more conveniently.

A surprising observation can be found if the diffusion of IT technology and the effects for economic growth are analysed in a cross-national framework. Economists assume that the invention of a new technology that reduces transaction costs and therefore increases profits is warmly welcomed in all market economies and would be distributed almost equally all over the globe – at least within the industrialised countries[1]. We would expect Europe and the United States of America, for example, to show more or less the same pattern in the application and diffusion of that new and cost reducing technology. But surprisingly, US expenditures for new software and hardware surpassed those of Europe by more than 2 per cent of GDP (Bryson, 2001) and American investments in ITC almost doubled those of Europe. It is not surprising that the labour market performance and investment in related markets were much more vigorous in the US than on the old continent. Why did Europe experience a significant delay in the development and distribution of that new technology?

From the perspective of institutional economics, it could be presumed that the European institutional framework is less supportive of new technologies than that of the US. If this is true, it should be possible to identify institutions from European legislation that reduce the speed with which a new technology is spread. Another hypothesis could be that informal European institutions stemming from the general *attitude* towards new technologies reflect greater scepticism and reluctance. If the first proposition holds, it should be

[1] The research about the so-called "digital divide" addresses the problem that IT technology supports strongly the economic development in the rich countries of the North while the poor and developing countries cannot benefit appropriately from the new technology. The gap between the (well informed) rich and the (less informed) poor even grew over the 90s.

possible to suggest improvements for the formal institutional framework to accelerate the implementation of new information technology. If the second proposition holds, amelioration might be more difficult. Attitudes or "mental models of the world" (North, 1999) are the result of a long and time-consuming learning process. It might even take more time to change attitudes and basic convictions than to reform the legal framework.

This paper presents an analysis of the *formal institutions of the European media and telecommunications market*, but also considers the informal institutions. Section 2 will discuss the basic elements of the European integration process. According to Browne (2001), the comparison of media systems has to take the cultural, geographical and legal characteristics of every country into account. The European Union has 25 members and a long line of new applicants. All European countries had national monopolies in telecommunication and most of them also had national monopolies in public broadcasting. Germany still has the largest public broadcasting system worldwide with an annual budget of almost seven billion Euros. It is only logical that this structure also affects the manner and the velocity with which new media technologies are adopted and distributed. After discussing the basic elements of that integration process, an institutional model of media regulation will be presented that fits the EU framework and allows a comparison of European institutions with those found in international markets.

In Section 3, the properties of the European legal framework will be discussed in greater detail. We will present the most important rules and regulations concerning television and telecommunications in Europe, as well as the legal framework for the Internet and e-commerce. The paper concludes with a short summary of the results and comes back to our initial question: Is "the European lag" caused more by formal institutions and state-induced restrictions or, are Europeans on average less anxious to make use of new technologies?

2. The Special Case of European Integration

2.1. Integration Principles and the Common Market

European integration is one of the most complex and fascinating processes in modern history. The political and economic achievements involved are enormous. Only 60 years after World War II, former foes have become close trade partners and friends. The countries within the core of Europe have realised the highest possible level of economic integration, a single European currency and an economic union.

European economic integration actually has two different faces: first is the negative image of agricultural policy (Common Agricultural Policy, CAP), which squanders billions of Euros, erects trade barriers against developing

countries and misuses scarce economic resources. It is the spectre of gargantuan, economically debilitating bureaucracy. The second apparition is the consumer-friendly institution that opens markets, restricts national monopolies and opens borders for European companies and people. It is beyond dispute that the liberalisation of telecommunications, the opening of public broadcasting monopolies or the privatisation of electricity producers are the direct result of European legislation and the principles of a common market as introduced by the Single European Act of 1986.

The main economic feature of European integration is the so-called common market principle. This code guarantees the free flow of goods, services, capital, and labour between the members of the Union. The *idea of non-discrimination* involves the reduction of trade barriers and should increase business activities in Europe. Every product or service is qualified for cross-national trade if it is accepted in the member country where it was initially produced. This "country of origin principle" is an expression of liberalisation and a pragmatic and market-friendly integration approach.

The European telecommunications market is a good example of what this approach implies. At the end of WW II as commercial telecommunications were just beginning, this sector was seen as a *natural monopoly* that had to be managed by state regulation (Frieden 2001). Due to that perception, every European country had its own monopolistic telecom sector with specific technical and institutional standards. Radio and television were almost only accessible for public broadcasting stations. Telephony and communication equipment were only provided by national monopolies. The technological development of the 80s increased the necessity of improving the regulatory framework in this sector.

The EU's policy for the information society opened those telecommunications monopolies, mainly using Article 95 (Internal Market Harmonisation), Articles 81 and 82 (Competition and Anti-Trust) and Articles 47 and 55 (the right of establishment and services) of the Treaty establishing the European Community (TEC). Private companies gained access to former restricted media and telecom markets as well as international competitors. The further promotion of trans-European networks (TEN) in the field of transportation and communication laid the groundwork for an improved infrastructure and an open market approach. Today, the costs of telecommunications, short- and long-distance telephony, for example, have sharply declined. This is caused by *Moore*'s and *Metcalfe*'s laws of modern telecommunication, but of course at the same time by intensified competition in an enlarged market. The merger between Vodafone and Mannesmann D2 in the market for mobile telephony became the largest take-over in history.

But *liberalisation* in Europe has a twin which must always be taken into account in telecommunications – *harmonisation*.1 When Article 95 TEC made it legal to offer telecom services all over Europe, there was still the problem

of differing technical standards. All Europeans remember how inconvenient it was to use a cell phone on a trip through Europe. As soon as you crossed a border the cell phone quit working because of the differing technical standards in the two countries. So the need to harmonise standards in order to maintain operability of technical equipment was obvious. Harmonisation is a necessary precondition for the further development of markets and goes hand in hand with liberalisation and market expansion.

But harmonisation is also the greatest threat for the competition of systems and ideas within the European market. Harmonisation can also lead to *centralisation* of economic decision by bureaucratic institutions. The economic theory of standardisation illustrates the difficulty of finding the best standard in so-called winner-take-all markets (Wentzel, 2003b). The state often lacks sufficient knowledge to choose the best standard. If it intervenes in the selection process, however, it might easily favour the wrong norm, leaving better options behind as "angry orphans" (Wentzel, 2002b). There are neither theoretical nor empirical criteria as to how far harmonisation should reach. There is clearly tension between the essential level of common standards to secure and facilitate communication and the centralisation that restricts competition. It is one of the most difficult challenges of telecommunications policy in Europe to develop an optimal policy mix to match these competing goals.

2.2. Why is Europe different?

Every comparison between American and European markets reveals significant differences. There is of course an American media market, but there is no comparable *single* European media market. The significance is readily apparent if the different levels for legal decision-making are considered.

Since May 2004, the *national level* of the European Union consists of 25 member states with their 20 different languages. Important countries in Europe such as Switzerland and Norway are not members of the EU, although both are of great importance for European trade and finance. Cultural and economic development is extremely diverse across the established EU countries, including the transition countries of Central and Eastern Europe and the important countries on Europe's periphery. There are large and rapidly developing markets, e.g. the Russian market, especially with respect to the diffusion of new media. Each country has its own legal and formal institutions that have to be considered in an analysis of a European media market.

Below the national level of the EU states, there are also *regional or local entities* (e.g. German "*Bundesländer*") possessing independent legal options. The *Bundesländer* have strong regulatory influence and can permit or restrict access to television markets. The European Constitution invokes the *principle of subsidiarity* (Art 9 Draft Treaty Establishing a European Constitution) guaranteeing the independence of those regional entities. The legal framework

becomes more complicated when the legislation of the lower entities also has to be considered.

In Europe, the *trans-national level* of media activity includes, e.g. political parties or consumer groups with branches in numerous countries. The socialist and the conservative parties from all countries convene frequently to define their common interest within a European framework. Environmentalists have already founded a trans-national European party (the "Eurogreens"). Labour unions enjoy trans-European co-operation as do other stakeholders. Large European companies have networks across the continent to pursue their specific business interests. When a given issue is discussed within European institutions and the Parliament, it is difficult to predict what coalition of stakeholders will be formed.

Finally, supranational European institutions have emerged over recent decades, e.g. the European Council, the European Commission and the European Parliament. Even for insiders and legal scholars, it is sometimes very difficult to know who possesses competences and legal powers in particular fields. Many different Directorates-General within the EU Commission contribute to media legislation, e.g. the directorate for education and culture, the directorate for the common market, the directorate for enterprises and information society and, finally, the directorate for anti-trust legislation. Anti-trust policy is especially important because (due to a decision of the European Court of Justice) media and film are regarded as services. Therefore the principle of non-discrimination and the free flow of goods and services must also be applied for media and telecommunications. Sometimes, of course, EU members have different perceptions and interpretations of the complex system of rules and regulations concerning media in Europe. In the absence of a specific and harmonious European media policy, the European Court of Justice is *practically* the only authority to resolve disputes in that field.

2.3. An institutional model of European media regulation

To compare international media systems, it is helpful to have an analytical framework that focuses on different institutional settings and therefore allows more far-reaching conclusions than a simple description of a regulatory framework at a given point in time. A morphography of media systems, as developed by Wentzel (2002a: 39), provides information about the key institutional elements within a media system, e.g. ownership, financial restrictions, public interest obligations, program content, diversity and innovation, openness towards international programs and owners, control of the public, and profitability.

To apply an institutional approach to European media regulation, it is useful to distinguish between three characteristics of a complex media system:

1. the human resources involved (the human or knowledge factor)
2. the technical infrastructure (standards, quality, institutional agreements)
3. the prevailing market system and business environment.

The successful development of digital media markets depends on all of these features simultaneously and will also be defined by the bottleneck factor. As we know from traditional comparative economics, many of the former socialist countries had a highly qualified work force and technical equipment, at least in some fields, but were unable to improve overall productivity due to the restrictions of central planning and an inefficient business environment.

The last of the three characteristics, the market system and the business environment, consists of different levels of interaction as illustrated in the following exhibit.

Levels of institutional interaction within the EU media regulation

First, the basic level of national regulations must be analyzed. In the EU that includes both the national and trans-national institutions. Market access, anti-trust legislation, privacy and ethical standards, taxation, protection against fraud, illegal transactions and numerous other issues must be addressed. The state of those institutions seems to be more consistent within a nation state than in a confederation of nations with still extant (and conflicting) national levels of legislation.

The second level that has to be considered is that of a general regulatory approach or regulation philosophy. Each single component of the basic legal framework is directly affected by the general sentiment favouring or opposing state regulation. Technology, content, ownership, and conflict settlement can be handled with either more or less involvement by the state. The US administration under President Bill Clinton, for example, expressed the point of view in 1997 that the guiding principle of modern media policy in global markets should be self-regulation, since that would promote rapid growth in that sector of the economy ("Framework for Global Electronic Commerce"). Five principles underline that generally market-friendly attitude:

1. The private sector should lead: innovation, expanded services, broader participation and lower prices will arise in a market-driven arena, not in an environment that operates as a regulated industry.
2. Governments should avoid undue restrictions on electronic commerce: Government attempts to regulate are likely to be outmoded by the time they are finally enacted, especially to the extent that such regulations are technology specific.
3. Where governmental involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment for commerce.
4. Governments should recognise the unique qualities of the Internet.
5. Electronic Commerce over the Internet should be facilitated on a global basis.

Extending the analysis to the international level, self-regulation becomes even more necessary (and successful) in the case of the Internet. Obviously, two different levels of competition can be observed in the global media market: first, the level of competing companies fighting for profits and market shares and second, the more general competition of systems, including the competition of different regulatory frameworks that attract (or repel) international investors. Systemic competition gives investors the choice of selecting the most market-friendly environment for their investment. "Voting with your feet" becomes a real option in open markets. But it would be premature and against all empirical evidence to affirm that freedom to choose the best standard would lead to a race to the bottom with respect to quality. Even though competition in the fight for market shares is necessary, some kind of cooperation is unavoidable in order to guarantee certain common standards, e.g. on the level of technical and transfer protocols.

Finally, the last regulatory level is control through the public or through independent agencies and non-profit organisations. The most important pre-conditions for successful self-regulation are transparency and procedural fairness (Wentzel, 2002b; 2003b). Therefore, control through the public and transparency are very helpful in avoiding illegal procedures and collusive actions.

Applying these theoretical and institutional considerations to EU media regulation, a preliminary conclusion is straightforward. Given the existing structure of a European market between the differing forces of competition and harmonisation, it is only logical that the resulting framework must be some kind of a *compromise* between the occasionally conflicting economic and political interests of the 25 member states. And, as we know from institutional economics, these compromises are not necessarily the most efficient available option.

3. The European Framework for Electronic Media: An Overview

The European media market consists of many different parts: For the purposes of our analysis, we used three different segments: radio and television, telecommunication and the Internet and electronic commerce. All sectors are closely interconnected through media regulation, content, private or public ownership, transportation capacities, ethical standards etc.

The first significant milestone towards a single (West-) European media market was taken in 1986 with the "Single European Act". The rules of that act were also applied to the media and telecommunication sector and therefore enhanced liberalisation of a tightly restricted field. Of course, this liberalisation process was also geographically expanded after the fall of the iron curtain and the development of free market systems in Eastern Europe. 1998 saw a completely liberalised telecommunications market in Europe and a partially

liberalised television market with private competitors and intensified trade in media and television content within Europe.

The emergence of the Internet and the World Wide Web at the beginning of the 90s brought about new activities for EU authorities i.e. to provide an appropriate framework for those newly emerging business activities. The *Lisbon Summit* in March 2000 set out a very ambitious plan called "eEurope – An information society for all". This plan was adopted by the EU Council: it defined a strategic goal for Europe to become "the most competitive and dynamic knowledge-based economy in the world". In order to achieve this goal, two action plans were decided upon, the so-called action plans *eEurope 2002* and *eEurope 2005*. The first plan focuses on the further intensification of Internet use among Europeans, while the second concentrates on effective access, on responsible use and universal availability, thus providing a more comprehensive and effective approach towards media regulation.

3.1. Rules and Regulations for Television

The economic history of radio and television demonstrates that divergent attitudes towards regulation determine market institutions (Wentzel, 2002a). Broadcasting started worldwide in the late 1920s as a private enterprise. But while the American broadcasting system developed more or less on market-based, individual entrepreneurial decisions, the European experience was quite different. Almost all European broadcasters came under the heavy-handed state control of the government, which used the "new media" to educate their own people and to convey positions of the government.

During the Nazi period, Germany experienced the use of broadcasting purely as a propaganda machine. No opinion other than the dictator's could be aired. Illegal listening to the British Broadcasting Corporation was sanctioned with the death penalty. After the war, the American High Commander for Germany, Lucius D. Clay, considered launching a broadcasting system after the American model, which means mainly based on private initiative and ownership. But in difficult economic and political post-war times, neither financial nor human resources were sufficient to secure a market-oriented media system. Therefore the decision was made to introduce a public broadcasting system, mainly after the role model of the BBC, which was also used for "re-education purposes". This decision turned out to be a major institutional *path dependency*, because many attempts to reform that system and to allow private competitors to enter the market were blocked by the incumbent stake holders (Wentzel, 2002a).

The opening of the German public broadcasting monopoly was mainly affected by European legislation and European competitors at the same time. In 1984, the EU launched a "green book" for a "European Television Market without Frontiers" (TVWF). The main idea developed in that brochure was

the mutual acceptance of TV programming within the European common market. At the same time, private companies, e.g. in Luxemburg, were broadcasting very attractive music and entertainment. This program was available via antenna TV almost all over Germany meaning that a private competitor had sneaked into this public broadcasting monopoly like a Trojan horse and without official legal permission.

In 1989, the "Television without Frontiers Directive" (89/552/EEC) was launched in order to establish the legal and institutional framework for a free movement of radio and television services within the European market. It set up rules for advertising, the mutual acceptance of content, co-operation of audiovisual programs, youth protection etc. Basically, the "country of origin principle" was introduced for broadcasting. At the same time, the first little "fortress Europe notion" became observable in the attempt to promote the production and distribution of European works. In 1997, the television without frontiers directive was amended in order to ensure that the new technological and political developments (with the fall of the iron curtain) were appropriately addressed.

The use of directives is a very important legal instrument in the development of the European market. Those directives are not directly transformed into national law, but the member states are to bring into force all the necessary regulations and organisational and administrative provisions to comply with them. As a result, the nation states cannot ignore European directives: They must adjust their legal framework in order to match EU standards and the so-called "*aquis communautaire*".

The EU also takes a supervisory role for its member states. According to Article **3a** of the TVWF Directive, member states are to notify the EU Commission of all measures taken concerning the licensing of broadcasting stations and the licensing of "events of major importance for society". The latter point sounds very reasonable at first, but actually turns out to be a major obstacle for private broadcasters and a restriction for market access. Basically, events of major importance for society are usually sports events such as the soccer world championships or the Olympics. Due to the still extant, strong influence of public broadcasting stakeholders, major sporting events should be banned from pay TV and should be accessible only on free TV. Since the broadcasting rights for major sports events are usually extremely expensive, no private stations can afford to purchase those rights when the only revenue they can make out of it comes from advertising. Therefore, public broadcasting stations which receive huge state subsidies (as in Germany) can retain a niche in the very competitive market of sports broadcasting.

The EU Commission is also involved in an active consultation process, resulting in a Communication on the future of European audiovisual policy (COM [2003] 784 final). The first objective is to monitor new advertising techniques (such as the split screen) to ensure that the TVWF standards are complied

with. The second is to guarantee the protection of minors and of human dignity in general in new program formats. Broadcasting is, in general, a very competitive and innovative market and at least sometimes standards of decency and ethics are challenged or violated (Campbell, 1999). At this point it should be emphasised that self-regulatory agencies in Europe also make a major contribution to the provision of high quality standards in television markets.

To sum up, the liberalisation of European television markets and the Television without Frontiers Directive have greatly enhanced the quality and diversity of European Television. With the use of the right technical equipment, European customers can watch more than 200 programs from other European countries. International stations are also available e.g. CNN, NBC, and also Arab and Asian stations. Regarding ownership and market access, the EU has also achieved a remarkable amount of economic freedom. As the EU Commissioner for television markets, *Vivian Reading* illustrated her credo in a speech in Berlin in March 2005: "In dubio pro libertat"[2].

At the same time, certain tendencies of a new protectionism within the EU must be monitored carefully. Naturally, the protection of a nation's own culture and heritage is a legitimate effort, but it should not be abused for short-term nationalistic purposes. Obviously, EU legislation has had trade-creating effects for the common market. This asset should not be squandered by restricting EU commercial transactions with overseas and developing countries.

3.2. Rules and Regulation concerning Telecommunication, Internet and E-commerce

The European telecommunications market is a story of successful economic liberalisation within the common market. Every European market (as well as the US) had a monopolistic telecommunication sector up until the beginning of the eighties. Privatisation was the result of new technical opportunities and of a new economic philosophy[3] concerning the regulation of monopolies. The policy of "dismantling the monopolies" in the United Kingdom and in the United States, at the beginning of the 80s, led to new economic management of that sector.

The first important step taken by the European Union was the liberalisation of services and equipment (1988 and 1990). Until 1988, the Deutsche Post,

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[2] Speech delivered at the *Konrad Adenauer*-Foundation in April: "20 Jahre medienpolitischer Urknall" ("20 years of media big bang in Germany").

[3] Up until the late 1970s, the economics of networks was analyzed with the theory of natural monopoly. Based on the idea of sub-addtivity of costs, a monopoly was thought to be economically most efficient to supply certain network services. The new theoretical orientation of "contestable markets" changed that interpretation dramatically and led also to very different policy recommendation.

for example, had a monopoly on the provision of telephones and equipment. The product they offered was technically obsolete and also extremely expensive. Many Germans purchased telephones and answering machines from the US. Technically, it was very easy to hook up those telephones, but it was illegal and was liable to a fine with severe penalties. Actually, for an Economics 101 class there is no better example of the low quality standards and the high prices of a monopoly than the performance of the Deutsche Post (and the AT&T in the US) until the end of the eighties.

The first step in liberalisation allowed customers to buy telephones from international providers and use them in their own national telephone system. In addition, the so-called Open Network Provision (ONP) guaranteed free access to telecommunication networks and therefore set up the basic framework for competitive market behaviour.

The second step in upgrading economic performance in the telecommunication sector was the liberalisation of infrastructure, including the new emerging sector of mobile communication and cable industries. Especially for mobile communication it was important that the incumbent monopolies not be permitted to misuse their market power to take over the newly developing sector of mobile telecommunication. Cable networks were also very important, because they were the technical precondition for the European-wide provision of private television, as mentioned above. Cable TV was crucial in overcoming the scarcity of frequencies for traditional antenna TV and also allowed, for the first time, the provision of mass communication with an interactive option. But, of course, private television that has to go through the bottleneck of state-owned cable infrastructure would not work efficiently in the long run. Therefore, free market access for private companies and the liberalisation of services had to go hand in hand.

The third step was a full liberalisation of infrastructure and services, including voice telephony. European customers gained a greater variety of choice, better quality and greater value added. Within less than twenty years, European markets had changed from a purely monopolistic (and nationalistic) structure toward a very competitive trans-national market, creating great value.

As in the sector of television, the EU issued directives to build a framework for a competitive market. A services directive (90/388/EC), a cable directive (95/51/EC), a mobile telephony directive (96/2/EC), a full competition directive (96/19/EC) and a cable ownership directive (99/64/EC) can together be characterised as liberalisation directives. Other directives such as the open network provision directive, the data protection directive, the interconnection directive, the European emergency number decision, the voice telephony directive, to name only a few, directly refer to the legal framework for digital markets. This network of directives and regulations is difficult to oversee, even for insiders and is therefore a major obstacle for market access, since it is difficult for newcomers to gain a detailed insight into the relevant rules and

liabilities. Therefore, the EU is trying hard to consolidate its media legislation into only a few directives to make it more clear and transparent for potential investors. The status quo of the regulatory framework within the EU is characterised by the following (Schulze, 2002):

- the General Framework, including the e-commerce directive and the electronic signature directive,
- jurisdiction and applicable law,
- transaction and consumer protection, e.g. the electronic money directive or the distance selling directive,
- content related e.g. copyright, directives, youth protection and cyber crime communication,
- governance e.g. domain name communications, and
- telecommunications e.g. the unbundling of local loop regulation.

The further development of the New Economy in Europe will be strongly influenced by the Union's attempts to consolidate the huge variety of legal restrictions and to transform them into a more consistent framework that enhances entrepreneurial activities.

5. Consequences and effects of European Media Regulation

In comparing European media regulation with other media systems such as that of the US, it is helpful to distinguish between knowledge infrastructure, technical infrastructure and standards and, finally, the corresponding action infrastructure. Starting with knowledge and computer skills, Europeans and Americans have reached about the same standards. Internet penetration and the diffusion of personal computers are at roughly the same levels. High school and college education in fields related to the information society are comparable. Also the technological standards and equipment seem to be about equal in Europe and the US.

Both markets have clear rules concerning consumer safety and protection against fraud. Privacy and ethical standards are almost equally protected in Europe and the US. Anti-trust legislation seems to be more clear and foreseeable in the US because of the structure of the FCC. In Europe, the co-existence of national anti-trust agencies and the EU Commission leads to a more complex and sometimes confusing business environment. This is also the case in the field of law enforcement. While the FCC and the FTC have quite efficient tools at hand to restrict the influence of media monopolies, things turn out to be more complicated in Europe. Moreover, European decisions are not limited to economic issues. Every European decision is subject to nationalistic considerations. A consistent anti-trust policy in the field of the media is not yet extant in the European market.

The action infrastructure for e-commerce and e-business in Europe seems to be quite satisfactory, at least from an economic standpoint. Europe has created quite a competitive and open media market for television, telecommunication, e-commerce and the Internet, especially as compared to the initial situation from which they started twenty years ago. But, as already mentioned, purely virtual transactions in the digital economy are rare. Therefore digital markets and the impact of IT investment must be analysed in combination with traditional labour and factor markets.

Even if European legislation on digital media seems to be reasonable in many aspects, the infrastructure for business transactions *following the initial contact* in the digital economy seems to be more business-friendly in the US. Europe has a very strong position concerning consumer and data protection. Labour markets are still very restricted and most European countries suffer under comparatively high rates of unemployment caused by over-regulation from the state and strong interest groups. Thus, it is not surprising that the growth multiplier resulting from IT investment is higher in the US than in Europe. If you do not liberalise traditional factor and labour markets, you cannot expect economic miracles and a recovery from sloppy growth rates from e-commerce and digital media. Both are interesting new fields of institutional and technological innovation, but not a cure against the malfunctioning of an overwhelming welfare state.

Another difference between Europe and the US is the general economic orientation and the amount of self-regulation used in both markets. Especially in the field of media content, the US approach leans more toward self-regulation and private initiative. An interesting expression of that viewpoint is the above-mentioned "Framework for Global Electronic Commerce" issued by the US administration on July 1, 1997. The first two principles declare that the private sector should lead and that governments should avoid undue restrictions on electronic commerce. Such a commitment is quite unusual for European governments and legislation: This is surely an expression *inter alia* of cultural differences. Europeans seem to be more sceptical than Americans about the application of new technologies. And Europeans are more trusting of the state's capacity to solve problems. Nevertheless, some developments in the field of digital media and especially in the emergence of the Internet might have changed this attitude somewhat.

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The Eastern Expansion of the Digital EU

Abstract

The eastern expansion of the European Union raises many challenges and brings new opportunities in terms of trade, capital flows and the exchange of digital information. Relatively poor central and eastern European countries entered the Community during a period in which information and communication technologies (ICT) play a particularly important role in the growth and structural change of OECD countries. In the 1990s, the US and several EU-15 countries recorded relatively high growth rates and the ICT sectors had a strong impact on the acceleration of productivity growth and output dynamics. We first look at the main characteristics of ICT and raise the question to what extent new EU member states are well-positioned to catch up with some EU-15 countries in selected ICT fields, especially in telecommunications. A series of descriptive statistics of the EU-15 and the new EU member countries shows that eastern European countries have considerable catching up to do in some digital fields. Some eastern European countries show better performance in terms of mobile telecommunication density, internet density or internet host density than Portugal or Greece. However, insufficient competition and privatisation problems constrain digital modernisation and the amelioration of the economic situation, not to mention the region's digital integration into Europe. The European Commission should investigate the unsolved ICT policy problems in Eastern and Central Europe critically.

1. Introduction

EU eastern enlargement brings considerable changes to the Community; it becomes larger, of course, with GDP for the EU-25 countries approaching that of the US. Economic growth is expected to increase as East European countries begin to converge in development terms as they participate in the enlarged EU single market. The enlargement took place in May, 2004 and included ten new EU member states: Cyprus, the Czech Republic, Estonia, Hungary, Lithuania, Latvia, Malta, Poland, the Slovak Republic and Slovenia. The new EU member states represent between 1/3 and 2/3 of the average EU per capita in purchasing power parity. Sustained growth of this region is also in the interest of the EU-15 countries, since economic convergence will create dynamic new markets in Eastern Europe and reduce the need for extensive Community subsidies ("structural funds") over future decades. Relatively poor central and eastern European countries enter the Community in a period in which information and communication technology (ICT) contributes

uniquely to OECD countries' growth and structural change. This important consideration distinguishes southern EU enlargement from eastern EU enlargement.

Part of the higher growth expected for new EU member states should come through trade creation and increased foreign direct investment (FDI). The latter will come largely from the EU-15 countries, implying that Western Europe's multinationals will become even larger than at present. Except for a few dozen joint ventures in Hungary, socialist Eastern Europe had been practically inaccessible for western multinational companies. Modern information and communication technology (ICT) facilitates the organisation of multinational companies: Computer networks and other elements of information technology allow firms to combine economies of scale with efficiency-enhancing, decentralised organisation of production abroad.

FDI inflows, together with domestic investment, will raise capital intensity and help increase labour productivity, which will in turn contribute to output growth in Eastern Europe. With heavy investments, US and German firms have been able to raise labour productivity. This is especially so where ICT investments have been large (Haltiwanger, Jarmin and Schank, 2002). In Eastern Europe, many sectors are not as capital- and technology-intensive as in the advanced OECD countries; however, there is no doubt that the strong ICT technology dynamics of the 1990s (e.g. in telecommunications, the field with the highest growth rate of recorded patents) offer particular modernisation opportunities for new EU member states. Since telecommunication density in socialist Eastern Europe was rather low and international economic relations were underdeveloped, systemic transformation and regional integration will open many fields to ICT investment (even basic telephony). This will contribute to productivity growth and greater product differentiation. The latter is often associated with innovation and will also stimulate trade and could contribute to higher output growth.

Obtaining information about market developments within the enlarged single market will be a major challenge for EU firms generally. Modernisation of telecommunications and the expansion of information and communication technologies will be particularly crucial. The growth-enhancing effects of ICT in Western Europe, North America and Asia suggest that transition countries should realise specific benefits from digital modernisation and the expansion of the telecommunications sector (Welfens, 1997; Siebert, 2002; Bargield, Heiduk and Welfens, 2002). Economic convergence in Eastern Europe could be accelerated through a rapid modernisation of the telecommunications sector, provided that this is associated with sustained competition. Increased market and pricing transparency will stimulate arbitrage and international trade, resulting in increased consumer surplus and efficiency gains;

- more efficient corporate organisation of production, outsourcing and distribution;

- increased interest in the region by multinational corporations, which consider advanced and reliable telecommunications services a requisite for investment:
- structural change towards more knowledge-intensive and technology-intensive products for which information is a specific factor input; digital telecommunications networks, both fixed and mobile, provide the required data highways for such industries.

Since socialist countries in Eastern Europe had very low penetration rates in fixed line telephony in the late 1980s (10-20 per cent as compared to about 50 per cent in the leading EU countries), there is considerable room for improvement. Mobile telecommunications offer a crucial alternative to fixed networks in transforming countries where state-owned telecommunications operators often face low productivity, tight budgets and limited access to capital markets. At the same time, some of the benefits of telecommunications modernisation are rather difficult to realise for transition countries: the digitisation of telecommunications networks in western OECD countries, for example, has greatly accelerated internet traffic, valuable both as a consumer service and as a cost-cutting agent for companies providing new digital services worldwide (e.g. Dell, Cisco, IBM, Siemens). This in turn requires increased use of computers, advanced software and skilled human capital. Computer density and human capital are obviously more readily available in the EU-15 countries than in the newly acceding countries, with the possible exception of Hungary.

Modernising and expanding telecommunications networks and related services are both complex and difficult; special market conditions in telecommunications can create impediments. Specific market characteristics cannot be ignored when looking into the dynamics of telecommunications. Opening up the fixed-line telephone market is not sufficient to generate sustained competition. In fixed line telephony, high sunk costs can prove a formidable barrier to entry. EU regulations require that national regulators prevent former national monopoly operators from withholding unbundled access to customers and that interconnection be possible at non-discriminatory, cost-oriented terms. The EU has summarised the most important rules in the form of framework directives (EU, 2002).

The internet provides new opportunities for trade in digital services, reducing transaction costs while permitting better market transparency. The most significant use of the internet is for business-to-business (B2B) transactions, mostly in the supply chain, although business-to-consumer (B2C) transactions are also important. The computer industry itself uses ICT intensively. Digital ordering and built-to-order-systems based on internet communication were successfully pioneered by DELL. IBM has decided to focus more on digital services, combining specific computer know-how with IT outsourcing of banks or airline companies.

Some special problems are encountered in bringing digital services in line with WTO principles. Security and digital copyright problems, as experienced in the Napster case, illustrate the relevance of digital intellectual property rights. Internet usage and internet hosting – the supply of information through internet secure computers – are important aspects of digital networking relevant for productivity, innovation and growth. Eastern Europe's position was relatively weak in the late 1990s, but there are broad opportunities to overtake leaders in internet commerce.

Section 2 looks at ICT dynamics in western OECD countries. Section 3 describes telecommunications and internet dynamics in Eastern Europe, and section 4 draws some policy conclusions. Our fundamental conclusion is that there is a digital divide within the new Europe, but opportunities also exist for reducing or eliminating the gap between central and eastern European countries and the older EU members. As EU membership mandates full liberalisation of telecommunications for the new EU member states, in both network operation and voice telephony, there are strong competitive impulses associated with more intensive use of both digital networks and information. Some eastern European countries might well overtake some of their western European counterparts within a decade in selected fields of telecommunications.

2. ICT: Telecommunications, Computers and Productivity in OECD Countries

2.1. ICT Dynamics, Investment and Productivity

The ICT sector stimulated economic growth in the US and some European OECD countries enormously in the 1990s. According to European Information Technology Observatory (EITO) definitions, ICT consists of three different elements: information technologies, telecommunication equipment and telecommunication services.

The rapidly growing market for ICT equipment is a competitive one. In software products there is less competition, especially in the office market where Microsoft dominates. IT services represent an internationally competitive market with a few dozen big firms. Telecommunications carrier services are rather competitive in the field of mobile telephony – most OECD countries have 2-4 suppliers. Competition in fixed line telephony is relatively weak with their high sunk costs and natural monopoly conditions; newcomers enjoy only 10-30 per cent market share in most EU countries. The former monopoly operator is often also a leading actor in the mobile telephony market. The 1998 opening up of voice telephony and network operations in continental EU countries stimulated competition in carriers markets. Cable TV networks

have also entered the market for telephony and internet services in most EU-15 countries. Enormous technological progress in ICT suggests that mobile telephony will play a growing role in the future.

The impact of ICT on both productivity growth and output growth has varied regionally. ICT production has strongly increased labour productivity growth in Korea, Finland, Ireland, Sweden, Japan and the US (OECD, 2003). None of the new EU member states have characteristics similar to Korea, Finland or Ireland. However, Hungary or Poland could become major ICT producers if government policies successfully promote FDI over an extended period, although strict EU subsidy control might limit this possibility.

Value added in telecommunications has gradually increased in OECD countries from about 2 per cent in the 1980s to slightly more than 3 per cent in the 1990s. As prices for telecommunications services began to decline after the liberalisation of EU markets in 1998, volume increased greatly as relative telecommunications prices fell. Part of that decline reflected the use of ICT in network operation. Falling computer prices and digitisation allowed a more efficient and flexible use of transmission channels in the 1990s. Finally, digitisation has intensified competition as former market segmentation in telecommunications, radio, TV and cable TV have been blurred. More competition should bring about a fall in prices as market power erodes and as process innovations are stimulated. Moreover, a wave of product innovations is particularly visible in the field of mobile telephony. The modernisation and expansion of telecommunications in EU-15 and also in EU-25 countries will stimulate trade and growth in Europe. Falling relative computer prices and growing digital networks provide a strong incentive for the business community to invest, stimulating innovation and economic growth in Europe.

ICT investment has not only played an important role in modernising manufacturing industries; in the late 1990s it also raised labour productivity growth in the services sector in Mexico, the US, Australia, the UK, Iceland, Sweden, Norway, Austria, Korea, Canada, Switzerland, Belgium, Denmark, and the Netherlands. In contrast, Germany and Italy had low and declining increments in labour productivity in ICT-intensive services (OECD, 2003). In Mexico, labour productivity growth increased by almost 1.5 percentage points in the late 1990s, showing that not only advanced industrialised countries can benefit from the use of ICT in the services sector. This suggests that labour productivity growth in services could be increased considerably by ICT investment (with the necessary concomitant investments in reorganisation and retraining within firms) in the new EU member states.

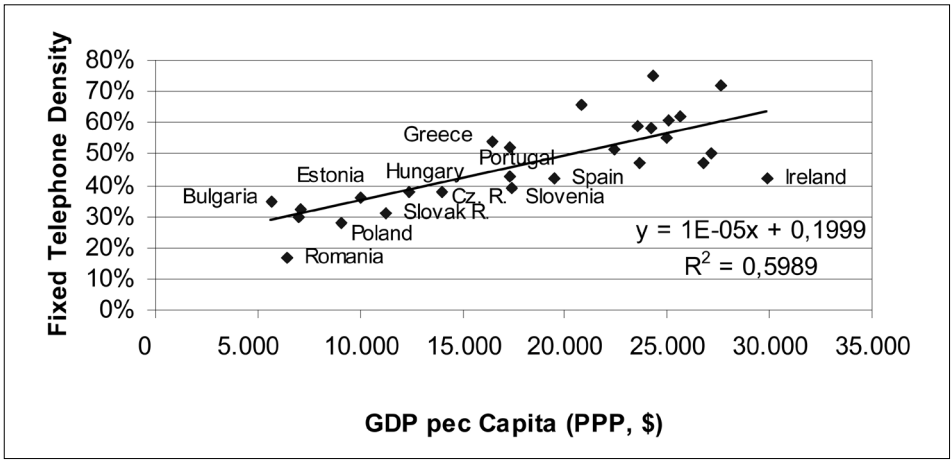
Some of the new EU member states have relatively high digital potential. Exploiting this will depend on foreign direct investment inflows, human capital formation and investment in research and development. EU eastern expansion and sustained growth in the region will create new opportunities for ICT

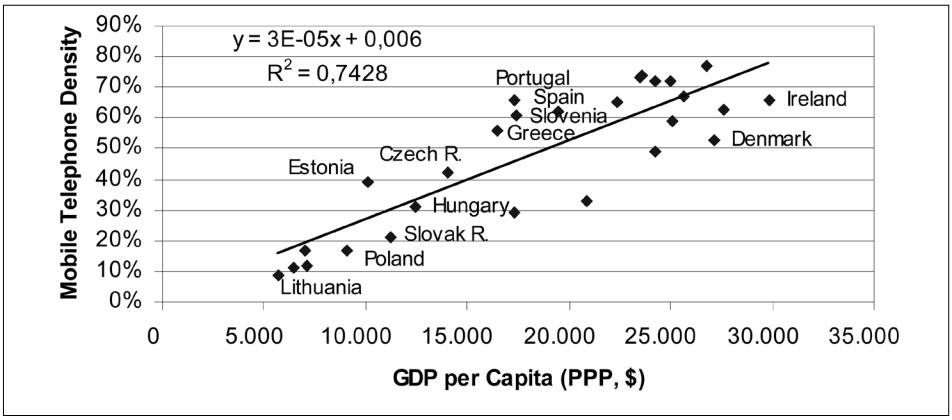
firms to exploit economies of scale, pursue new options for trade and FDI, as well as for digital expansion and modernisation.

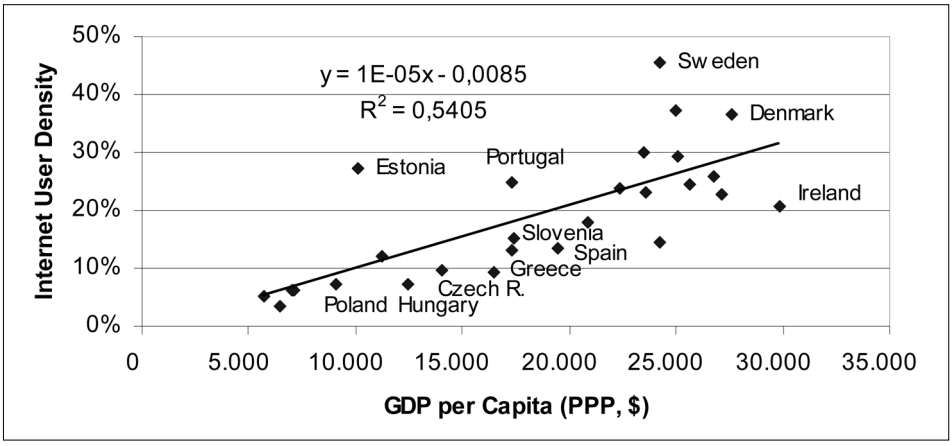
Figure 1 shows the relationship between GDP per capita (on the basis of purchasing power parity - PPP) and the density of a country's fixed line telephone network. A simple regression line between fixed line telephone density and GDP per capita shows Bulgaria above the regression line with Romania, Poland, the Slovak Republic, the Czech Republic and Slovenia below; this analysis ignores variables other than per capita income that help determine telephone density, but does roughly indicate a large potential for catching up. Figure 2 shows the correlation between mobile telecommunication density and per capita income. Here, Estonia, the Czech Republic and Slovenia are above the regression line, making them relative leaders from a cross-country perspective. Low fixed line telephone density in Eastern and South-eastern Europe creates a particularly strong demand for mobile telephony, which in some regions of Eastern and South-eastern Europe (in spite of unrealistic traditional wisdom) is indeed a substitute for fixed line telephony. With respect to internet user density, only Estonia is above the regression line and above the relative average. This also holds true with respect to internet host intensity.

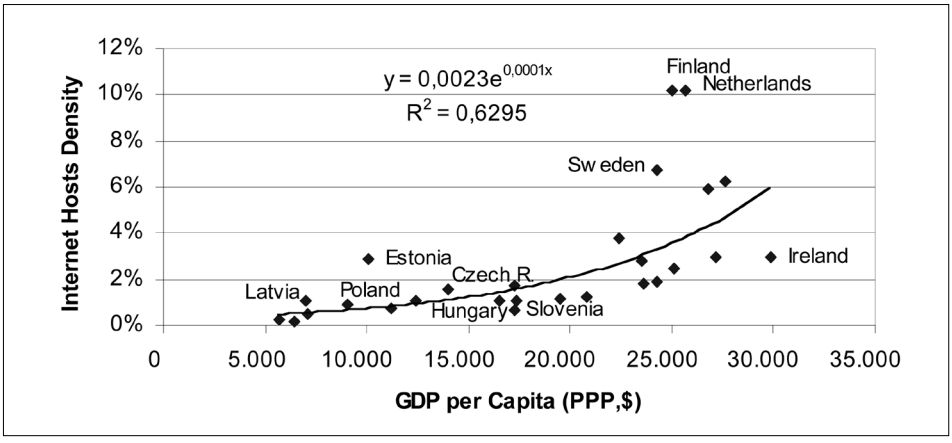
Among new EU member states, Estonia thus stands out as a leading country in the digital field. For this small economy, this could bring about a comparative advantage in information-intensive goods and services. In contrast, the largest new EU member state, Poland, is below average and needs to catch up in both fixed line telephone density and mobile density. Without strong improvements and expansion in fixed and mobile networks and increasing intensity of competition with the associated declining user prices, Poland will be unable to close the digital gap. The network density gap translates into an internet gap, so that improving network density would benefit both telecommunications and the internet.

Figure 1. – RELATIONSHIPS BETWEEN GDP AND ICT-SUBINDICATORS IN EUROPE, 2000









Note: The depicted relationship is calculated from data for the year 2000 from 26 European countries, i.e. EU-14 (EU-15 minus Luxemburg), new EU member states, Turkey and Bulgaria.

Source: ITU (2002), own calculations.

In PPP terms, Slovenia has the same per capita income as the second poorest EU-15 country, Greece (Portugal is slightly poorer, see Table 1). Slovenia, however, has higher indicators than Greece in the field of mobile telephone density, internet user density and internet host density. Only in traditional fixed line density is Greece better equipped than Slovenia. The Czech Republic also does better in all fields than Greece, except for fixed line density, which is a general legacy from the socialist era of new EU member states. Given the fact that there are considerable barriers to entry in fixed line telephony and that the dominant national operator has rarely been restructured in these countries, inefficiencies, poor service and relatively high prices are not surprising.

Modernisation efforts in transition countries have been impaired by modest budgets and unfavourable economic conditions. Privatisation has also been slow in the field of fixed line telephony. Since high computer density is crucial for digital modernisation and productivity growth (partly because of network effects), the Czech Republic, Slovenia and Estonia are three new EU member states whose ICT sectors are similar to those of the poorer EU-15 countries. Since computer density is important in the internet economy, these three countries are well positioned. Within the overall group of new EU member states, there is considerable digital heterogeneity, but this is also the case among EU-15 countries, where the Netherlands and the Scandinavian countries are clear digital leaders.

Table 2 describes quantitative relationships among the variables per capita GDP, fixed and mobile telephony, internet users and hosts, and computer density in terms of Pearson's correlation coefficients. Positive and significant correlations are visible in most cases. Only internet hosts show a lack of significance in relationship to the other variables, except with respect to internet users. Apparently, other influences are crucial for the host density. The percentage of firms engaged in trade, the share of multinational subsidiaries among all firms and the level of education of the population, are variables that should positively affect internet host density. The link between per capita income and digital indicators reveals a causality problem which is not clarified by any rank correlation coefficient.

A better telecommunications infrastructure and increasing use of both the telecommunications network and the internet (and supply-side activities through the internet) can be expected to contribute to national output Y in the implicit production function Y(K,L,Z,T). Here, K is capital, L is labour, Z is the level of technology and T is the use of the telecommunications network. This type of production function has been tested by Welfens and Jungmittag (2002) with significant results for Germany. The demand for telecommunication services typically has positive income elasticity yielding a positive correlation between digital indicators and per capita income.

As competition intensifies through market entry, technological progress and increased numbers of users, the marginal revenue from new users will fall as

saturation is approached. Revenue per subscriber in mobile telephony should fall in the advanced OECD countries; new mobile services and a rise of per capita income could, however, increase those revenues in the long term. That indicator fell in all West European countries (except for a brief period in Austria) in the period from 1995 to 2002. A decline in mobile revenues per subscribers could also be observed in the new EU member states. Hungary, leading in mobile telephony among central and eastern European (CEE) countries, had per capita revenues similar to those of Greece and Portugal.

Table 1. – INFORMATION AND COMMUNICATIONS TECHNOLOGIES PER 100 INHABITANTS IN NEW EU MEMBER STATES (NMS) AND EUROPEAN UNION, 2002

	GDP per capita, PPP ($)	Fixed Telephone	Mobile Telephone	Internet User	Internet Hosts	PCs
NMS-10						
Cyprus	13.300	69,3%	59%	30%	0,64%	24,4%
Czech R.	15.300	34,8%	84%	30%	2,48%	14,6%
Estonia	10.900	35,0%	63%	41%	4,68%	21,0%
Hungary	13.300	35,4%	68%	16%	2,57%	10,8%
Latria	8.300	30,6%	40%	14%	1,53%	17,1%
Lithuania	8.400	26,8%	47%	20%	1,77%	7,0%
Malta	17.000	52,7%	72%	29%	1,93%	22,9%
Poland	9.500	34,7%	35%	23%	1,89%	8,5%
Slovak R.	12.200	27,2%	54%	16%	1,65%	18,4%
Slovenia	18.000	42,4%	85%	42%	1,92%	30,0%
EU NMS average	12620	38,9%	60,7%	26,1%	2,10%	17,5%
EU 15 countries : poor						
Greece	19.000	52,9%	83,8%	18%	1,45%	8,1%
Portugal	18.000	41,9%	81,9%	35%	1,58%	11,7%
Spain	20.700	45,9%	82,2%	19%	1,45%	56,1%
EU-3 average	*19233*	*46,9%*	*82,6%*	*24,1%*	*1,49%*	*25,3%*
EU 15 countries : rich						
Austria	27.700	46,8%	82,8%	40%	4,50%	33,5%
Belgium	29.000	49,6%	78,6%	32%	3,25%	24,1%
Denmark	29.000	69,6%	83,3%	46%	15,56%	57,7%
Finland	26.200	54,7%	84,5%	50%	23,43%	44,2%
France	25.700	56,9%	64,7%	31%	2,32%	34,7%
Germany	26.600	65,0%	71,7%	42%	3,14%	43,5%
Ireland	28.500	48,4%	75,5%	27%	3,47%	39,0%
Italy	25.000	48,6%	92,6%	30%	1,19%	19,5%
Luxemburg	44.000	78,0%	101,3%	37%	3,14%	51,7%
Netherlands	26.900	62,1%	72,2%	53%	19,37%	42,8%
Sweden	25.400	72,0%	88,5%	57%	9,49%	56,1%
UK	25.300	58,7%	84,5%	40%	4,85%	36,6%
EU-15 average	26.466	56,7%	81,8%	37,1%	6,5%	37,2%

Sources : ITU (2003), IBM (2003), EUROSTAT (2003) own calculations.

Table 2. – CORRELATION COEFFICIENTS, (2002)

		GDP per capita, PPP ($)	Fixed Telephone	Mobile Telephone	Internet User	Internet Hosts	PCs
GDP per capita, PPP ($)	Pearson Correlation	**1**	,759**	,752**	,542**	,358	,723**
	Significance (2-side)		,000	,000	,005	,079	,000
	N	25	25	25	25	25	25
Fixed Telephone	Pearson Correlation	,759**	**1**	,564**	,628**	,380	,726**
	Significance (2-side)	,000		,003	,001	,061	,000
	N	25	25	25	25	25	25
Mobile Telephone	Pearson Correlation	,752**	,564**	**1**	,506**	,237	,518**
	Significance (2-side)	,000	,003		,010	,254	,008
	N	25	25	25	25	25	25
Internet User	Pearson Correlation	,542**	,628**	,506**	**1**	,688**	,631**
	Significance (2-side)	,005	,001	,010		,000	,001
	N	25	25	25	25	25	25
Internet Hosts	Pearson Correlation	,358	,380	,237	,688**	**1**	,527**
	Significance (2-side)	,079	,061	,254	,000		,007
	N	25	25	25	25	25	25
PCs	Pearson Correlation	,723**	,726**	,518**	,631**	,527**	**1**
	Significance (2-side)	,000	,000	,008	,001	,007	
	N	25	25	25	25	25	25

Note : ** The correlation is significant on the level of 0,01 (2-side).

Source : ITU (2002), own calculations.

Telecommunications revenue as a percentage of GDP is between 2 and 4 per cent of GDP in EU-15 countries. Greece and Portugal, with 4 to 5 per cent of GDP, are outliers characterised by relatively weak competition in both fixed line and mobile telephony, which results in relatively high prices. The new EU member states, with their weak competition, are in the same situation with a relatively large ratio of overall telecommunications revenue to GDP (see Table 3).

Table 3. – TELECOMMUNICATIONS REVENUE IN EUROPE IN 2002

	Telecom-munication Revenue as % of GDP	Fixed and Mobile Telecommunication Revenue		Mobile Telecommunication Revenue		
		Per Access Path	Per Capita	Per Mobile Subscriber	Per Capita	Percent of Total Revenue
Austria	2,57	504,00	651,34	435,84	364,56	55,97
Belgium	2,80	519,00	664,16	375,92	295,32	44,47
Denmark	2,60	539,00	787,40	559,78	466,40	56,00
Finland	3,59	653,00	908,07	473,08	410,37	45,19
France	2,23	442,00	536,98	285,47	184,70	34,40
Germany	2,92	512,00	705,23	371,04	269,92	38,27
Greece	4,10	357,00	457,50	246,15	208,09	42,00
Ireland	2,66	652,00	825,56	312,02	238,12	28,84
Italy	3,20	448,00	607,40	308,90	289,97	43,10
Luxembourg	1,50	455,00	710,78	182,97	194,04	27,30
Mexico	2,66	414,00	166,26	195,00*	43,00*	28,50*
Netherlands	3,40	588,00	815,80	375,55	279,66	31,80
Portugal	5,30	502,00	625,79	281,73	232,48	37,15
Switzerland	3,59	859,00	1317,92	469,87	370,86	28,14
Spain	4,55	551,00	732,41	347,16	286,13	39,07
Sweden	3,26	539,00	874,91	281,15	249,90	28,56
United Kingdom	4,67	861,00	1232,67	372,56	313,22	25,41
Czech Republic	4,70	266,00	322,33	191,73	162,74	50,49
Hungary	5,65	353,00	366,40	189,70	128,24	35,00
Poland	4,50	400,00	182,90	148,29	53,39	24,20
Slovak Republic	4,60	254,00	174,70	140,50	76,37	37,70
Turkey	3,60	135,00	78,40	120,48	41,86	2,70

Note: *2001 Data

Source: ITU (2004) / EITO (2004)

2.2. Basic Regulatory Aspects of Telecommunications

With the liberalisation of 1998, the European Commission provided an important competitive impulse in fixed line telecommunications. Opening up network operation and voice telephony stimulated a wave of new market en-

tries in fixed line telephony. At the same time, national regulatory agencies (NRA) in EU countries undertook asymmetric regulation, imposing various rules on the dominant network operator (the former national monopoly operator), typically including interconnection rules and price caps as a means to stimulate static and dynamic efficiency; it was the intention that prices be determined largely by long-run incremental costs.

Prices in long distance and international telecommunications have fallen sharply among the continental EU-14 countries in the first five years of liberalisation, just as they did in the UK, where liberalisation had begun in 1984. The incumbent telecommunications network operators have diversified into new activities. Local access is less contested than long distance and international telecommunications markets; however, regulators have imposed unbundling guidelines allowing newcomers to rent access from the incumbent operator. Newcomers in the fixed line market have rolled out their own network to some extent, but are also relying on leased lines.

The EU has developed various framework regulations, including a July 25, 2003 EC regulator framework for electronic networks and services. The previous framework emphasized *inter alia* non-discrimination and avoiding the abuse of market power. The new framework's changes include directives that NRAs cooperate in the establishment of common regulatory practices, respect EU approaches to licensing and regulation and promote market access competitiveness through effective unbundling requirements.

Since regulation is so crucial for the pricing of telecommunications and internet services, weak or inconsistent regulation favours former monopoly operators (resulting in high prices for digital services) and can impair information dissemination in almost all sectors of the economy. Weak regulation can also delay the diffusion of innovations and thus undermine overall competitiveness and growth. New EU member states have established politically-independent regulatory authorities, as required by both EU membership and the *acquis communautaire*. The regulatory approaches in most of these countries, however, are rather opaque. There has only been a partial opening of their telecommunications markets.

3. Eastern European Digital Modernisation

Estonia, Hungary, Lithuania, Latvia, Poland, the Slovak Republic, Slovenia, and the Czech Republic belong to the group of post-communist countries of Central and Eastern Europe (the CEEC-8 countries) which have been undergoing a process of fundamental political and economic transformation since the beginning of the 1990s. Competition policy has been part of systemic transformation and in this context regulatory policy for infrastructure sectors has been of reform interest, but the telecommunications sector *per se* has not been a priority.

For many years the economic potential of the ICT sectors was not fully understood. The short-term budgetary revenue considerations of telecommunication services offered by a national monopoly operator were often considered more important than long-term aspects of digital modernisation, the telecommunications sector as a whole and its associated spillover effects. In the socialist period, CEECs telecommunications could be characterised as backward with underdeveloped and poorly performing infrastructure and the source of a tremendous "digital divide" in basic communication infrastructure at the European level. The situation has changed since 1989/90, although the new EU member states are still lagging far behind EU standards.

Considering the social and economic advantages associated with well-performing telecommunication systems, CEEC-8 countries now realise that modernisation opportunities were neglected in the early 1990s. The boost to economic development in some of the less affluent EU-15 countries in the 1990s, including Ireland and Finland, made clear that the modernisation of telecommunications and the stimulation of broader ICT sectors can have positive long-term effects on productivity growth and output dynamics.

As the CEEC-8 countries attempt to develop information and communication technologies, it is important that special attention be devoted to digital modernisation, which permits the expansion of modern telecommunications markets and is the most important prerequisite for technological and economic convergence. This convergence has major implications from both economic and regulatory perspectives. The fact that the UK established an integrated regulatory agency in 2003 testifies to the new regulatory landscape in Europe's digital sector.

ICT and Integration processes

Assuming that the economic significance of information and communications technologies in EU countries increases exponentially, then the underdeveloped ICT environment in the CEECs could lead to a sustained digital divide within the Community. From a medium-term perspective, such a divide would become an obstacle in the process of European integration; in a single EU-25 market, countries having a relatively poor telecommunication and internet infrastructure would face high communication costs and transaction costs, especially for international trade. Such costs would have effects similar to a tariff on trade. FDI inflows would be rather anaemic as multinationals need a modern telecommunications network to organise overseas production efficiently; since roughly 1/3 of international trade is intra-company trade (within multinational firms), countries attracting only small FDI inflows on a per capita basis will also fail to realise trading opportunities.

The Process of technological convergence

The ICT sectors provide new opportunities to accelerate the process of convergence (catching up). Governments, as well as the business community in

CEEC-8 countries, should understand the potential of the information economy and provide adequate funds for ICT investments as well as incentives to attract ICT producers. Considering Ireland, a major producer of ICT in the 1980s and 1990s in the OECD area, it is apparent that small, less affluent countries can, under certain circumstances, attract ICT multinationals. Given the fact that wages in Eastern Europe are much lower than in the EU-15 countries and that there is a broad base of skilled labour in several of those countries, it should be possible to attract major IT producers. Hungary attracted IBM as a producer and exporter of hard disks in the 1990s. Poland and Estonia have also actively encouraged foreign ICT producers.

3.1. Digital Modernisation

"Digital modernisation" is the process through which electronic sectors and institutions in the field of computation, communication and data storage switch to digital technologies and procedures. Switching from analogue transmission of voice and pictures to digital transmission allows a wide range of innovative recombination of digitally stored information, which can be used both in computer-controlled production or service provision. Digital modernisation allows for the development and management of novel complex systems.[1]

Narrowly defined, digitisation is the process of converting a system from analogue to digital format. The process of digitalisation specifically concerns technological aspects and makes it possible to generate, process and transmit any type of information (voice, data, and video) in a binary system of zeros and ones. This technological revolution has broad implications, especially in quality, speed and capacity dimensions. Digitisation promotes factor-augmenting technological progress. From a technical point of view, it makes systems rather open. Any new network operator linking up with the public network finds digital transmission much easier than the old analogue system. Digitisation opens up a wide range of business opportunities especially in areas with a high rate of return. Digitisation of communication systems influences the cost functions of firms. It reduces the marginal costs of communication services, yielding efficiency gains at the firm level. This also reduces transaction costs, opening up the possibility of trade creation.

Digital modernisation can stimulate dynamic competitive processes, inducing major suppliers to upgrade existing technologies. As companies enrich their business activities, they are likely to intensify their research and development activities, contributing to the national innovation system and enhancing the competitiveness of the whole economy.

[1] This definition has been formulated on the basis of the definition of modernisation presented by C.E. Black in "Dynamics of Modernisation" (1996).

Digital modernisation increases the opportunities of individual firms, some of which will ultimately become the basis of entirely new markets with products and services which can be digitalised and traded electronically. This observation pertains to ICT industries as well as to the industries of the old economy. Digitisation reinforces the role of information as a production factor; growing dependence on information in production processes partly reflects the dynamics of a new economy and of a new economic sector, the information sector (Porata, 1974, 1976; Dziuba, 2002).

Digitisation eliminates existing borders between various kinds of information – voice, video and data. The dynamics of markets and technologies will lead to a multi-layer process of convergence in networks as well as in services. Digital modernisation also stimulates the internationalisation of the economy. It effectively links various information and communications platforms or makes them easier to interoperate. Through digital modernisation, new EU member states will gain broad access to a borderless cyberspace in nearly all sectors.

EU-15 countries will gain from the digital modernisation of new EU member states as increasing use of ICT stimulates trade within the enlarged Community. Digital modernisation will stimulate diversification in ICT production and in digital services, as countries try to exploit digital comparative advantages. Countries richly endowed with information, information capital and complementary human capital will specialise in information-intensive goods for domestic consumption and export.

Digitisation will also permit efficiency gains in the public sector through increasingly efficient information systems. New digital services will be introduced and many traditional ones automated. As CEEC-8 countries modernise public administration in the pursuit of more democratic institutions, enhanced information flows will increase the efficiency and transparency of governing bodies. As digital modernisation reduces the marginal costs of public services, cost-cutting effects will apply welcome relief for constrained budgets. Increased transparency might help reduce corruption. Digitisation will help to meet the Copenhagen criteria in several ways. EU accession countries could find it easier to compete within the EU single market and become more stable democracies.

3.2. Digital Modernisation of Access Infrastructure

For decades, the communication infrastructure of central and eastern European countries has been underdeveloped in comparison with western European countries with similar per capita income. In the socialist system, communication systems were characterised by very low telecom density. In

the transition beginning in 1989/90 state monopoly telecommunications systems were restructured, and in some countries partial privatisation began. Modernisation measures in the national public switched telephone network (PSTN) were noteworthy in terms of digital modernisation. Digitisation upgrades the quality of the core communication infrastructure, opening up new areas for digital communications.

Poor quality and analogue infrastructure forced all new EU member states to increase their investments in the telecommunications sector where two aspects were emphasised:

- the telecommunications network and service accessibility had to be extended relatively quickly, and quality standards had to be improved;
- modernisation of subscriber lines and trunk networks is a prerequisite for the provision of new digital communication services (*e.g.* broadband data transmission).

Table 4 estimates the required capital for digital modernisation in Eastern Europe and the extension of a fixed telephone network for each country. To achieve the average EU level of fixed telephone penetration, the new EU member states should install a total of 30.5 million telephone lines and bear the additional costs for the digital modernisation of existing networks. The mere extension of fixed telephony networks would require investment in excess of $30 billion in the CEE region.

It is also helpful to consider the cost of modernising the fixed line infrastructure. According to Welfens and Graack (1997), the incremental costs of upgrading existing networks to standards allowing basic digital communication, e.g. Integrated Services Digital Network (ISDN), range from 20 per cent to 30 per cent of total investment. Thus, for all CEEC-8 countries the capital needed for upgrading existing networks would range from $1.9 to $2.9 billion. Through the end of 2001, about 15.8 mil1ion new fixed telecommunications connections had been installed in new EU member states. The average penetration density of fixed telephone access had risen from a level of 22.5 to 40.1 telephones per 100 inhabitants. The highest growth rate in accession lines has been achieved in three new EU member states, i.e. the Czech Republic, Hungary, and Poland. Their net growth in fixed telephone accessibility ranged from 20 per cent to 26 per cent over a decade.

One should not expect the gap in fixed line telephony to be closed quickly. Given the enormous technological progress in mobile telephony and falling prices of the respective equipment, mobile telephony is of greater importance in overall communications for the new EU member states; moreover, in urban areas cable TV and other options seem to be a substitute for fixed line investment.

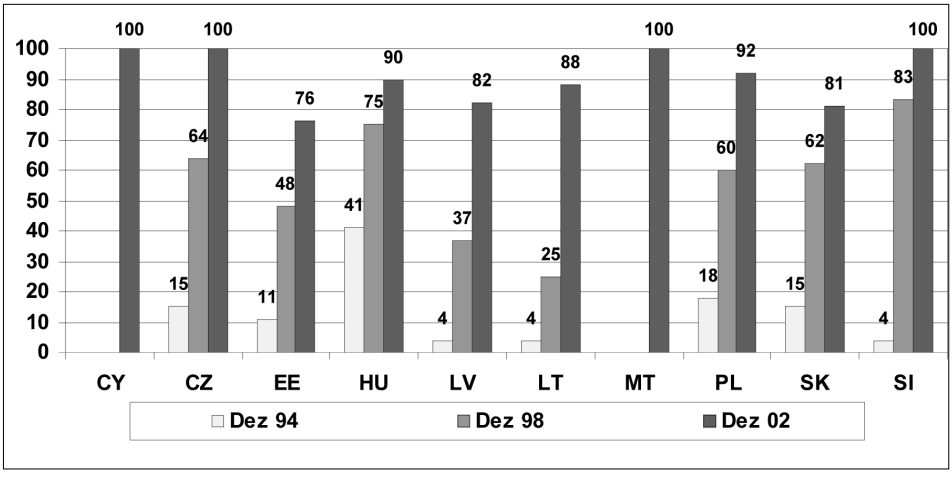
Table 4. – CRUDE DIGITAL MODERNISATION COST ESTIMATES FOR NEW EU MEMBER STATES

	Fixed Telephone Penetration			Number of fixed connections	Number of new fixed connections	Costs of roll out of fixed infrastructure 1991-2001	Costs of digital modernisation of existing networks Incremental costs: 20% - 30%
	1991	2001	Net Change	1991	1991-2001	USD million	USD million
Cyprus	44,59%	63,40%	18,81%	337.546	142.392	142,4	67,5 – 101,3
Czech R.	16,57%	37,50%	20,93%	1.702.236	2.150.139	2.150,1	340,4 – 510,7
Estonia	21,19%	37,70%	16,51%	290.091	226.022	226,0	58,0 – 87,0
Hungary	10,89%	36,80%	25,91%	1.091.396	2.596.700	2.596,7	218,3 – 327,4
Latvia	24,39%	32,10%	7,71%	578.531	182.881	182,9	115,7 – 173,6
Lithuania	22,00%	33,70%	11,70%	812.900	432.315	432,3	162,6 – 243,9
Malta	38,60%	53,40%	14,80%	150.540	57.720	57,7	30,1 – 45,2
Poland	9,32%	31,60%	22,28%	3.602.180	8.611.220	8.611,2	720,4 – 1.080,7
Slovak R.	14,39%	32,40%	18,01%	777.319	972.864	972,9	155,4 – 233,2
Slovenia	22,91%	42,40%	19,49%	455.451	387.461	387,5	91,0 – 136,6
Totals	**22,5%**	**40,1%**	**17,6%**	**9.798.190**	**15.759.714**	**15.759,7**	**1.959,6 - 2.939,5**

Note: The figures should be taken as a rough estimate only
Source: ITU (2002), own calculations.

As Figure 3 reveals, the digitisation of fixed telecommunication infrastructure remains incomplete in Eastern Europe. Only four new EU member states had achieved full digitalisation of their fixed networks by 2003. Medium-term achievements are rather satisfactory and in most cases have brought the degree of digitisation to about 80 per cent.

Figure 3. – DIGITALISATION RATE OF FIXED NETWORKS IN CEECs (%)



Source: IBM (2003) and ITU (2002)

From 1991 to 2000, $28.2 billion have been invested in fixed-line telephony in the ten new EU member states. During this period, however, other communication platforms including mobile telecommunications and cable TV have emerged and expanded (see the graph below). Comparing this investment with that of the EU's more developed economies for the same decade is instructive if not as sensible as a comparison of per capita investments would be. Investments in Germany ($59.1 billion), France ($117.7 billion), Italy ($67.1 billion) and the UK ($84.6 billion) for the same decade, for example, give an indication of how large the infrastructure gap has been between Western and Eastern Europe.

Since 1993, the average annual share of telecommunications investment in gross fixed capital formation of the CEEC-8 countries (excluding Cyprus and Malta) has exceeded the EU-15 average, which can be taken as an indicator of some convergence in infrastructure. A similar situation can be found in Spain, Portugal and Greece, whose key indicators also lagged behind the EU average.

The telecommunications investments of the CEEC-8 countries relative to overall gross fixed capital formation have been higher than for the EU-15 countries since the transformation recession from 1991 to 1993. In the early 1990s, Hungary and Estonia were clear leaders among transition countries; in the late 1990s, the Czech Republic, Lithuania, Latvia and Hungary recorded relatively high investment shares in telecommunications.

3.3. Financing Digital Modernisation in Eastern Europe

Few countries have attempted to finance telecommunications investments through the revenues derived from the national monopoly, including privatisation revenues where relevant. Hungary pursued this route to some extent, but the main source of investment financing was bank lending, new equity and profits. Poland has tried to use revenues from selling licenses in fixed line telephony to finance increased investment in the industry. In 2003, legislation allowed licence revenues from new entrants to be used for investment in telecommunications infrastructure. From an economic policy perspective, this approach gives government a potentially important new instrument, encouraging infrastructure investments.

If, in the course of modernisation, the introduction of greater competition encourages product innovations and higher profits for some new services as the monopoly rents of an earlier period are gradually eroding, overall profits in the telecommunications sector need not be lower than under the old monopoly. As competition tends to generate greater output and more innovation in telecommunications, few arguments remain for the retention of a telecommunications monopoly and state ownership. Private corporations listed in the stock market will be required to publish a wide range of financial and per-

formance data, welcome ingredients for medium-term restructuring and privatisation. Full privatisation will normally improve corporate governance and stimulate static and dynamic efficiency gains; however, the rating of a private company is often weaker than the rating for government bonds, which leads to rising costs of capital under privatisation. For the former monopolist, "the dominant operator," the provision of universal services under government pricing (often much above costs) could provide safe medium-term profits; this possibility is quite important in considering full privatisation.

The scarcity of domestic financial resources has forced telecom enterprises in the region to utilise international capital inflows for investment financing and restructuring. Given the pent-up demands from the socialist period, there are considerable investment opportunities in telecommunications for strategic investors and international finance institutions (e.g. the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the World Bank). Telecommunications investments of major international institutions in particular countries and sectors are typically a signal for private international investors to follow suit. FDI investment flows from EU-15 to CEEC-8 countries typically decline in periods of recession when EU-15 profits are relatively small. In the 2001 collapse of the New York stock market bubble, especially the NASDAQ, telecommunications stocks fell more than proportionately, which had a significant, negative impact on markets and analysts in Western Europe. A new scepticism has made the financing of telecommunications in eastern European countries relatively difficult, even if local market analysis suggests an enormous potential for medium-term expansion.

The financial engagement of international institutions in the process of digital modernisation in new EU member states should not be overlooked. The EBRD is of particular relevance. Between 1990 and 1999, it was engaged in 50 telecommunications, informatics and media (TIM) projects in 20 transition economies, at a total cost of €7.3 billion with capital totalling €1.3 billion. The annual total of EBRD financing commitments to TIM projects has ranged from €100 million to €200 million. This source of investment financing could become less relevant in these countries in the medium-term, since their EU membership will strengthen the role of banks and capital markets there. In the meantime, the function of other international finance institutions, such as the European Investment Bank (EIB) should also be acknowledged for its impact on the process of digital modernisation (EBRD, 2000). Since 1990, the EIB has granted €15.8 billion in loans for ICT and other infrastructure development projects.

Foreign investment in the manufacturing industry in eastern European countries has grown significantly. The ICT sector has become increasingly important with telecommunications particularly crucial. In the late 1990s, the production of telecommunications equipment became important in some CEE

countries. Establishing production in electronics in Eastern Europe can be achieved quickly if conditions for investors are attractive.

Foreign direct investment has also played a very important role for digital modernisation. There is clearly a positive role for strategic foreign investors. Inward foreign direct investment in the new EU member states from 1989 to 2001 exceeded $100 billion. More than 60 per cent of this amount was absorbed by three countries (*i.e.*, the Czech Republic, Hungary and Poland), but in terms of FDI *per capita*, Slovenia, the Slovak Republic, Lithuania and Malta were the leaders among the accession countries.

The digital modernisation of telecommunications also has implications for the trade balance. Upgrading and extending the communications network requires increased imports of technology-intensive equipment and software. In the CEE countries, digital modernisation has contributed to a growing trade balance deficit. A gradual increase in imports of telecommunications equipment in the first half of the 1990s was accelerated in the second half. At the same time, an increase in telecommunication equipment exports from those countries was noteworthy. The structural adaptations enabling these trade changes could be indicative of increasing CEE country specialisation in the production of certain ICT products, which will contribute to economic growth and convergence.

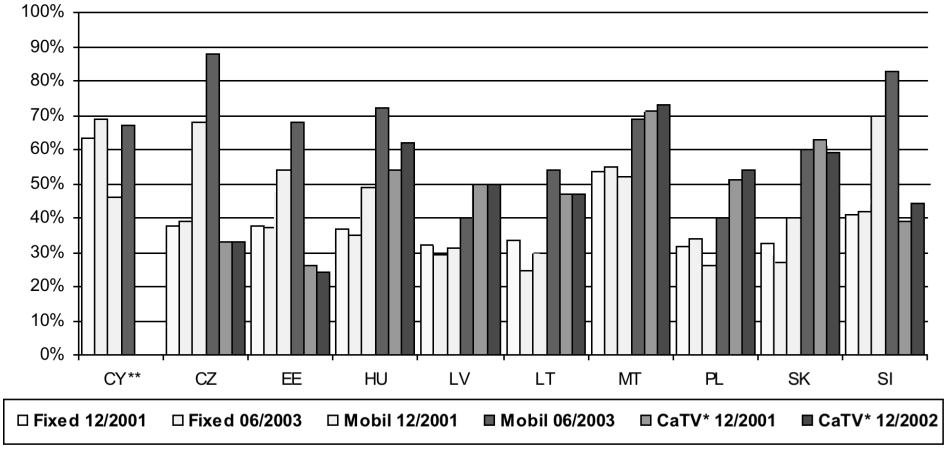
It is not really clear whether the new EU member states have dynamic comparative advantages in electronics or in the production of telecommunications equipment. After an initial phase of FDI in Hungary, several MNCs started to move plants to more attractive locations (e.g. Bulgaria, Romania or China). This resulted in the unemployment of several thousand skilled workers in Hungary. With a real appreciation of the currencies of the CEE countries, the relative wage advantage of other locations will rise over time.

3.4. Extension of the Telecommunications Infrastructure

Considering developments in the extension and digitisation of telecommunications infrastructure, much has been accomplished in the new EU member states. There is still room for considerable improvement, especially in rural areas. Statistics for the number of fixed lines per 100 inhabitants shed light on development in the central and eastern European countries. Due to liberalisation and expansive investment programs on the part of the former monopolists and increasing newcomers, the household penetration rate of fixed line telephones increased significantly (to a level of nearly 70 per cent of all households) over the last 12 years in the new EU member states. Since 2001, however, the level has gone back down in all these countries except Slovenia. Fixed and mobile telephone penetration and cable TV penetration, are shown in Figure 4 below.

The observed decrease in the connections of fixed telecommunications is a result of the sub-optimal performance of the fixed telecommunications sector with its relatively high prices on the one hand and the as yet weak demand for enhanced telecommunications access. The access gap in the CEE countries must be recognised; in spite of efficient and highly competitive markets, some services cannot be delivered because of a lack of profitability. State assistance (e.g. public subsidies based on competitive principles) could help in eliminating this gap.

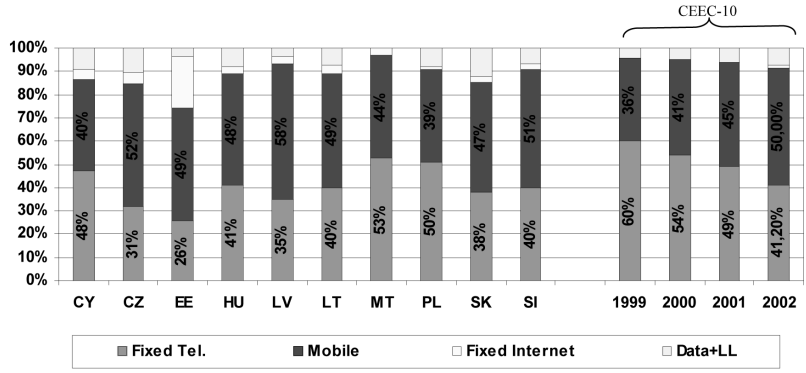
Figure 11. – BASIC COMMUNICATION ACCESS INFRASTRUCTURE IN NEW EU MEMBER STATES: CABLE-TV, FIXED AND MOBILE TELEPHONE PENETRATION RATES (CONNECTIONS PER 100 INHABITANTS*)



Note: *The (CaTV) penetration rate relates to the percentage of households connected to CaTV Operators; ** In Cyprus, there are no CaTV operators.

Source: PWC (2002) and IBM (2004)

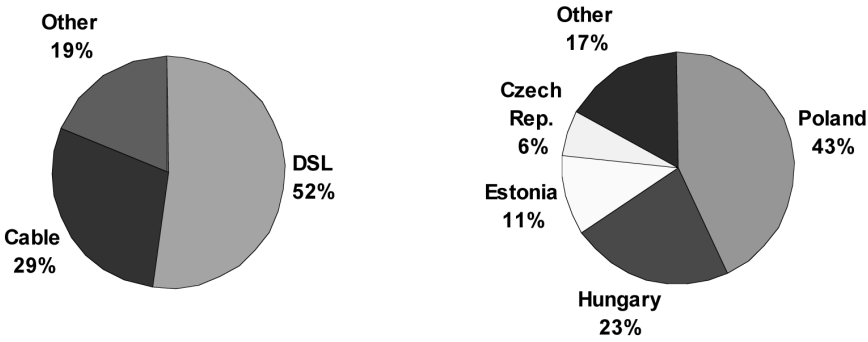
Figure 5. – TELECOMMUNICATIONS MARKET SEGMENTATION IN NEW EU MEMBER STATES (LEFT) AND REGIONAL DEVELOPMENT* (RIGHT), 2002



Note: * - Cyprus, Malta has been excluded, LL – leasing of lines.
Source: PWC (2002), IBM (2004), own calculations.

The development of broadband access technologies was introduced very late in the new EU member states. Initially, the main objective of the sector was to achieve an acceptable level of accessibility to basic telecommunication services. The initial implementation of ISDN in Poland and Estonia took place in 1994 and has still failed to gain popularity. These services have mostly been targeted at commercial users. Developments on the xDSL market reflect another situation. The first attempts to achieve broad utilisation of xDSL took place at the turn of 2000/2001 and the market has grown exponentially since then, achieving greater density than ISDN. Today, xDSL has become the greatest impetus for growth in broadband access in the new EU member states, reaching approximately twice the number of subscribers in 2003 (820,000) as in 2001 (400,000). In 2003, the broadband market value was estimated at USD 467 million (ITU, 2004).

Figure 6. – BROADBAND CONNECTIONS IN CEE COUNTRIES, 2003 (LEFT*) AND BROADBAND CONNECTION SHARES IN CEE COUNTRIES IN 2002 (RIGHT**)



Source: *Budd, J. (2003), DSL Boosts Broadband Services in the Czech Republic and Slovakia, IDC and **Budd, J. (2003), Central and Eastern Europe Broadband Access Services and Analysis, 2002-2007, IDC.

The role of Cable TV operators in broadband diffusion in the CEE countries has been important. In recent years, the expansion of operators in this internet access market has been rapid. The positive reception of DSL has had a growing impact on the way business is conducted. Strong competitiveness between different broadband access modes can be expected. The rapid rolling out of wireless technologies could play a significant role. The increasingly frequent implementation of modern ICT business strategies, such as bundling internet, telephone and cable TV services, affects market structure developments (i.e. market convergence via mergers, acquisitions and joint ventures). It also influences the legal environment through the responsive introduction of new regulatory regimes.

As mentioned above, new wireless technologies for broadband access play a significant role in CEE countries. In terms of technological advancement and diffusion, the rates in new EU member states are near, or sometimes even

exceed, those of their EU counterparts. The roots of wireless communication in new EU member states go back to the early 1990s. The average density of mobile telecommunications in the EU countries in 2003 was 81 per cent, but only about 43 per cent in central and Eastern Europe (IBM, 2003). There is still huge potential for investment and development of infrastructure.

In terms of penetration, mobile telecommunications in the least developed markets expand very quickly. Penetration in the CEE countries is expected to reach 73 per cent in 2007. In 2002, regional spending on mobile services was $ 9.2 billion. Revenues derived from short message services (SMS) increased from 10 to 15 per cent in 2002. In that year data and SMS accounted for 7 per cent of all CEE telecommunications revenues (Ludwiczynski, 2003). New services, such as multi-media services (MMS) and other applications, have been launched and are growing in usage across most of the region.

4. Policy Conclusions

From a policy perspective, competition is crucial for the ICT sectors of the new EU member states. For small countries such as the Baltics, this might require regional network integration. Finland has shown that even in a relatively small European country, there can be strong competition. Internet competition in local access markets is also important. The unbundling requirement of the EU framework regulation will force new member states to establish competition in the access market, which should put downward pressure on prices for internet use. For the business community, broadband internet access will lead to the expansion of DSL, cable networks and mobile broadband technology.

As several EU-15 network operators have invested in fixed link telecommunications or in mobile network providers in the CEE countries, convergence prospects for the new EU members are favourable. Sustained and high aggregate output growth will stimulate the demand for telecommunication services and the presence of many multinational companies in Central and Eastern Europe – above all in Hungary, the Czech Republic and Poland – will stimulate the demand for digital value-added services. For some time, mobile telephony is likely to be more important than fixed line telephony, since competition in mobile telecommunications is more intense. The dominance of the former monopoly operators in fixed line telecommunications has continued in the transition countries.

There is a clear digital divide between the metropolitan areas and the countryside or peripheral regions of the new EU members. If this telecommunications gap should continue, the prospects for the less affluent regions to converge with national *per capita* income averages will remain poor. National governments and the European Union should therefore closely monitor the size and durability of the digital gap in the regions of central and eastern Eu-

ropean countries. It might be useful for the European Commission to encourage the investment of structural funds in the expansion and modernisation of telecommunications in economically-challenged areas.

Digital modernisation of government and public administration will also improve productivity and stimulate growth in new EU member states. A lack of skilled personnel could be a problem, of course, in both the public and private sectors. Because growing ICT sectors generate a greater demand for skilled labour, a growing wage premium for skilled workers may be expected. Governments in new EU member states would be wise to increase government expenditures for education and retraining, emphasising learning with and about modern software as well as about advanced telecommunications technologies.

There is no doubt that digitisation and modern telecommunications will stimulate trade and investment in the newly constituted EU. So it will be important that regulators adopt an economic development stimulating regime consistent with the *acquis communautaire*. One may anticipate that within a decade, the economic performance of some of the new member states will approach the average of the EU countries.

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Valuing Global Depositary Receipts: the Case of Telekomunikacja Polska*

Abstract

We examine the post-issue pricing of Global Depositary Receipts (GDRs) issued in 1998 as part of the privatisation of Telekomunikacja Polska (TPSA), the largest telecommunications operator in Poland. We calculate an independent estimate of TPSA's cost of capital and use our estimate to discount cash flows provided by a Morgan Stanley Dean Witter analyst report. Though that report suggests TPSA's GDRs were fairly priced, our analysis indicates the GDRs were overvalued. One difference between our findings and the analyst report stems from our use of an explicit country risk premium that reflects the incremental risk to US investors of investing in emerging market equities. Another difference stems from Morgan Stanley Dean Witter's use of price multiples. Though comparisons of TPSA's price multiples to price multiples of other European telecommunications firms indicate that TPSA's price may have been fair in a relative sense, the long-term performance of telecommunications equity indexes after TPSA's GDRs were issued hints at potential overpricing of telecommunications firms in Europe and the US on a broader scale.

1. Introduction

On November 18, 1998, Telecomunikacja Polska (TPSA) offered public investors the opportunity to buy its shares for the first time in the company's history. Polish investors would trade the shares on the Warsaw Stock Exchange. International investors would trade Global Depositary Receipts (GDRs) issued under the US Security Exchange Commission's Rule 144A and Regulation S. The GDRs were issued at USD 4.44 each, but they gained value quickly and closed on January 29, 1999 at USD 7.29. Over the same period, the return on the Polish market was approximately 7 per cent.

In late January 1999, Morgan Stanley Dean Witter (MSDW) initiated coverage of TPSA's GDRs with a neutral rating at a price of USD 7.125. This rating implied that the price was neither too high, nor too low. We examine the reasonableness of that rating using data provided in the MSDW analyst report and other data that was publicly available at the time. We accept the MSDW cash flow estimates but develop independent estimates of TPSA's cost of capi-

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tal. In contrast to MSDW's conclusion, we infer that GDRs correct price was approximately USD 5.19 and that TPSA's GDRs were, therefore, overpriced by about 37 per cent.

We estimate the cost of equity using two risk premiums following procedures outlined in Damodaran (2004). Our first risk premium compensates investors for risk they bear for investing in a US company similar to TPSA. The second premium compensates investors for the incremental risk of investing in that type of firm in Poland. Even in perfectly integrated markets, required returns may be driven by multiple factors in which case multiple risk premiums are relevant. With less than perfect integration, the case for multiple premiums is even stronger.

MSDW also present evidence that suggests that TPSA's GDRs were overpriced based on a discounted cash flow analysis. However, MSDW put greater weight on the use of TPSA's price multiples relative to the price multiples of other European telecommunications firms. Though these comparisons indicate that TPSA's price may have been fair in a relative sense, our analysis hints at the possibility that prices of many telecommunications firms in Europe and the US were too high at the time of TPSA's initial public offering.

The rest of the paper proceeds as follows. Section 2 discusses GDRs in the context of cross-listing, capital raising choices. Section 3 gives TPSA's background and operating environment. Section 4 discusses the valuation of TPSA's GDRs, and Section 5 concludes.

2. GDRs and Other Cross-listing, Capital-raising Choices of Foreign Firms

Foreign firms like TPSA often raise new capital by issuing GDRs. However, other types of Depositary Receipts (DRs) can also be used. In general, DRs are negotiable securities that represent a foreign company's equity. They are created when a non-US company deposits shares in a local branch of a foreign commercial bank and the bank issues DRs backed by the deposited shares.

Foreign firms use DRs to raise funds in the US with one of two methods. DRs traded by the public on major US exchanges (i.e., the New York (NYSE) or American Stock Exchange (AMEX), or NASDAQ) require full registration with and subsequent reporting to the SEC. They also require compliance with US Generally Accepted Accounting Practices (US GAAP). These securities are known as Level III American Depositary Receipts or ADRs.

GDRs, like those issued by TPSA, frequently trade among private or foreign investors under SEC Rule 144A and/or Regulation S. They require neither registration with nor subsequent reporting to the SEC. Nor do they require

compliance with US GAAP.[1] To protect uninformed investors from the risks of trading such GDRs, the SEC restricts the pre-selling and trading of Rule 144A securities to Qualified Institutional Buyers for the first two years of the securities' existence. To qualify as a Qualified Institutional Buyer, an institutional investor or security dealer (registered with the SEC) must hold at least USD 100 million or USD 10 million in securities, respectively. Regulation S issues allow investors other than Qualified Institutional Buyers to trade the GDRs, but only in off-shore markets. Regulation S prohibits firms from making any effort to pre-sell their securities to anyone in the US. After the securities have traded in off-shore markets for 40 days, investors are allowed to buy and sell the securities in the US. By preventing firms from initially selling their securities to the uninformed investors, the SEC feels that the public is protected. The restriction on who trades GDRs and in which markets they trade them typically reduces the liquidity of these securities.

Table 1 lists the number of Rule 144A, Regulation S, combination Rule 144A/Regulation S, and Level III ADRs issued by European firms between 1990 and 1998.[2] The data come from the Bank of New York data base that includes list-

Table 1. – SUMMARY OF EUROPEAN CAPITAL RAISING DEPOSITARY RECEIPT ISSUES FROM 1990 THROUGH 1998 CATEGORIZED BY DEVELOPED AND DEVELOPING MARKETS AND BY ISSUE TYPE

		Number of Depositary Receipts Issued, Categorized by Type				
	Mean Per Capita GDP of Issuing Firms' Home Country	144A	Reg S	Combination 144A/Reg S	Level III	Total
Developed Countries	$23,537	38	2	13	66	119
Percent of Total		32%	2%	11%	55%	100%
Developing Countries	$2,602	7	23	35	2	67
Percent of Total		10%	34%	52%	3%	100%

Sources: Bank of New York ADR data base and World Bank. Per capita GDP is in 1995 US Dollars. Classifications of developed and developing countries are made by the World Bank Data Group.

[1] Foreign firms can make their shares available for trade without raising capital in US markets with Level I or Level II ADRs. Level I ADRs trade over the counter and have essentially the same registration and accounting requirements as Rule 144A and Regulation S equities. Level II ADRs trade on major exchanges and have very similar registration and accounting requirements as Level III ADRs.

[2] See Karolyi (1998, 2004) for a nice summary of the reasons for and the effects of DR issuances.

ings many years earlier than 1990. However, because Rule 144A and Regulation S were enacted in 1990, we truncate the Bank of New York data base to correspond roughly with the inception of these SEC provisions. We eliminate data after 1998 to exclude offerings made after the TPSA issue. The data in Table 1 are categorized by whether the World Bank Data Group considers the country of the issuing firm as a developing or a developed country. The per capita GDP in 1995 US dollars gives additional evidence of the difference in the economic development of developed versus developing countries.

Between 1990 and 1998, firms from developed European countries issued almost twice as many DRs as firms in developing countries (119 vs. 67). Fifty-five percent of the issues by firms in developing countries were Level III ADRs. In contrast, only three percent of the issues from firms in developing countries were listed on major US exchanges. The other 97 per cent percent involved Rule 144A and/or Regulation S GDRs. The infrequent use of Level III ADRs by firms from developing countries likely reflects the higher costs of 1) listing securities on a major exchange, 2) reconciling accounting statements with US GAAP, and 3) disclosing information not required in the home-country [See Fanto and Karmel (1997)]. Coffee (1999, 2002) argues that firms that incur these costs commit to providing higher-quality information to investors on an on-going basis than do firms that issue Rule 144A and/or Regulation S securities.

This factor, combined with the inherent uncertainty of developing market economies whose firms more frequently issue GDRs, may make pricing GDRs more difficult than pricing Level III ADRs. Nevertheless, Qualified Institutional Buyers who either hold the GDRs until they trade publicly or sell them to other presumably well-informed Qualified Institutional Buyers will not want to overpay for securities whose price could decline while the Qualified Institutional Buyers still hold them. Likewise, capital-hungry firms that rely heavily on outside markets and want to return to those markets for future funding have incentives not to overstate the value of their securities. Therefore, both buyers and sellers have incentives to keep GDR prices fair. The question we ask is whether prices remain fair after the issue when MSDW gave TPSA's GDRs a neutral rating. Before examining that question, we discuss TPSA's background.

3. TPSA's Background and Operating Environment

Based on the MSDW analyst report and the GDR offering circular, TPSA was the major local, domestic long distance and international long distance telecommunications provider for Poland at the time of its initial public offering. TPSA also owned 66 per cent of Centertel, the third largest mobile operator in Poland. Though TPSA competed with other operators for the local services market, it enjoyed monopoly positions in the domestic long distance and international long distance markets. These monopoly positions

were scheduled to end as the Polish government granted both domestic long distance and international long distance licenses to other firms at the end of 1999 and 2003, respectively.

In the past, TPSA was able to set low tariffs for local service consumers while charging businesses higher rates for domestic long distance and international long distance services to make up for consumer market losses. However, due to future competition, TPSA expected profit margins to shrink in long distance services. Indeed, domestic long distance tariffs were expected to fall by 50 per cent in nominal terms (or USD 0.15 per minute) by the end of 2002. Because of these changes, TPSA's long-distance businesses would no longer be able to subsidize local market services. To offset the decline in long-distance revenues, the local telephone service had to become a profit centre. In anticipation of this change, TPSA was raising local fees. Despite these increases, local telephone usage continued to grow. Nevertheless, analysts believed that TPSA would not be able to fully rebalance its fees by the end of 1999 when domestic long distance competition began.

TPSA's penetration of 20 per cent (20 lines per 100 people) was significantly lower than the European Union average of 52 per cent. To reach the short-term goal of 27 per cent penetration, TPSA had to construct two million new lines by 2000. However, as funds were devoted to increasing penetration and modernization of the current network, TPSA was concerned it may not be able to focus on key growth areas such as data services. Management of TPSA favoured modernizing the current network in order to compete with future entrants in profitable markets. However, the Polish government pressured TPSA to focus on expansion, rather than modernization, because more than two million people were on the waiting list for a telephone line at the end of 1997. Much of the planned expansion was scheduled to occur in rural areas which were unprofitable due to low demand and low usage.

TPSA expected to spend USD 4 billion on capital equipment by the end of 2000. However, only USD 2.8 billion could be financed internally. The deficit would mostly likely be financed through debt. Major ratings agencies had recently given TPSA's debt at the sovereign level, which was equivalent to a Standard and Poor's rating of BBB–. This rating was due to government ownership of TPSA, not the firm's individual credit worthiness. In the last quarter of 1998, TPSA raised $1 billion in 5- and 10-year tranches of dollar-denominated debt at from 285 to 325 basis points above the US Treasury Bond rates on bonds with like maturities.

At the end of 1998, approximately one-third of TPSA's liabilities were in US dollars while almost all of TPSA's revenues were in Polish Zloty. Management expected the Zloty to continue to deflate against the dollar due to inflation levels that were higher than those in the US. Should this Zloty deflation occur, TPSA's liabilities would increase without a corresponding increase in revenues. Only a small amount of the exchange rate exposure was hedged.

TPSA operated in a very unstable environment and was subject to greater legal and political risks than companies in developed markets. For example, the government could shorten the length of the current international long distance monopoly set to end at the end of 2002 which would hasten TPSA's exposure to competition from western countries. Moreover, Poland's stock market had very unstable returns. An investor who invested in Poland's version of the U.S. Dow Jones Industrial Average and held the index from December 1993 through December 1995 would have lost 27.1 percent, compounded annually. An investor who purchased in December 1995 and held through December 1998 would have earned a compound annual rate of return of 10.7 percent. The uncertainty of the legal environment and the volatility of the Polish market would affect the volatility of TPSA's GDRs and would be a source of concern to investors.

On the positive side, Poland's inflation rate had shrunk significantly from the extreme high of 29.5 per cent in 1994 to an estimated 11 per cent in 1998. Moreover, Poland had been the fastest growing economy in emerging Europe over the previous five years, delivering a GDP growth rate of 5 to 7 per cent per annum. Poland also expected to become a member of the European Union in the next few years which was predicted to help stabilize its economy.

4. TPSA's GDR Price

4.1. MSDW's Discounted Cash Flow (DCF) Estimate

The market value of a firm's assets is the discounted present value of the cash flows those assets are expected to generate. Based on TPSA's position in the Polish market, MSDW estimated the cash flows for TPSA between 1999 and 2005 shown in Table 2. The terminal value in 2005 represents the value in 2005 of projected cash flows beyond 2005. Though realized cash flows invariably differ from estimated cash flows and many factors in TPSA's background suggest a sensitivity analysis for the cash flows is appropriate, we accept the cash flow estimates for our purposes and focus on the determination of a discount rate. The appropriate rate for the cash flows in Table 2 is TPSA's weighted average cost of capital or *WACC*. The *WACC* is given by the following formula:

$$WACC = D/V \cdot R_d \cdot (1-T) + E/V \cdot R_e \qquad (1)$$

in which D and E are the values of debt and equity in a firm's target capital structure, V is the value of the firm (the sum of debt and equity), T is the marginal tax rate, R_d is the return required by debt holders to compensate

[3] The MSDW estimate of the price at the *end* of 1999 was USD 6.72. That estimate is consistent with the estimate reported above for the beginning of the year because USD 6.01 · (1.119) = USD 6.72. Though lower than the observed price of USD 7.125, MSDW concluded the observed price was fair based on other comparisons.

Table 2. – ESTIMATED CASH FLOWS, CAPITAL STRUCTURE, TAX AND INTEREST RATE INFORMATION FOR TPSA

	Estimated Cash Flows ($US Millions)						
	1999E	2000E	2001E	2002E	2003E	2004E	2005E
EBIT	$1,093	$1,169	$1,277	$1,341	$1,258	$1,489	$1,800
Taxation (Unlevered)	($350)	($351)	($383)	($402)	($377)	($447)	($540)
Capital Expenditure	($2,183)	($1,801)	($1,389)	($1,328)	($939)	($889)	($841)
Depreciation	$675	$792	$906	$976	$1,041	$1,059	$841
Changes in Working Capital	$14	$48	$3	$17	$21	$10	$4
Free Cash Flow to the Firm (FCFF)	($751)	($143)	$414	$604	$1,004	$1,223	$1,264
Terminal Multiple							15.40
Terminal Value							$19,466
Total Cash Flows	($751)	($143)	$414	$604	$1,004	$1,223	$20,730
Corporate Tax Rate	32%						
Equity in Target Capital Structure	80%						
Debt in Target Capital Structure	20%						
Yield to Maturity on Debt	8.20%						
Yield to Maturity on 10-Year Treasuries	4.74%						
Shares (and GDRs) Outstanding	1.4 billion						

Source: Morgan Stanley Dean Witter Analyst Report

them for the risk of holding the firm's debt, and R_e is the return required by equity holders to compensate them for the risk of holding the firm's equity.

The MSDW report gave the following estimates for TPSA: D/V = .20, E/V = .80, T = .32, R_d = 8.20 per cent and R_e = 13.5 per cent. Combined, these estimates yield a *WACC* of 11.90 per cent. Applying this estimate to the cash flows in Table 2 yields a market value estimate for TPSA at the beginning of 1999 at USD 10.53 billion. Multiplying by .80 to get the aggregate value of equity and dividing that value by the 1.4 billion shares (and GDRs) outstanding gives a GDR price of $6.01 at the beginning of 1999.[3]

4.2. Our DCF Estimate

Figure 1 shows the sensitivity of the estimated price for GDRs to changes in the discount rate. An increase in the *WACC* from 11.90 per cent to 12.90 per cent causes the estimated price per GDR to drop from USD 6.01 to USD 5.65. Thus, the price elasticity of the GDR with respect to changes in the *WACC* is approximately -.72. This sensitivity suggests that the choice of discount rates has a significant impact on the price. Therefore, we now focus on the determination of the discount rate for TPSA by accepting MSDW's estimates of all of the *WACC* components, except R_e.

For TPSA's *WACC* to be 1 per cent higher, R_e must be 1.25 per cent (= 1 per cent/.80) higher if all other variables are held constant. To examine the possibility that R_e was higher than the 13.5 per cent estimate MSDW used, we now provide an independent estimate of R_e using data available in January 1999. Our estimate is based on procedures outlined in Damodaran (2004) who argues that the required return for investing in equities in developing markets must compensate investors for the risk of investing in similar firms in mature markets and the incremental risk of investing in the same type of firms in developing markets. Thus, R_e can be expressed as

$$R_e = R_f + \beta_m \cdot (MMRP) + \beta_d \cdot (DMRP) \quad (2)$$

where R_f is the risk-free rate, *MMRP* and *DMRP* are average risk premiums for mature and developing markets, respectively, and β_m and β_d are estimates of the amount of market risk a particular stock has relative to other stocks in the mature and developing markets. Values of β equal to 1.00 imply average risk. Values higher (lower) than 1.00 imply greater (lower) than average risk.

Since the cash flows in Table 2 are in US dollars, we discount those cash flows with a dollar-denominated discount rate. Since those cash flows extend over several years, we use an estimate for the risk-free rate that also extends over several years. For R_f, therefore, we use 4.74 per cent which is the observed yield-to-maturity on 10-year US Treasury securities, taken from Bloomberg.

A common approach for estimating the β's is to regress returns on the firm's stock against returns on a market index. The slope in that regression is a measure of the sensitivity of the firm's stock price to changes in a market index. Thus, when changes in broad economic factors induce changes in the market index, the slope or β indicates the extent to which the firm's stock price will change on average.

The shortness of the time between the issue date and the date of the MSDW analyst report leaves inadequate data for TPSA's GDRs to provide reliable regression estimates. When data on the firm itself are unavailable, analysts often infer risk from firms with similar operating and financing characteristics. In Poland, no comparable firms existed. However, other European telecommunications firms had preceded TPSA in issuing DRs. Regressions for three of those firms – MATAV (Hungary), Česky Telecom (the Czech Republic), and Portugal Telecom (Portugal) – are reported in Table 3. The regressions use weekly returns with all available Bloomberg data from the time each DR began trading through January 29, 1999. Dollar-denominated returns on the DRs are regressed against dollar-denominated returns on the respective local market indexes and on the return of the S&P 500, after common co-movements in the local market and S&P 500 indexes have been removed. The t-statistics in those regressions range from 4.80 to 10.89 standard errors away from zero. In each case, the t-statistic for the local market is larger than the t-statistic for the S&P 500. Thus, β_{d} is at least as significant as β_{m} which suggests that local market movements influence DR prices even after controlling for movements in the US market. One reason for the strong relation between returns on the DRs and returns on the local market indexes may be that the firms that issue DRs account for large portions of their respective local market indexes. However, rerunning the regressions after adjusting index returns as if these firms accounted for 25 per cent of total index values, still produces highly significant estimates of β_d.

Of the three countries represented by firms in Table 3, Portugal is less like Poland than are Hungary and the Czech Republic. Portugal fits in the developed country category in Table 1, while the Czech Republic, Hungary, and Poland are developing countries. Thus, Portugal's economy is likely to be more stable than the economies of these other countries. This assertion is consistent with the country bond ratings reported in Table 4. In contrast to Portugal's high quality Aa2/AA bonds, the Baa/BBB bonds of the Czech Republic, Hungary, and Poland are viewed by rating agencies as being less secure. Table 4 also shows that the correlations between returns across equity markets are higher when the Polish market is compared to the Hungarian (0.60) and the Czech Republic (0.52) markets, than when it is compared to the Portuguese (0.40) market. This finding suggests further that Poland's economy is more similar to the Hungarian and Czech Republic economies than to the Portuguese economy.

Other things constant, the more stable the economy, the more stable the firm. Therefore, we expect Portugal Telecom to be less risky than the other two comparison firms.[4] Nevertheless, *relative* to the risk of other firms within its economy, we expect the risk estimates for Portugal Telecom to be as valid as the risk estimates for MATAV and Česky Telecom are relative to the other firms in their markets. Moreover, because the t-statistics in each regression in Table 3 are highly significant, we ignore potential differences in the numbers of observations in the regressions. We assume, therefore, that all risk estimates in the table are equally valid reference points for the risk to which TPSA's GDR holders would have been exposed in Poland, after accounting for the risk they bore in the more mature US market. Thus, we use a simple average of the β's to estimate the sensitivity of TPSA's GDRs to movements in the US and Polish markets. Those averages are 1.03 for β_m and 0.88 for β_d.

Having measured β_m and β_d, we now estimate average risk premiums for mature (*MMRP*) and developing (*DMRP*) markets. For *MMRP*, we use the average historical spread between annual returns on a broad portfolio of US stocks and the return on long-term government bonds from 1926 through

Table 3. – REGRESSIONS OF COMPARISON COMPANY DOLLAR-DENOMINATED GDR RETURNS AGAINST DOLLAR-DENOMINATED RETURNS ON A LOCAL INDEX AND AGAINST RETURNS ON THE S&P 500

Security (Sample Period)	Coefficients	Standard Errors	t-statistics	p-values
MATAV DR (11/21/97-1/29/99)				
Intercept	0.00	0.005	0.62	0.5368
Budapest Index	0.72	0.083	8.75	0.0000
S&P 500 Index	1.37	0.193	7.14	0.0000
SPT, or Cesky Telecom DR (6/05/1998-1/29/1999)				
Intercept	0.00	0.006	0.04	0.9686
Prague Index	1.02	0.114	8.93	0.0000
S&P 500 Index	0.96	0.201	4.80	0.0000
Portugal Telecom DR (1/05/1996-1/29/1999)				
Intercept	0.00	0.003	1.23	0.2204
Portugal Index	0.91	0.083	10.89	0.0000
S&P 500 Index	0.76	0.116	6.54	0.0000

Source: Bloomberg. Weekly dollar-denominated returns on the GDRs of comparison firms are regressed against weekly dollar-denominated returns on the respective local market indexes and on the return of the S&P 500, after common co-movements in the local market and S&P 500 indexes have been removed.

[4] Differences in the securities themselves may also be important. Portugal Telecom and MATAV both issued Level III ADRs traded on the NYSE. Cesky Telecom issued a Regulation S GDR traded on the London International Stock Exchange. Because liquidity is higher on the NYSE than on most foreign markets, Cesky Telecom's GDRs may require a liquidity premium (not necessarily reflected in Table 3's estimates of risk). TPSA's GDRs would require a similar premium.

Table 4. – COUNTRY BOND RATINGS AND CORRELATIONS OF US DOLLAR-DENOMINATED RETURNS ACROSS EQUITY MARKETS FOR A WORLD INDEX, A US INDEX, AND INDEXES IN POLAND, HUNGARY, THE CZECH REPUBLIC, AND PORTUGAL

		Correlations Across Equity Markets					
Country	Moody's/S&P Bond Ratings	World (MSCI)	US (S&P 500)	Poland (Warsaw)	Hungary (Budapest)	Czech Republic (Prague)	Portugal (Portugal)
World		1.00					
US	Aaa/AAA	0.89	1.00				
Poland	Baa3/BBB-	0.43	0.35	1.00			
Hungary	Baa2/BBB	0.53	0.45	0.60	1.00		
Czech Republic	Baa1/BBB+	0.35	0.24	0.52	0.53	1.00	
Portugal	Aa2/AA	0.59	0.40	0.40	0.47	0.37	1.00

Source: Bloomberg. Correlations are measured using weekly returns from January 1996 through January 1999.

1998. Data for this calculation come from *Stocks, Bonds, Bills, and Inflation 2001 Year Book* published by Ibbotson Associates, Inc. Analysts disagree on whether the premium should be based on a geometric or an arithmetic average. However Damodaran argues that the best estimate of the long-term spread is given by the geometric average. Accepting Damodaran's argument yields an estimate of 6.02 per cent for *MMRP*.

Because we do not have a long history of returns on Polish stocks or bonds, the procedure used to estimate *MMRP* for the US cannot be used with confidence to estimate *DMRP*. Instead, we follow Damodaran by examining the spread between yields on US corporate bonds with the same (BBB) rating as Polish bonds and the yield on US government bonds. That spread, according to Table 5, was approximately 2.13 per cent (6.87 per cent-4.74 per cent) as of January 5, 1999. This estimate indicates how much higher returns to bondholders must be in Poland than in the US, but it does not tell us what the premium should be for stockholders. To get that estimate, we multiply the bond spread by the ratio of the annualized standard deviations of returns on the stock and bond markets in the bottom panel of Table 5. That ratio (2.94 = 36.70 per cent/12.50 per cent) suggests that Polish stocks were three times more volatile than were Polish bonds. With increased volatility comes increased risk. Thus, we estimate *DMRP* to be 6.25 per cent (= 2.94*2.13 per cent).

With our estimates for R_f, β_m and β_d, and *MMRP* and *DMRP*, the value of R_e from equation (2) is 16.44 per cent. Plugging that estimate into equation (1) yields a value of 14.27 per cent for the *WACC*, which, in turn, gives an estimated price per GDR at the beginning of 1999 of USD 5.19. The fair price of USD 7.125, according to the MSDW analyst report, was 37 per cent higher than our estimate.

Table 5. – BOND YIELDS BY RATING TYPE AND VOLATILITIES OF BOND AND STOCK MARKETS

Bond Rating	Yield on 10-Year Debt as of 1/05/1999
US Treasury	4.74%
AAA	5.60%
AA	5.88%
A	6.18%
BBB	6.87%
BB+	7.65%
BB-	8.66%
B	10.72%
Annualized Standard Deviations:	
Polish Bonds	12.50%
Polish Stocks	36.70%

Source: Bloomberg. Annual standard deviations are measured using weekly returns from June 1996 through January 1999.

4.3. A Sensitivity Analysis of Our DCF Estimate

Of course, our estimate is just that, an estimate and subject to error. However, in comparison to the MSDW analyst report, we use a lower risk free rate (4.74 per cent vs 7.90 per cent) but a higher risk premium. Because the MSDW report does not discuss how their numbers were derived, we can only compare the numbers, not the methods of getting them. However, the higher risk-free rate used in the MSDW report may reflect an adjustment for risk. For example, the bonds TPSA issued were issued at 285 to 325 basis points above the US Treasury bond rate prevailing at the time of issue. Those differences are approximately equal to the difference between the risk-free rate we use and the risk-free rate used by MSDW, 3.14 per cent (= 7.90 per cent-4.74 per cent). Damodaran (2004) cautions against impounding adjustments for risk into the risk-free rate and also argues that bond spreads should be grossed up to reflect the higher risk of equity investments.

Of course, any adjustment for risk presupposes that country risk cannot be diversified away. Other things constant, the more positive the correlation between returns across markets, the lower the opportunity to reduce risk through diversification. Table 4 indicates that the correlation between returns on the Polish equity index and returns on every other index are positive. They are also significantly greater than zero at the .05 level. Thus, not all country risk can be eliminated through diversification which suggests that country risk premiums are relevant.

The premium we estimated above may still be too large, however. Damodaran argues, for example, that using longer horizons will reduce the ratio of the standard deviations of returns on stocks and bonds. To estimate the lower limit of that ratio, we use the 73 years of data from Ibbotson Associates, Inc. to calculate the standard deviation of returns for US stocks and long-term Treasury securities. The standard deviations calculated with US data are lower for both stocks (20.25 per cent vs. 37.50 per cent) and bonds (8.25 per cent vs. 12.50 per cent) than for Poland. However, the ratios in the US and Poland are not much different (2.45 vs. 2.94). Nevertheless, we apply the US ratio to get a revised estimate of *DMRP* of 5.22 per cent (2.45*2.13 per cent). We also lower the estimates of β_d by two standard errors for each country in Table 3 to get a new estimate of β_d equal to 0.70. Multiplying that new estimate by the new estimate of *DMRP* and adding the product to the other components of R_e gives a revised estimate of the cost of equity of 14.59 per cent. Other things constant, that estimate corresponds to a GDR price of USD 5.69 compared to which the so-called "fair" price of USD 7.125 was 25 per cent too high. Thus, we conclude that the observed price was not fair based on DCF calculations.

4.4. The Other Side of the Story: A Multiples Approach in an Optimistic Environment

Given that our DCF analysis and the DCF analysis performed by MSDW both indicate that TPSA's GDRs were overvalued at USD 7.125, we now ask why MSDW would issue a neutral rating. In part, the answer is that MSDW put greater weight on other valuation techniques. Specifically, comparisons of enterprise value to projections of unlevered free cash flow that examine how much capital suppliers pay for potential cash returns from the firm persuaded MSDW that TPSA was fairly valued relative to other firms.

Table 6 gives enterprise values as of January 22, 1999 for MATAV, Cesky Telecom, Portugal Telecom, and TPSA. The table reports MSDW's year-end estimates of unlevered free cash flow as well as ratios of enterprise value to unlevered free cash flow for each firm from 1998 through 2000. Though TPSA's ratio was on the high end of the range in each year, it was not unreasonable compared to the ratios of the other firms. Nevertheless, using an estimate on the high end implied that TPSA had either lower risk or higher growth potential than these other firms. If those assumptions were accurate and if the other firms were correctly priced, TPSA's neutral rating may have been justified. We have not examined the pricing of the comparison firms but other analysts did. Specifically, Credit Suisse First Boston had given TPSA and each of the comparison firms a "Buy" rating in January 1999, indicating that all these firms were *undervalued*. In that context, MSDW's neutral rating was conservative.

Table 6. – COMPARISONS OF ENTERPRISE VALUE TO UNLEVERED FREE CASH FLOW (UFCF) FOR TPSA AND COMPARABLE FIRMS

Firm	Enterprise Value ($ Million)	UFCF ($ Million)			UFCF Growth 98E-00E	Enterprise Value/UFCF		
		1998E	1999E	2000E		1998E	1999E	2000E
MATAV	7,797	346	366	445	13%	22.5	21.3	17.5
Cesky Telecom	6,543	213	304	360	30%	30.8	21.5	18.2
Portugal Telecom	13,671	599	764	796	15%	22.8	17.9	17.2
TPSA	11,775	400	489	625	25%	29.4	24.1	18.8

Source: Morgan Stanley Dean Witter Analyst Report. Enterprise value equals market capitalization plus net liabilities; unlevered free cash flow is the cash flow available for repayment to capital suppliers.

Though markets are not clairvoyant and analyst recommendations may not be unbiased estimates of future performance, asking how TPSA and its comparison firms fared following these analyst reports is nonetheless interesting. To that end, Figure 2 compares the performance of TPSA to the performance of a US and a European telecommunication index and to the S&P 500 between January 31, 1999 and December 31, 2003. All prices are expressed relative to the price as of January 31, 1999. Until the middle of 2000, both telecommunications indexes gained value faster than did the S&P 500. Over the next three-and-one-half years, both indexes dropped precipitously against the S&P 500. TPSA's GDRs performed relatively poorly over most of the period. By the end of 2003, the price of TPSA's GDRs had declined by 47 per cent, the European (US) telecommunications index had declined by 39 per cent (53 per cent), and the S&P had declined by 8 per cent.[5] Thus, TPSA and other telecommunications firms were more risky than an average stock for US investors and investing internationally would not have provided US investors with diversification benefits when US telecommunications stocks faltered.

Interestingly, the price appreciation for US and European telecommunications indexes throughout 1999 and into 2000 suggests analysts' recommendations may have been right in the short term. However, those recommendations did not change just prior to the large decline in the prices in the middle of 2000. Thus, it is difficult to interpret a buy recommendation when it does not differentiate market surges from market demises.

5. Conclusion

We examine TPSA's GDRs to determine whether they were correctly priced in early 1999 after first trading publicly in late 1998. Despite the neutral rating given to the GDRs in the Morgan Stanley Dean Witter analyst report, we

[5] Excluding dividends, Portugal Telecom's shareholders earned 31%, Cesky Telecom's shareholders lost 6%, and MATAV's shareholders lost 36% over the period depicted by Figure 2.

present evidence that the GDRs were overpriced. One reason for our more pessimistic view stems from our use of an explicit country risk premium as recommended by Damodaran (2004). Another reason stems from Morgan Stanley Dean Witter's use of price multiples. Comparisons of TPSA's price multiples to price multiples of other European telecommunications firms indicate that TPSA's price may have been fair in a relative sense. However, the long-term post-issue performance of TPSA's GDRs and of US and European telecommunications equity indexes intimate that analysts may have been too optimistic for the industry as a whole. Though the buy ratings issued by analysts in early 1999 for these firms seemed justified until the middle of 2000, performance after that time was poor. Of course, such *ex post* evaluations in our small sample may be unfair. Nevertheless, we argue that economic justification can also be found to suggest that TPSA's GDRs were over priced based on information that was available *ex ante*.

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Figure 1

Projected GDR Prices for TPSA based on Cash Flows from Morgan Stanley Dean Witter Analyst Report and WACC Estimates that Vary with Required Returns on Equity, Holding the Cost of Debt, the Tax Rate, and the Target Capital Structure Constant

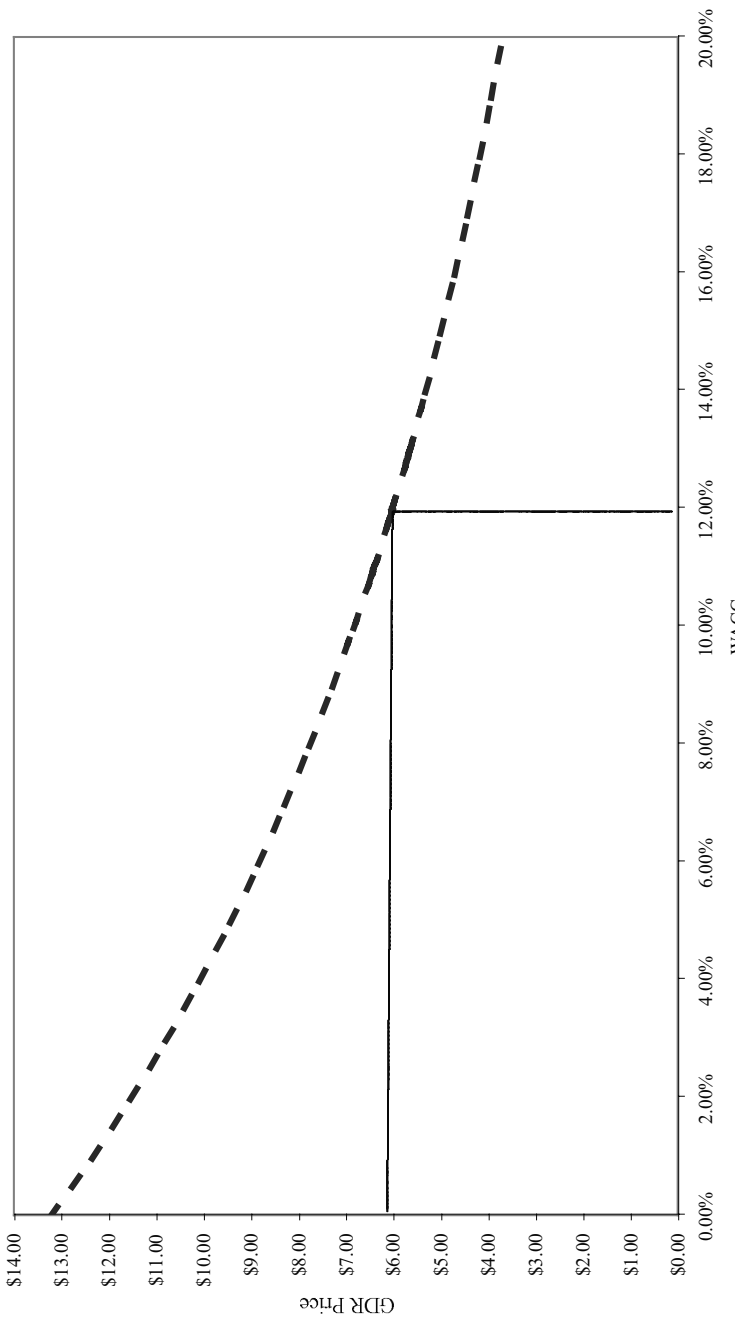
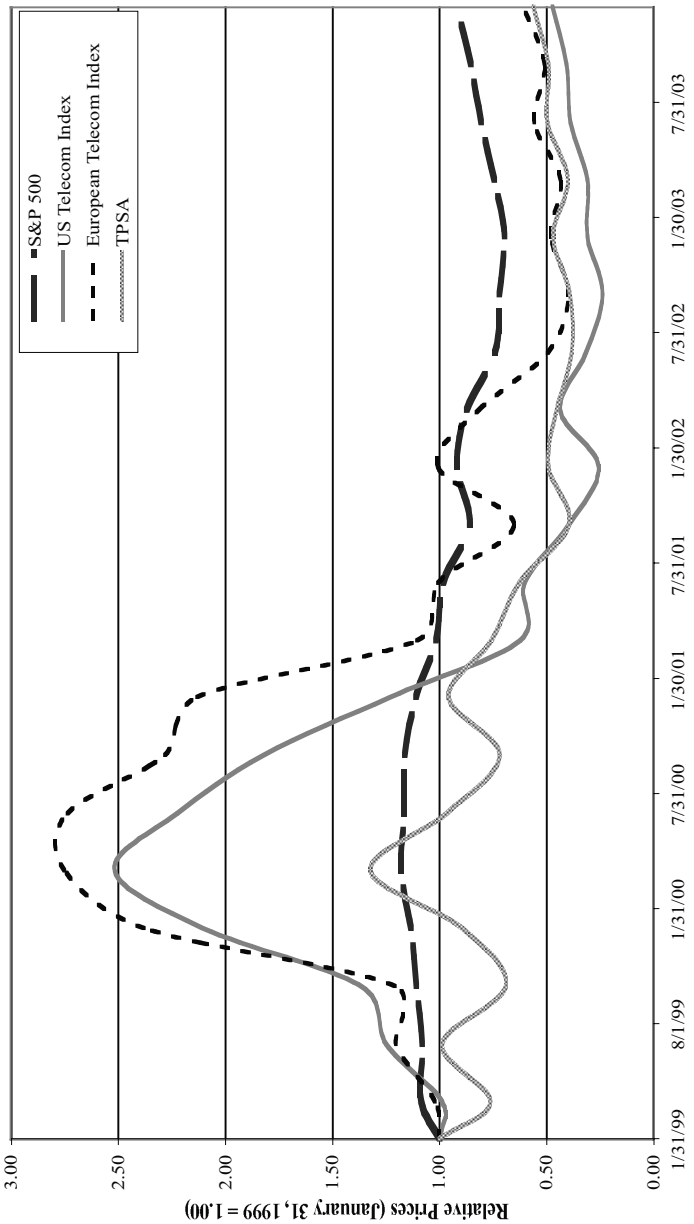


Figure 2
Post-Issue Relative Price Performance of TPSA
Compared to Telecommunications Indexes in the US and Europe and to the S&P 500



ROBERT G. CRAWFORD

The Ethics of Productivity in the Information Economy

Abstract

As the consummate economic problem, change affects everyone–positively or negatively–through altering asset values created by capitalising the resultant future. Change via productive innovation results in intra- and inter-societal wealth transfers that create winners and losers. The ethical concern is that winners are privileged and losers discounted. Positively, productivity meets the material needs of others. Hence, being a non-productive member of society is immoral. Negatively, imposing losses on others is also immoral. Innovators, as potential winners, privilege productivity; potential losers seek its prevention. Recognising that the problem is privileging the status-quo as an *outcome* rather than as a *process* provides an escape from the dilemma that innovation should be prevented because it imposes losses on others. A *process* that permits alternatives reduces the likelihood that an inferior service or product can be successfully introduced. Thereby, the ethical event of competitive productive alternatives actively 'call into question' any spontaneously offered inferiority. Competitive innovation that reduces one's welfare by improving other's welfare is an unavoidable systemic risk. Result protection attempts to prevent the consequent losses of innovation by privileging a few, in ways not available to all. Result protection tends to lead to economic stagnation that can only be overcome through process protecting policies.

1. Introduction

Everyone potentially, and most actually, have their needs met and their lives sustained via the complex web of relationships constituting the economy. This paper is about those relationships and why their alteration creates an ethical issue. It focuses on the consequences of the fact that every individual's actions affect others and each is in turn affected by these actions. The essence of economic process is change and change generates very thorny interpersonal effects.

Change alters the 'status-quo' or the current *state* of the world. Each alteration affects everyone–some positively and others negatively–even if only marginally. Change creates the present in the sense that it brings forth the future, a future often strange and unexpected. Since asset values are determined by a highly complex calculation that 'capitalises' the expected future–the not-yet but none-the-less anticipated–into the present, change is the consummate economic problem.

Economics (finance) is the core theory of capitalisation. Economics does not handle change well and predicts the future even less well. The reason is that most economic models 'explain' events as the sum of a deterministic causality component plus an 'error' term with assumed statistical properties that in essence leave its effect expected to be zero. Anything outside the 'causal' structure is forced into the error term – by definition the 'unexplained' component.

Asset value determination is of the utmost importance because changing asset values–changes in wealth, the dominant *state* variable–clearly drive behaviour in the modern world. Change is the optical filter through which the economic phenomenon of productivity is examined.

Productive innovations are a fundamental instrument of change. The decade of recent technological innovation, the theme of this collection of papers, has substantially changed the structure of the economy and promises to have permanent and more expansive consequences than heretofore manifested. The World Wide Web, made possible by computers, is the current event in the fast-flowing event stream generated by computers, whose productivity was initially underestimated and discounted. Gradually, realisation of the breadth and depth of computing's productive possibilities, manifest in technological innovation enmeshed in an institutional structure itself in flux, have become viewed as a generally positive or desirable movement for society.

Think of the economy as the moving *ship of state* propelled by productivity and innovation. Its movement is growth, now essential to the general wellbeing of society. Growth is fuelled by productivity and innovation. But, every moving ship creates a wake and in the wake of changing productivity lurks a dark side of the murky ethical horizon. Productivity's wake disrupts the status-quo, altering asset values that result in intra- and inter-societal wealth transfers. These are often unanticipated and they always create losers. Everyone is affected to some extent. The ethical issue of productivity is its varied consequences for everyone. The full weight of the ethical concern becomes apparent in the extent to which winners are privileged and losers discounted. Currently, the weight disproportionately falls on the perceived immediate loser. Consequently, participation in the economy requires everyone to maintain a position or judgment with respect to gaining and losing. This judgment is complicated by the certainty that everyone will be a gainer or a loser at various times in life. For a position on gains and losses to be tenable and simultaneously stable for both groups, it must not privilege either. To analyse possible tenable positions, one must address the ethical concern.

2. The Ethical Domain

The ethical domain is the person-to-person relationship, a relation of obligation.[1] This can be as simple as when one says "after you" rather than hurrying to be the first to enter a building in front of someone else. One can always hurry to 'be first,' but doing so amounts to privileging one's own reasons for entering a building over the reasons of the other person. Or, when encountering someone on the sidewalk coming from the opposite direction, one senses one should yield the right-of-way. Refusing to do this, privileges one's own purposes for being on the sidewalk. This 'sense' of the priority of the other person is what one experiences or 'feels' rather than rationally cognates.

More significantly, one's obligation is to be of material service to others. One's experience of being obligated by others in just the sense described is called ethics. Levinas explains ethics as "the calling into question of (one's) egoist spontaneity by the presence of the other person." [2] It must be pointed out that there is nothing legally compulsory or necessary about this ethical obligation, but ethics as an obligation are not a choice; it comes before choice in that it establishes choice.[3] It does not dictate or determine choice! One can place one's self first just as one can refuse to yield. The 'ought' of ethics is neither necessary nor coercive. However, service is harder to resist when working at a job that exists to serve others.

The prospect of being hostage to the will of others makes one uneasy or wary, of course, because being hostage inhibits one's ability to be responsible. One seeks protection from such conditions. The recognised economic phenomenon that accomplishes the security and protection of ethics–the social structure that accomplishes the calling into question of egotistical spontaneity–is competition. Competition is the social institution which prevents egotistical spontaneity from governing economic activity; it is the sure structure that prevents others from privileging themselves in economic relations. In economics, competition is the structure that accomplishes efficiency. Such a structure is necessary because of the unreliability of everyone volunteering to take up their responsibility properly. One factor that can alter or affect one's willingness to accept or refuse responsibility to others is the closeness of the relationship one has with others.

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[1] This conclusion is succinctly established in the philosophy of Emmanuel Levinas. For an excellent brief summary of Levinas' works see James E. Faulconer's "Emmanuel Levinas," *Dictionary of Literary Biography*. Bloomfield Hills, Michigan: Bruccoli Clark Layman/Manley, 2004.

[2] Emmanuel Levinas *Totality and Infinity* p.38.

[3] See Patricia H. Werhane, "Levinas's Ethics: A Normative Perspective without Metaethical Constraints" in *Ethics as First Philosophy: The Significance of Emmanuel Levinas for Philosophy, Literature and Religion*. See Adriaan T. Peperzak, ed., Routledge, New York and London, 1995 for a cogent argument against the 'egoism' of modern economics' view of self-interest.

We live in a world of relationships with others ranging from close to distant. The 'closest' relationship is family and family relations are the centre. Relational distance from this centre increases as our relational set expands from immediate and extended family to friends, neighbours and social acquaintances, co-workers, people in our city, region, country and ultimately with everyone. These categories only suggest the complex relationships each person has with others. Our relations with everyone in the set have many dimensions, some of which may entail conflicts. Further, the affinity we have with others constitutes us as persons and reflexively is constitutive of them. Such affinity is the common base of one's sense of responsibility for actions that more or less affect others.

The strength of this effect is 'closeness' and reflexively, closeness with others determines the extent to which they influence our intentional behaviour. It is commonplace that we show more consideration for and are affected by those who are close to us than by those who are distant. Regardless of its strength, this affection entwines us with others in everyday experiences. Such affective entwinement, our social relations and interpersonal relationships constitutes ethics.

It is obvious that our activity affects others just as their activity affects us.[4] In a strict sense, every action one takes has an effect on others and therefore has ethical implications whether recognised or not. Often the effect is intentional, but more often than not, it is unintentional. Since intent is difficult to establish, society gauges intent by retroactively judging effect as the indicator for intent. The adhesion of social relations is given by the degree each member, in assessing their action's efficacy, recognises and takes account of or is responsible for their influence on others. Volitional indifference to others requires that society adopt binding 'rules' that govern interpersonal relations. In turn, indifference to these rules requires enforcement. Police action–indictment, prosecution, conviction and penalty–is designed to coerce compliance in the presence of volitional failure. Autonomy within society is the extent of volitional activity within society and is the concern of privacy (Hirschleifer, 1980). The realm of privacy and the extent of the freedom implied by privacy, specifies the limits of social responsibility.

The practical problem created by recognition of the other person, whether realised clearly or not, is the necessity of making a "place" for oneself in society–achieving a life of one's own, while maintaining this recognition. This is the economic problem. The problem of economy in its etymological sense, is the problem of dwelling–the problem of household management. One's place as a responsible member of society is established by becoming self-reliant–that is, becoming a self, worthy of reliance. To refine the assertion that self-reliance is contributing to the welfare of others through participating

[4] The papers in this volume like Thomas Apolte's are a clear example of what is described here.

productively in the economy, consider statements from Adam Smith's Wealth of Nations.

About wealth, Adam Smith wrote long ago, "Every man is rich or poor according to the degree in which he can afford to enjoy the necessities, conveniences, and amusements of human life." (Smith, 1776, p 17) He also wrote that wealth is a consequence of a division of labour "*not originally the effect of any human wisdom* (but) the necessary, *though very slow and gradual*, consequence of man's "propensity to truck, barter and trade." Smith further stated "whether this propensity be one of those original principles in human nature, of which no further account can be given; or whether, *as seems more probable, it be the necessary consequence of the faculties of reason and speech*, (emphasis added) it belongs not to our present subject to enquire" (Smith, 1776).

Although Smith said nothing more about reason and speech in *Wealth of Nations*, philosophically, reason and speech presumed by Smith are the prototype of our ethical relation with others. Given that the propensity to truck, barter and trade is in essence a subset of reason and speech, it is reason and speech as the ethical response to others that creates the possibility of economic activity, the possibility of exchanging goods and services. It is by realising this possibility that one determines one's place in society. Division of labour and trade–specialisation and exchange–is the ethical domain of productivity. Being grounded in reason and speech, productivity through business exchange retains all the ethical attributes of reason and speech as a relation with others.

This assertion adds meaning to Smith's famous statement of his theory of the social foundation of wealth creation. "Man has almost constant occasion for the help of his brethren, and it is in vain for him to expect it from their benevolence only." (Smith, p.18) More likely, one succeeds in society through being of service to others first, showing them that it is their own advantage to do for him what he requires of them by first showing them their gains from reciprocal dealing. Thus "it is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner" but from recognising the priority of their interest.

Benevolence in Smith's sense of a non-reciprocal non-exchange relationship is the contemporary idea of a gift. It seems obvious that continuous dealings of the general stuff of nourishment as consumables between persons cannot be sustained by benevolence in the gift sense, as there is an insufficient pre-existing supply of stuff required to continuously rely on gifts. There must be "production" of some kind by someone. Production is best accomplished in a context of reciprocal exchange. As mentioned above, modern economics asserts that both production and exchange are founded upon self-interest interpreted as ego interest. However, Smith's claim that one is most likely to satisfy ones own interest by first satisfying the other's interest calls this standard economic assumption into question.

Richard Epstein, a law and economics scholar sympathetic to the economic way of thinking, explicitly states the interpretive view of self-interest as ego-interest. Self-interest is an attitude, disposition, or approach that persons bring toward their initial endowments. It states that they will use these endowments so as to maximize their *private* returns, subject to whatever external constraints–natural, social, or legal–under which they labour. It is the universal function which transforms natural endowments (the arguments of the function) into individual satisfactions (its dependent variable.) The organisms that are self-regarding (ego-regarding) keep all of what they produce and are able to obtain some fraction of the output of other organisms whose altruism is genuine and powerful. *In time, genuine altruists lose 'market share' to the committed egoists.* The process is in a sense inexorable, so that altruists in the long run face extinction. The battle over resources is a function of scarcity, not of the particulars of any physical or social arrangements. (emphasis added) (Epstein, p.103)

An alternative to assuming that economic activity is initiated by an ego interest indifferent to others is to assume that economic activity is initiated by recognition of the other's interest, which consequentially sustains one's self in the economy. That ethics–the interpersonal relation–requires one to 'be-for-others-before-being-for-self' or to 'be-for-self-by-being-for-others' doesn't mean that it will happen. Regardless, effort to distinguish between these competing hypotheses seems practically unfruitful. While it may be impossible to distinguish between inducements, trying to do so seems unnecessary because in any event, one needs to be vigilant for the egoist with whom one will end up on the "short end of the stick" in economic interaction. Thus, without straining over psychological motivational explanations, society organises to protect its agents from the negative consequences of egotistical (opportunistic) behaviour.

The dominant form of protection is provided by competition. In all effectively or concretely competitive environments, participants are generally satisfied with the results of exchange. The benefit of continuous dealing of buyer and seller is another institution that protects participants. Repeated experience with the same party assures satisfaction with the transactions because of the losses that can be imposed by withdrawal of business association.

As such, economic exchange is a moral response to others arising from the ethical relation–the *obligation* one has for another person–or ethics. Can one imagine the 'success' of an innovation that did not benefit others? The general idea of obligation and moral obligation in particular, is not foreign to economic theory. The highly respected Armen Alchian states "Employees in a firm have a *legal duty and moral obligation* to work in the interests of their employer rather than of any other firms. Trade secrets or techniques in the firm *should not* be disclosed to other firms. An employee may, in the course of duties, obtain information of great value to a competitor. The employee *would violate* the duty of trust to the employer by threatening to work for

a competitor and reveal the confidential information."(Alchian, 2003) Here the word *obligation* connotes more that just the volitional "result of choice" meaning or "contractual agreement between parties with no prior ground." The "result of choice" definition is usually how obligation is understood in modern economics, because the ground for activity is individual choice founded on utility maximisation. (Stigler, 1980 and Jensen, 1994) Moral obligation is consistent with the fundamental view that obligation is the I/Other[5] relation. In this view, choice formalised by a contract is not the establishment of the obligation but a delineation of what the prior or pre-choice obligation entails.

The significance of competition is revealed by the fact that in every relationship with another person there is always a third party (*i.e.*, another to whom one is also obligated.) These multiple obligations, expressed as meeting the demands of others in economic language, require choosing a response from among competing alternatives. Cost is the economic structure that assures the interests of all parties are considered in any allocation of resources that meets these demands. Because competition is a governance structure for interpersonal interaction in the economy, it is a moral structure. Although related, morality is not synonymous with ethics. Morality, commonly called ethics (as in 'code of ethics'), is the rules or laws governing behaviour towards others. Ethics is that which founds morality. Here morality is viewed as the general way adjudication between competing interpersonal claims should be accomplished. This view of ethics overcomes objections to conventional ethical thought that sees ethics and morality as sourced in personal goodness. Competition rather than personal goodness is the spring from which ethical behaviour toward others flows.

To summarise these points, each person is obligated to others as a constitutive moment of being a 'self' in society. This obligation is not a choice, but is the foundation of choice, a choice by which one can choose to accept or reject the obligation. Meeting the needs of others is an aspect of obligation. Each person is obligated to meet the concrete material needs of others.[6] The economic system, a web of interpersonal relations, is the dominant way that needs are met. The system morally fulfils its purpose to the extent that the system is open to competition and does not privilege any particular group in the system. This conclusion implicitly makes two assumptions: 1) no want is less worthy of satisfaction than any other want, and 2) everyone is sufficiently prepared to participate in exchange system.

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[5] Capitalizing "Other" signifies the concrete other person.

[6] In his book *Difficult Liberty,* Levinas states, "The other's hunger is sacred; only the hunger of the third party limits its rights." I am indebted to Jim Faulconer for pointing out this quote. This idea appears again in Totality and Infinity p. 172.

3. Viewing Productivity as an Ethical Issue

Productivity establishes and supports the means of meeting the material needs of others. Competitive business is the primary means of fulfilling one's ethical obligation. Producing something, being productive by doing that which provides a contribution to others as determined by them, is one's ethical obligation. Thus, being a non-productive member of society is immoral by this standard. Failure to enhance the productivity of one's activity is a failure of one's ethical obligation! Likewise, societal rules preventing someone from enhancing their productivity or even employing their productivity are immoral.

Even though one is obligated to others, one can shirk or fail to take up one's obligation. However individual failure through shirking is systemically called into question by the presence of others taking up their productive obligation. Others' productive behaviour drastically diminishes the shirker's place in society. Systemic response, the interaction of those who do respond properly to the needs of others with those who do not, demotes shirking and is a way of understanding Smith's 'invisible hand'. Smith's development of the foundations of exchange in the *Theory of Moral Sentiments*, carried over in the *Wealth of Nations*, views the evolution of social exchange as a kind of unintended generosity of social interaction.

However, productivity change is a double-edged sword. One producer can be directly affected by another's productivity improvement, which reduces the value of assets and the ability to sustain life by current activity. One suffers losses. The reaction is to feel offended because one privileges one's own status in the system. Reciprocally, one's productivity similarly affects others who respond in the same self-privileging fashion. How is the decision between competing privileges decided? What responsibility does the other have for the losses imposed? What responsibility does one have for the losses imposed on others in general? Commonly, one is responsible for damage caused to others. However, to prevent one's losses by preventing the others' productivity improvements, to sustain one's own value or maintain one's own production, would be to impose losses on producers in a position to promote net improvements in the overall economy. Who is responsible for those losses? Can this dilemma be resolved without resorting to a comparison of individual merit contaminated by opposing personal interests?

The dilemma of being restricted by losses imposed on others implicitly hides an assumption which must be uncovered before a way to avoid interpersonal comparison can be offered. The assumption that one should be prevented from innovation because innovation imposes losses is tantamount to privileging the status-quo as *outcome* rather than as *process*. Ethics as understood above, names our responsibility for others. Although responsibility entails meeting the needs of all others, it does not entail any specific result that meets their needs, regardless of the need.

Conceptually, one's responsibility to others is 'excessive' or 'exorbitant' in the sense of being impossible to meet since one is responsible for every person. Practically, this impossibility requires everyone to judge between competing claims. This adjudication, in order to escape the egoist trap of being decided by the decider according to egoist perspectives, requires determination by some other. To be moral, this determination must not enable one to privilege one's own interests over the interests of others. This avoidance is accomplished by morality as limiting rules, rules that proscribe an egoist response.

Morality is the set of limiting rules that defines obligation from a transcendent perspective–a perspective 'above' egoist individual preferences. Traffic laws, property laws, in short the legal system, cultural norms, religious norms and common law are examples of morality. For example, in interaction with others, process rules rather than result rules constrain the imposition of losses on others by directly damaging or physically destroying their assets. But *process* does not constrain one from creating equivalent asset damage through introducing a superior product. That is because under competition, the 'superiority' of an innovative product is not determined by the innovator, but by third parties. Contrarily, intentional physical damage is a direct determination by the one imposing the damage. A *process* permitting alternatives reduces the likelihood that an inferior service or product can be offered successfully. As such, permissible alternatives actively 'call into question' any spontaneously offered inferiority. The calling into question of an inferior product by a superior product is an ethical event. Morality thus specifies how one is to take up one's obligation to others as process. More importantly, morality also specifies what is not permissible in one's relation with others.

Because value is established in the process of exchange that is a form of reason and speech, insight into exchange efficacy follows from examining free speech. Meaning is established through a speech exchange called dialogue. Speech is reliable or trustworthy if speech is honest and open. Reliability is established by free speech. Free speech entitles others to say what they want except for specific situations such as yelling "fire" in a crowded theatre. However, that one can say nearly anything one wishes to does not prevent one from lying or making silly statements. Lying devalues speech because lying renders meaning unreliable. Presumably, one designs and understands the strategic intent of one's own lies; it is the other's lies that are problematic. The check on anyone's lying is an open speech forum, with everyone permitted to enter, to contest the other's speech. The possibility of others also speaking, challenging the 'liar' by questioning them, can uncover the lie. Speakers still can lie or say stupid things, but with open speech those will be recognised as lies or stupidity and will be ignored. Both the liar and the stupid speaker will lose credibility. Open dialogue means truth will be revealed in the exchange forum.

The above result depends on the usually unstated implicit assumption that all relevant participants are prepared to participate in the dialogue. Those who

are not sufficiently prepared, obtain surrogates to represent them–as manifest by lawyers, doctors, politicians and others who are prepared. These surrogates most often need not be specifically compensated because their interests are, in general, aligned with the interests of those not able to participate on an equal footing on their own. Regardless, superior speech devalues inferior speech, as determined by the listener, not the speaker.

4. Evaluating Technologically Induced Outsourcing

Computers and the World Wide Web diminished the constraint of creating products within a transportation cost induced proximity to the location of their use. Transportation costs affected the time for transporting even lightweight products from producer to user. Reducing this constraint for many new products and services has momentous consequences. The most serious are the responses that prevent possible innovation. In the information economy, many products and services are now intangibles; moreover, electronic transmission permits separation of producer and consumer both in time and location. These intangible products, by becoming locationally and temporarily unbundled from tangible assets previously necessary for production and use, have significantly changed the asset landscape resulting in a redistribution of global employment.

Innovation (productivity enhancement) reduces the values of assets tied to the *status quo*. Superior products lessen the demand for existing products, reducing the income to the specialised assets associated with their production. Owners lose wealth to the extent that these existing assets cannot easily adjust to the new products. Since assets capitalise the value of the future stream of income from the product, loss occurs. Fear of this loss creates the incentive to restrict innovation and competition–the essential requirements for trustworthy exchange value. The usual restrictive response is to establish policies or rules that protect values associated with the *status quo*. Such protection of results rather than process seems meritorious because the negative consequences for innovation that imposes losses on the innovators and all those who stand to gain from the innovation are never observed.

However, in a context where activity is socially permissible, protection that privileges one group over others breaches morality. In spite of this breach, politics and policy is such that it succeeds by dispensing privilege. Thus, while immoral, result- preserving rules that establish privilege will likely persist unless a meta-rule can be established that rules out the dispensing of privilege. Establishment of such meta-rules is a kind of constitutional provision and seems unlikely in a privilege-dispensing society. What likely response can be expected?

One can do nothing but let the competing forces that are extant in the economy grind as they have in the past. The merit of this reaction lies in the as-

sumption that expected returns have anticipated losses from innovation and are capitalised in the risk prospects. Therefore, any *ex post* realisation of losses has been already hedged or discounted and so has earned prior compensation. Thus, no active or protective response is necessary.

However, the forces of competition are limited in scope. While conceptually the most effective means to applied ethics, competitive forces are not uniformly distributed across all agents in the economy. This uneven distribution is the main justification for regulating private economic activity in the public interest. Here the term 'public interest' recognises the necessity for some form of transcendence to govern private (individual) economic activity. However, as literature on regulation has shown, regulatory protection seldom performs as it is intended. (Breyer and MacAvoy, 1987) In many instances, protectionist social policies are thinly veiled 'rent' appropriation by the politically well connected.

An alternative is to provide a form of 'social' insurance paid for by premiums proportional to the gains from successful innovation. Asset owners pay a premium for a policy that compensates for losses in asset value associated with superior innovation, or social productivity. Such policies have been implemented in various forms in current society but not without problems. The main problem with any structure that specifies a redistribution of gains from winners to losers via a result rather than a process rule is a redistribution scheme that becomes anticipated and gamed. Thereby the magnitude of innovation and productivity that accounts for the gains is lessened by this 'tax' on productivity which mitigates the natural consequences that induce egoists to perform for the benefit of others. This conceptual problem is magnified by the practical problem of measuring gains which tend to be very diffuse and measuring the losses which tend to be unobservable. Further, this solution tends to ignore the fact that while specific risk can be reduced by diversification, systematic risk is unavoidable and is therefore not compensatory. Process rather than result rules recognise that systemic risk is inescapable and they opt for its discipline. Thus, participation in the system generates compensation for successful innovation while simultaneously subjecting innovators to the rigors of competition, driving their economic rents to zero. There is no efficient escape from the systemic risk of participating in the system. All of the papers in this volume address aspects of this risk.

5. Conclusion

What one does economically has consequences for others, intended and unintended, for which one is responsible. This responsibility arising from viewing the economy as moral terrain is incompletely specified. However, incomplete specification of responsibility in the moral domain does not absolve one of moral responsibility. Ironically, innovative acts that responsibly fulfil this obligation can be harmful by reducing the asset values of those with whom one

is ethically required to compete. Such competition, a beneficial open process, is in the public interest. Nonetheless, that competition can reduce one's wealth through beneficially improving the welfare of everyone in the economy is an unavoidable systemic risk. Result protection describes particular attempts to prevent the realised consequences of this risk by privileging a few in ways not open to all. Result protection tends to lead to economic stagnation that can only be overcome through process protecting policy.

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– P is the selling price, and
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