DEUTSCHE
BUNDESBANK

Capital, labour and productivity: What role do they play in the potential GPD weakness of France, Germany and Italy?

Antonio Bassanetti
(Banca d'Italia)

Jörg Döpke
(Deutsche Bundesbank)

Roberto Torrini
(Banca d'Italia)

Roberta Zizza
(Banca d'Italia)

Discussion Paper
Series 1: Economic Studies
No 09/2006

Deutsche Bundesbank, Wilhelm-Epstein-Strasse 14, 60431 Frankfurt am Main,
Postfach 10 06 02, 60006 Frankfurt am Main

Tel +49 69 9566-1
Telex within Germany 41227, telex from abroad 414431, fax +49 69 5601071

Please address all orders in writing to: Deutsche Bundesbank,
Press and Public Relations Division, at the above address or via fax +49 69 9566-3077

ISBN 3–86558–127–7 (Printversion)
ISBN 3–86558–128–5 (Internetversion)

Abstract

The paper analyses the recent supply side developments in France, Germany, and Italy by employing a non-parametric approach to estimate potential GDP. The analysis reveals marked heterogeneity among the three countries with regard to the contribution made by labour input. Where similarities can be found, however, are in the slowdown of accumulation activity and in the pronounced worsening of total factor productivity. The paper is rounded out by estimates of some measures of wage pressures and of profitability in order to assess the role played by the movements of relative input prices in the intensity of use of primary factors in the production process.

Keywords: Potential output, growth accounting, productivity, NAIRU, factor shares.

JEL classification: O47, O52, E32.

Non-Technical Summary

The paper analyses recent supply side developments in France, Germany and Italy. Potential GDP growth is estimated by a non-parametric framework. This framework relies generally on a growth accounting exercise. This renders it possible to decompose potential output growth into contributions by long-term developments in employment, capital and total factor productivity. Applying this method suggests that, since 2001, potential growth has been sharply slowing in all three countries.

Furthermore, in Germany and in Italy the same findings also hold for the larger part of the 1990s. Thus, the performances of the supply sides in the three countries appear to be meagre not only in comparison with the U.S., but also with other European countries. Although all three economies under investigation share a low rate of potential growth, some relevant differences across these countries remain noteworthy. To begin with, the contribution of labour input to growth was quite heterogeneous: On the one hand, in France and particularly in Italy it contributed significantly to potential growth since the mid-1990s. This relatively positive development was fostered by the restrain of labour costs induced by the policies adopted in the last decade. On the other hand, in Germany the contribution of labour input to potential growth decreased in the post-reunification period and subsequently remained at low levels by historical standards. For all three countries, however, the analyses reflect a high level of unemployment and of its structural component.

For all three countries under investigation, the findings suggest a decline of the contribution of TFP to growth in the time range considered. It has been particularly pronounced in Italy. From these results it might be concluded that policies are warranted that enhance the institutional environments in which firms operate and that a deep re-organisation of the economy may help to improve the efficiency of the production system.

The first two determinants of the decelerating potential GDP have been widely recognised by the empirical literature. In contrast, the paper focuses more on the slowdown of the contribution of capital to growth in the three countries. The paper offers some parts of a possible explanation, though certainly not the only one. In particular, it is argued that a steep decrease in labour shares has contributed to slowing process of substituting capital for labour. However, although this argument fits quite well to French and Italian data, characterised by a substantial degree of wage moderation, the explanatory power of the hypothesis is more limited for the case of Germany.

Nicht technische Zusammenfassung

Das Papier untersucht aktuelle Entwicklungen der Angebotsbedingungen in Frankreich, Deutschland und Italien. Das Produktionspotential wird mit Hilfe eines nicht parametrischen Ansatzes geschätzt. Dieses Verfahren beruht auf einer Wachstumszerlegung und erlaubt es, das Potentialwachstum in die langfristigen Beiträge von Arbeit, Kapital und totaler Faktorproduktivität zu zerlegen. Die Anwendung der Methode zeigt eine spürbare Verlangsamung des Potentialwachstums in allen drei Ländern nach 2001. In Italien und Deutschland verlangsamt sich das Potentialwachstum sogar seit Beginn der neunziger Jahre. Damit ist das Trendwachstum der drei Länder nicht nur im Vergleich zu den USA, sondern auch in Relation zu anderen europäischen Staaten schwach.

Obwohl alle drei Länder ein niedriges Potentialwachstum aufweisen, gibt es dennoch einige bemerkenswerte Unterschiede. So war der Wachstumsbeitrag des Faktors Arbeit recht divers: In Frankreich, und besonders in Italien, trug dieser Produktionsfaktor spürbar zum Wachstum seit Mitte der neunziger Jahre bei, wozu die beschäftigungsfreundliche Entwicklung der Arbeitskosten wesentlich beitrug. In Deutschland hingegen nahm der Wachstumsbeitrag des Faktors Arbeit seit der deutschen Einheit kräftig ab und blieb seitdem auf einem im historischen Vergleich sehr niedrigen Niveau. Für alle Länder gilt hingegen, dass das nur geringe Potentialwachstum eine anhaltend hohe, insbesondere strukturelle Arbeitslosigkeit widerspiegelt.

Der Beitrag der totalen Faktorproduktivität zum Wachstum nahm in allen drei Ländern ab, besonders stark in Italien. Aus diesen Resultaten kann geschlussfolgert werden, dass Verbesserungen des institutionellen Umfeldes und der Organisation der Produktion notwendig sein könnten, um das Wachstum zu stärken. Während der Beitrag der beiden genannten Produktionsfaktoren zum abnehmenden Potentialwachstum bereits häufig in der empirischen Literatur diskutiert wurde, wendet sich dieses Papier auch dem Sinken des Beitrages des Faktors Kapital zum Potentialwachstum zu. Es wird argumentiert, dass eine mögliche Erklärung dieses Phänomens in dem kräftigen Sinken der Lohnquoten seit Beginn der achtziger Jahre bestehen könnte, das auf eine verminderte Substitution von Arbeit durch Kapital hingewirkt hat. Allerdings steht diese Erklärung besser mit den italienischen und französischen als mit den deutschen Daten in Übereinstimmung.

Contents

List of Tables

List of Figures

Capital, Labour and Productivity: What Role do They Play in the Potential GDP Weakness of France, Germany and Italy? [1]

1 Introduction

In recent years the economic debate has frequently focused on the widening gap between the rhythm of growth of the U.S., on the one hand, and the euro area, on the other. The slowdown of the largest European countries, in particular, launched a major wave of empirical research seeking to understand its determinants. Although some consensus emerged regarding a few of them, mainly concerning the marked deceleration of total factor (and labour) productivity and the relatively poor performance of the labour market, much still remains to be uncovered and properly understood.

The Banque de France, Banca d'Italia and the Deutsche Bundesbank joined forces to conduct a research project designed to address, from different angles and perspectives, the similarities and differences between France, Germany and Italy with regard to their sluggish economic performance. While one part of the project focused on the demand side of the economy and another on the cyclical position of the three countries, the present paper concentrates only on the supply-side conditions. In particular, we analyse the development of potential GDP growth and its components in the 1982-2004 period. In doing so, we recur to a non-parametric approach that has the advantage of not requiring any assumption about the specific functional form of the production technology (section 2).

Though the supply-side focus certainly limits the scope of the research, the fact that the adopted approach is fundamentally based on the growth accounting identity enables us to evaluate the contributions of the primary inputs of production and of productivity to the dynamics of potential GDP, which have been particularly weak in recent years.

We find the hampering role played both by the high levels of the Non-Accelerating Inflation Rate of Unemployment (NAIRU) in all of the three countries (despite the improvements seen in Italy and, to a much lesser extent, in France since the mid-1990s) and by the marked deceleration of total factor productivity (TFP), which is indicative of a diffuse and increasingly serious lack of efficiency (section 3). The reduced potential

[1] Deutsche Bundesbank, Economics Department, Wilhelm-Epstein-Str. 14, D-60431 Frankfurt am Main, Germany, email: joerg.doepke@bundesbank.de. The paper is part of the joint research project "Growth and Cyclical Asymmetries in France, Germany and Italy" carried out by the Banca d'Italia, the Banque de France and the Deutsche Bundesbank. We thank Heinz Herrmann, Karl-Heinz Tödter, Michael Dear and participants in the workshop on "Growth and cyclical asymmetries in France, Germany and Italy" held at the Banque de France (Paris, 22-23 June 2005) and in the seminar held at the Minda de Gunzburg Center for European Studies at Harvard University (Cambridge, MA, 14 December 2005). The opinions in the paper, however, are those of the authors alone and do not in any way reflect the views of the institutions with which they are affiliated.

growth is also attributable to the sizable slowdown in the accumulation of capital stock, despite increased investment in information and communications technologies (ICT). The overall evidence is further confirmed by the outcomes of a simple growth accounting exercise through which we assess the diminishing support of labour productivity by capital deepening and, to a greater extent, by total factor productivity (section 4).

While the first two determinants of the decelerating potential GDP have been widely addressed by the empirical literature, the slowdown of accumulation activity in the three countries deserves more attention than it has attracted until now. We focus on one possible explanation, though certainly not the only one, which deals with the process of substituting labour for capital that would have been induced by their relative prices in the last decade, characterised by a steep decrease in labour shares (section 5). While this argument applies quite well to France and Italy, where wage moderation has been substantial and the producers' labour costs have grown more slowly than labour productivity, for the case of Germany the interpretation is more problematic; here the overall evidence seems to point to more general difficulties in deploying both factors of production profitably since reunification in the early 1990s.

A brief summary of our results is reported in the last section of the paper.

2 Estimating potential growth: a non-parametric approach

In order to estimate potential output, we refer to the non-parametric approach proposed by Tödter and von Thadden (2001): although founded on the theory of production, it has the advantages of not requiring any assumption about the specific functional form of the production technology and of simplicity.

A quick sketch of the method may start with the production function $Y_t = A_t F(K_t, L_t)$, where $F(K_t, L_t)$ is assumed to be continuous and differentiable and A_t is the Hicks-neutral technical progress; in the following analysis we will also adopt the standard assumptions of constant returns to scale and of perfect competition. Taking logs and differentiating leads to the growth accounting equation:[2]

$$\Delta y_t = \alpha_{kt}\Delta k_t + \alpha_{lt}\Delta l_t + a_t; \quad \alpha_{kt} + \alpha_{lt} = 1 \tag{1}$$

The growth rate of output (Δy_t) is equal to the sum of the growth rates of the factors of production (Δk_t and Δl_t), weighted by the corresponding output elasticities (α_{it}), plus the dynamics (a_t) of total factor productivity.

On the basis of the assumptions made,[3] the unobservable output elasticities are equal

[2]In the following, the natural logarithm of a variable X is indicated using lower-case letters (i.e. $x = ln(X)$) and its changes over time (differences) with the symbol Δ (i.e. $\Delta x_t = x_t - x_{t-1}$).

[3]Though quite common in the literature, the adopted assumptions are undoubtedly restrictive and their failure invalidates the shared identity of TFP and technological progress. However, it has been noted that the resulting growth accounting allows useful analysis even when they are not fully satisfied (see, for

to the observable factor shares, given by the ratio of the cost of each input to the value of output; factor shares sum up to unity.[4]

Taking this as a starting point, the aggregate potential output y_t^* can be obtained very simply, by: 1) calculating the dynamics of total factor productivity (a_t); 2) estimating the trend (potential) values of TFP (a_t^*) and of the labour input (l_t^*); [5] 3) substituting them into the growth accounting equation, together with an appropriate initial value for y_0^*, and solving for y_t^* recursively.

Before reviewing these three steps in greater detail, it is worth mentioning some caveats about the standard growth accounting exercise that, for pragmatic reasons, we use in this paper. Specifically, beside the already mentioned assumptions, we use the official capital stock and employment data as input measures and therefore we disregard the possibility of estimating the actual flow of services released by the productive factors.[6] This would require us to take into consideration the potentially different marginal productivities of different types of both capital goods and workers through the correction of capital stock for its efficiency loss due to depletion and of employment by means, for example, of educational attainments. All of this may translate into some imprecision in the measures of the factor contributions to economic growth and, therefore, of TFP. However, since the aim of the research was not a detailed growth accounting analysis, we preferred to remain within a simple framework; moreover, we think that the sharpness of the stylised facts that emerge from our exercise makes the findings quite robust to more sophisticated settings. Finally, we remind the reader that we do not use harmonised data and that, therefore, the potential differences in the procedures adopted by national statistical institutes may have a (hopefully minor) effect on international comparisons.

Taking these warnings into account, let us now return to the methodology.

First step

Total factor productivity is the only unknown in the growth accounting equation and can be calculated as a Solow residual on the basis of the historical data:

$$a_t = \Delta y_t - \alpha_{lt}\Delta l_t - (1 - \alpha_{lt})\Delta k_t \tag{2}$$

Specifically in our exercise we focused on the quarterly sample ranging from 1982 Q1 to 2004 Q4; this frequency was chosen with the aim of providing potential GDP estimates to be compared with the corresponding actual releases of national accounts, allowing a "real-time" economic analysis. In this context, y_t is the log of GDP evaluated at constant prices and l_t is the log of total employment.[7] Statistical institutes release capital stock data

example, Barro, 1999; Basu and Fernald, 2002).

[4]In this framework the cost shares are allowed to vary over time.

[5]It should be noted that, considering the cyclical fluctuations in the use of capital input (proxied by the degree of capacity utilisation), a distinction may also be made between the potential and actual capital stock. Anyway, following the procedure adopted by the OECD and the European Commission, we preferred to make no distinction and to use the actual capital stock in the third step of the procedure.

[6]The only exception is for France, for which we use a measure of the *productive* capital stock provided by the Banque de France.

[7]In the context of a growth accounting analysis, the value added at basic prices would be a better

(whose log in real terms is k_t) at only an annual frequency; we obtained quarterly estimates to be inserted in equation (2) through interpolation.[8] As regards the output elasticity a_{lt}, we used the adjusted wage shares released regularly by the European Commission.[9]

Second step

Smoothing TFP. Calculated as a residual, the TFP shows highly pro-cyclical fluctuations that need to be eliminated to assess its contribution to potential output. Its trend (a^*) can be obtained in various ways: for example, by using simple moving averages, or by recurring to widely used univariate filters such as the Hodrick-Prescott (HP)[10] or the exponential smoothing filter. In this paper we follow the original contribution by Tödter and von Thadden, resorting to the extended exponential smoothing (EES) approach advocated by Tödter (2002). Like the HP, the EES implies revisions of the estimated trend values as new observations become available.[11] However, according to Tödter, the EES distributes them more evenly across all trend values, whereas the HP concentrates their impact at the very end of the sample.[12] The outcomes of the filtering procedure are shown in Figure 1 in which the quarterly TFP is compared with its trend;[13]we will return to them in the next section.

Smoothing labour input. Since the number of employed persons can be expressed as

$$L_t = LF_t(1 - u_t) \tag{3}$$

where LF is the labour force and u is the unemployment rate, we need to estimate the 'natural' rate of unemployment (u^*) and substitute it into equation (3) to get the trend (potential) level of employment (L_t^*).

The same methods available to estimate the TFP trend (a^*) could also be adopted for smoothing the labour input. However for our purposes we preferred to recur to recent research carried out at the Banca d'Italia, focusing on the estimation of the NAIRU through

measure of aggregate activity; the choice of GDP at market prices, due to the fact that we are targeting potential growth (possibly comparable with actual GDP to get an assessment of the output gap), may be reflected in the estimates of TFP. However we think that the impact on the trend of productivity, obtained in the second step through a smoothing procedure, is indeed minor.

[8]For Germany we used quadratic interpolation; for Italy we recurred to a Chow-Lin procedure exploiting the dynamics of a quarterly estimate of the stock of capital available at the Banca d'Italia; for France, as already mentioned, we adopted a quarterly measure of *productive* capital stock provided by the Banque de France.

[9]Also in this case we obtained quarterly series by quadratic interpolation of annual data; moreover, a_{lt} is the two-period average of the wage share.

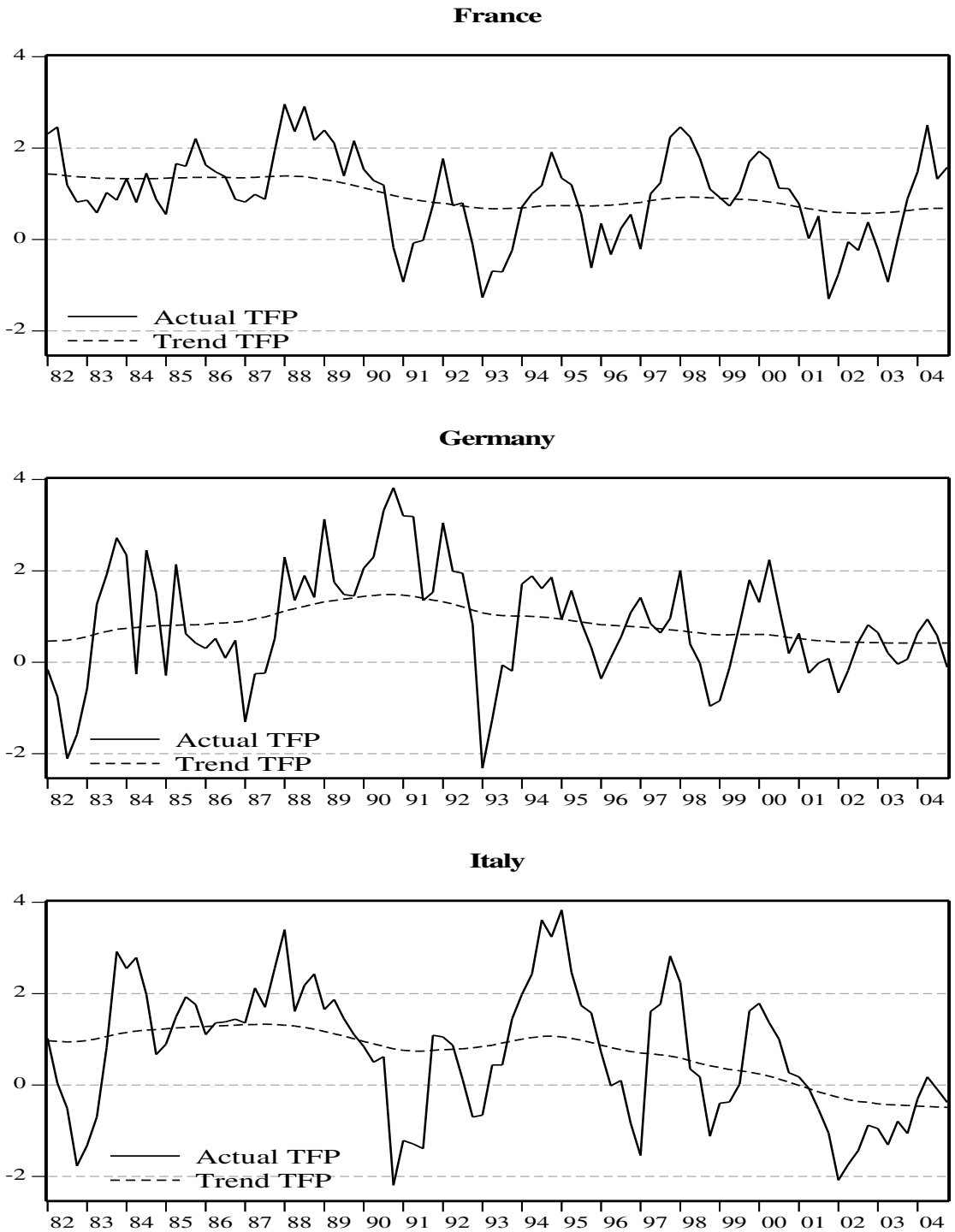
[10]See Hodrick and Prescott (1997).

[11]Both filters, in fact, are symmetrical for central observations and become increasingly asymmetrical towards the tails of the sample.

[12]To see how the EES extends the original exponential smoothing filter and for further comparison with the HP filter, the reader is referred to Tödter (2002).

[13]It has to be said that, for the sake of robustness of our final results, we also calculated potential GDP relying on HP-filtered TFP; our results were revealed to be consistent with those described in the rest of the paper.

Figure 1: Total Factor Productivity: actual and trend values



Note: quarterly year-on-year rates of growth. The three figures have the same scale to facilitate comparison.
Source: elaborations on national statistics.

the unobserved component method.[14] This approach allows to decompose the unemployment rate (u) into a cycle and a trend component; the last one is interpreted as the measure of the NAIRU (u^*) we are looking for.[15] The attractiveness of the unobserved component method lies in the fact that it combines positive aspects of purely statistical and purely structural frameworks yet implying a low burden in terms of data requirements.[16]

Referring to Appendix I and to Zizza (2005, 2006) for methodological details, here we merely wish to recall that, for the sake of robustness, two unobserved component models have been estimated for each country: a univariate model for the unemployment rate and a bivariate model with unemployment and GDP, embedding Okun's Law.[17] In each case our best estimates of u^* - in terms of both precision and smoothness - derived from the bivariate specification.[18]

As is shown by Figure 2, the long-run labour market developments have been quite different among the three major euro-area members.[19] In France and Italy the NAIRU grew constantly in the first part of the sample, climbing up to 11.1 and 10.6 per cent, respectively, in 1994 and 1996. This was followed by a reduction, which was much faster in the Italian economy than in France, as a result of the labour market policies adopted in the two countries since the early 1990s (which we will revisit in the next section). In the current decade, whereas in Italy the unemployment rate and the NAIRU kept falling, dropping to 8 percent in spite of a very weak cyclical phase, in France the economic slowdown contributed to increased unemployment, which in 2004 rose to 10 per cent; for the moment, however, this worsening did not imply an increase in the NAIRU as well.

The picture for Germany is quite different: although the level of unemployment has been historically much lower, it underwent sustained post-reunification growth in both actual and potential terms, reaching levels close to those of France and Italy.[20] In 2004 the NAIRU rose to 9.4 per cent, its peak value in the period under investigation.

[14] In order to obtain smoother estimates of the potential employment L^*, the labour force LF has been filtered as well, using the HP technique.

[15] It can be added that this approach 'encompasses' the HP technique, since under particular conditions the trends stemming from the two methods are equivalent (Harvey and Jaeger (1993)).

[16] Moreover, since it derives optimal asymmetric weighting schemes at the tails of the series (see Harvey and Trimbur (2003)), it produces reliable estimates at the end of the sample, thus reducing the uncertainty regarding the current level of the NAIRU.

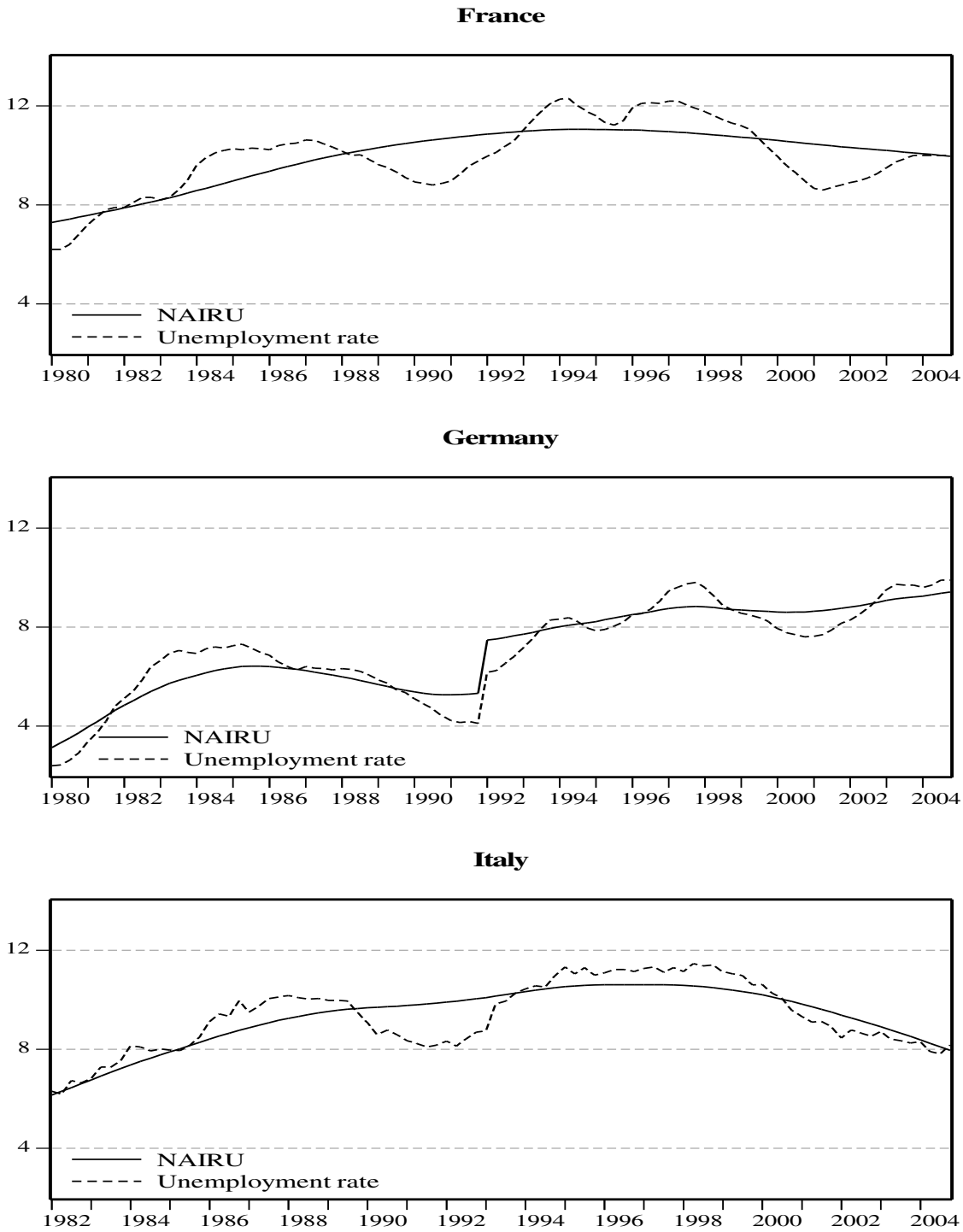
[17] This law holds that there exists a link between cyclical fluctuations of output and unemployment. See Apel and Jansson (1999); Fabiani and Mestre (2001) and Runstler (2002).

[18] This is not surprising since multivariate unobserved component models usually improve upon univariate specifications enhancing the accuracy of the estimates, allowing consistency with the underlying economic theory to be achieved and reducing the revisions between real-time and final estimates (see, for example, Runstler (2002) and Camba-Mendez and Rodriguez-Palenzuela (2003)). In our exercise, the univariate models produced measures of the NAIRU that were substantially equal to the unemployment rate itself; in other words, they were not able to identify a significant cyclical component. This is also the reason why we did not use this method for filtering the TFP.

[19] Alternative measures, either coming from *ad hoc* filtering techniques, such as the HP or the EES filters, or provided by international institutions such as the OECD and the European Commission, are broadly in line with our estimates.

[20] When estimating the NAIRU, the break due to the reunification has been modelled explicitly by including a dummy to account for the level shift.

Figure 2: Unemployment rate and NAIRU



Note: quarterly rates. The three figures have the same scale to facilitate comparison.
Source: elaborations on national statistics.

Third step

The trend values for total factor productivity (a^*) and potential labour input (l^*) are inserted into the growth accounting equation:

$$y_t^* = y_{t-1}^* + a_t^* + \alpha_{lt}\Delta l_t^* + (1 - \alpha_{lt})\Delta k_t \tag{4}$$

In order to obtain the level of potential output, a starting y_0^* can be freely selected.[21] In the following, however, our results will be shown only in terms of year-on-year quarterly rates of growth, Δy^*, which are the sum of the contributions given by trend TFP (a^*), capital $(1 - \alpha_{lt})\Delta k_t$ and labour ($a_{lt}\Delta l_t^*$). These determinants can be used to interpret the main driving forces behind the evolution of the supply side of the economy.

3 Evidence on potential growth and its determinants

Meagre performance.

The main results stemming from the non-parametric approach are shown in Figure 3. Since 2000 potential GDP growth has been decreasing in all of the three countries. In Germany and, to a lesser extent Italy, this evidence seems part of the negative tendency characterising a large fraction of the sample, while in France it follows a series of growth rates fluctuating around fairly low levels.[22]

Our estimates give broadly the same picture as those released by the OECD and the European Commission; moreover, the longer time span available from these institutions allows us to emphasise that the decrease of potential growth is a long-standing feature of our economies. Actually it was much steeper in the past decades: according to the European Commission,[23] in the mid-1960s potential output was growing at a yearly rate of close to 5 per cent both in France and in Italy and 4 per cent in Germany; ten years later the rate decreased to about 3 per cent and 2 per cent respectively. Finally, in the mid-1980s French and Italian potential GDP growth had also fallen to only slightly above 2 per cent, whereas in Germany it remained stable at that rate for about ten years, undergoing a brief, though marked, acceleration in the second part of the decade, prior to German reunification.[24]

Although one can think that a relatively low rate of growth is a typical characteristic of well developed and advanced economies, nonetheless the very recent performance of the three largest euro-area members has been somewhat meagre even in comparison with other European countries. As an example, the potential growth rates of Spain, Sweden and the U.K. have been on a mildly positive trend since the mid-1980s, and in 2004 they were

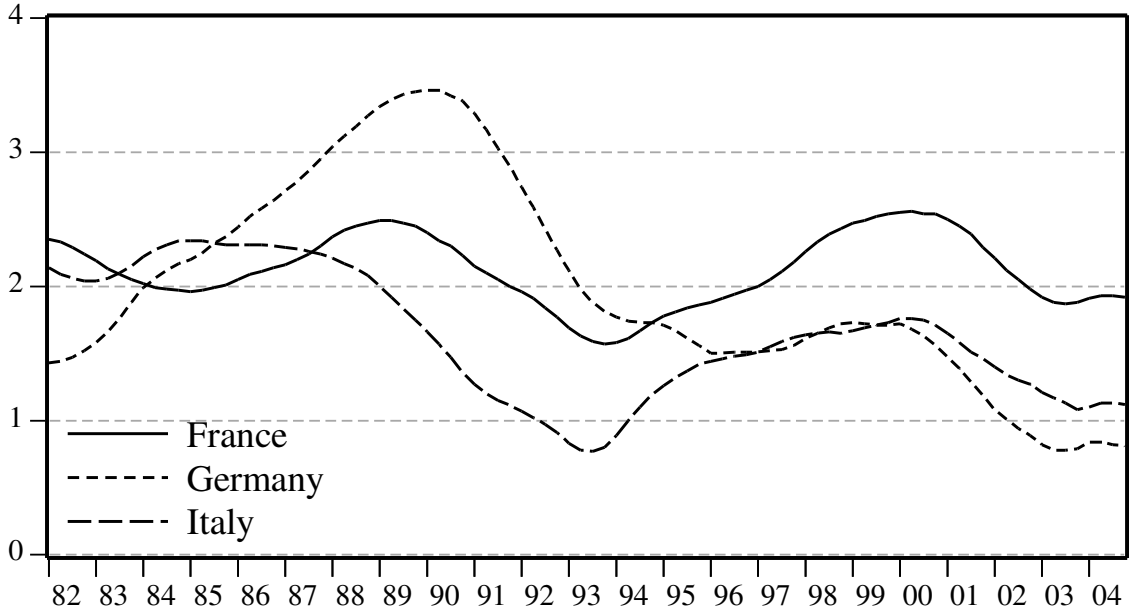
[21] Tödter and von Thadden suggest choosing y_0^* such that the output gap in the reference period assumes the average value of zero.

[22] For Germany, see also Deutsche Bundesbank (2003).

[23] The potential output estimates of the European Commission are available in the AMECO database.

[24] This overall evidence emerges also from the potential output estimates of the OECD.

Figure 3: Potential GDP



Note: quarterly year-on-year rates of growth.
Source: elaborations on national statistics.

slightly above those estimated for France, Germany and Italy.[25] According to the OECD, U.S. performance has been even better: since 1975 its potential GDP growth has fluctuated only slightly around a flat trend of around 3 per cent, which is also the estimated rate for 2004.

The overall picture drawn by these developments requires an attempt to understand their determinants.

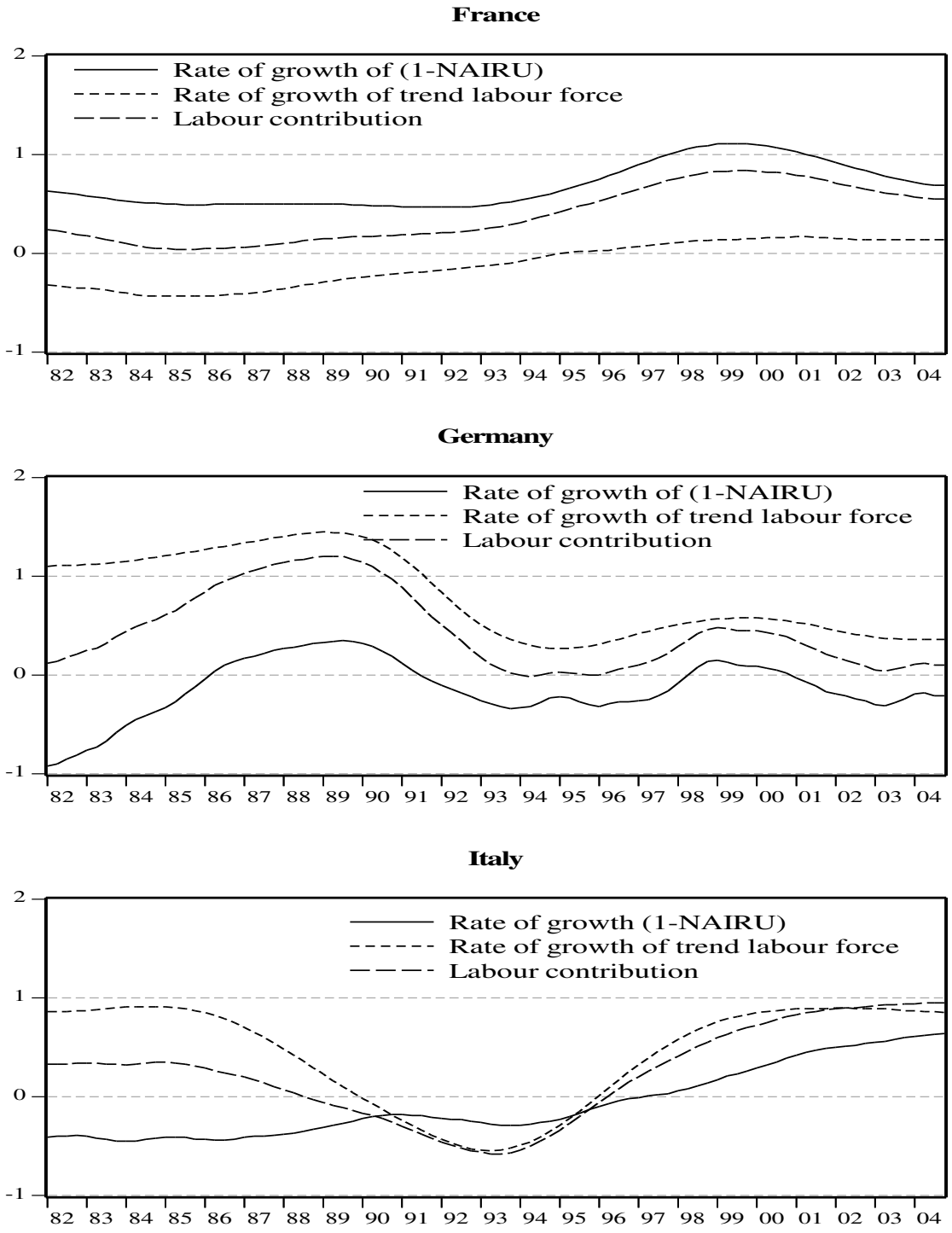
The role of labour.

A sharp heterogeneity among the three countries emerges when focusing on the contribution of the labour input to potential output, in terms of its levels and fluctuations (Figure 4). Since the mid-1990s, France and, in particular, Italy have managed to reverse the long-standing trend of labour's small or even negative support to potential growth. Nothing of this sort can be observed for Germany: its labour contribution shows a marked decline characterising the post-reunification years and a stabilisation at low levels thereafter.

To shed some light on this evidence, we should recall that the contribution by labour is given by the rate of growth of potential employment, Δl^*, weighted by the labour share α_{lt}: $\alpha_{lt}\Delta l^*$. While postponing the discussion about factor shares to section 5, at this stage we simply emphasise that, in the time range considered, a_{lt} markedly declined in all three

[25] On the basis of the estimates of the European Commission, in 2004 potential growth in Spain, Sweden and the U.K. was, respectively, 2.9, 2.1 and 2.6 per cent.

Figure 4: Labour contribution to potential GDP growth



Note: percentage points. The three figures have the same scale to facilitate comparison. Source: elaborations on national statistics.

countries, thus hampering the respective labour contributions while emphasising the role played by the dynamics of potential employment l^* in their recovery in France and in Italy. According to equation (3), Δl^* can be decomposed into two parts: the rate of growth of the labour force and of the complement to 1 of the NAIRU (1-NAIRU). From Figure 4 it emerges that in the second half of the 1990s the increase of Δl^* in France and Italy (and therefore the rise of the labour contribution as well) reflected both the reduction in the natural rate of unemployment (and thus the increase in 1-NAIRU; see previous section) and, to a larger extent, the marked acceleration of the rate of growth of the labour force. In turn, this caused a sizable increase in the employment rate, which in 2004 reached 62.8 and 57.5 per cent in France and Italy, respectively, from the low levels of 59.6 and 51.8 per cent in 1995.

The good labour market performance in these two countries is even more striking considering that the contemporaneous cyclical upturn was not particularly intense with respect to previous expansionary phases and that, nonetheless, the acceleration in job creation was driven in both cases by the business sector.[26] Actually, the results also reflect the labour market policies adopted in the early 1990s:[27] in both countries they were aimed at wage moderation and, more generally, at restraining labour costs (through cuts in employer social security contributions in France and a new bargaining system in Italy)[28] while at the same time enhancing flexibility in the use of labour input (relaxing the restrictions on taking up part-time work and on non-standard and fixed-term contracts).[29] The outcome has been actual labour cost moderation: as we will see in section 5, since the early 1990s labour cost growth in both France and Italy has been substantially slower than that of labour productivity. These developments probably induced an important change in the relative prices of inputs and, presumably, a shift in the factor composition of the production technology in favour of the more intensive use of labour emphasised by Figure 4. Evidence of this also can be found when analysing the role of capital, as will soon be clearer.

The situation in Germany has been quite different: labour's contribution to potential output growth did not benefit from either an increase in the labour force, whose growth has been substantially stable after the post-reunification slowdown, nor from the evolution of the NAIRU which, in fact, has increased sharply since 1992, emphasising the inability of the economy to exploit cyclical expansions in order to reintegrate the unemployed into labour activity. Recent developments in wage bargaining outcomes and the adoption by the Federal Government of new labour market policies are designed to address these issues.[30]

[26] In the 1996-2000 period the average yearly rate of GDP growth in France and Italy was 2.8 and 1.9 per cent respectively.

[27] For a detailed analysis, see Pisani-Ferry (2003) and Estevao and Nargis (2005) for France and Brandolini et al. (2005) and Torrini (2005 a, b) for Italy.

[28] Certainly the French labour market dynamics have been influenced also by the experimental reduction in the work week to 35 hours; the extent of its effect, however, is still controversial.

[29] The increased adoption of non-standard and fixed-term contracts also contributed to moderate labour costs.

[30] In this respect, an important stimulus came from the proposals of the "Hartz Commission"; for a discussion of these issues, see Deutsche Bundesbank (2004).

As was the case for France and Italy, some of these policies were implemented in order to reduce labour costs and increase flexibility in the use of labour input through the easing of the tax and social contribution burden for part-time jobs and for the low-wage sector; furthermore a greater use of temporary jobs has been promoted, together with improved incentives for self-employment. It is, however, too early to assess their impact on the labour market.

In recent years the labour contribution stood at relatively high levels (close to 1 percentage point) only in Italy, where the labour force continued to increase at a fairly healthy rate and the unemployment rate kept decreasing despite the country's very poor overall economic performance. While in Germany the labour contribution remained substantially flat at around 0.1 percentage point, in France the peak recorded in 2000 has been partly cancelled out by the decline that occurred during the latest economic slowdown, when the NAIRU no longer decreased and the labour force growth rate decelerated markedly. Despite these heterogeneities, potential GDP growth in the three countries is still constrained by high unemployment and, above all, by its structural component. The literature has sought to uncover its main determinants;[31] a consensus of sorts has emerged and is reflected in the policies implemented in the last decade. Still, however, an additional effort is needed to understand what undermines the incentives for a more intensive participation of the labour input in the production process.

The role of capital

As could be expected, in the period under investigation the amplitude of variations of the capital contribution to potential output growth is much lower with respect to the labour input. Nonetheless, a few heterogeneities emerge among the three countries (Figure 5): while the French and Italian contributions are fairly synchronised, with a recovery in the second half of the 1990s that compensated, though only in part, for the decrease in the first part of the decade, the support from capital has shown a steep downward path in Germany since 1992. Indicating a pronounced restructuring process that appears not to be over yet, by 2004 German capital's contribution had been halved (0.3 percentage point) and was smaller than in France and in Italy (each 0.7); even in these two countries, however, it started to decline since the beginning of the new century.

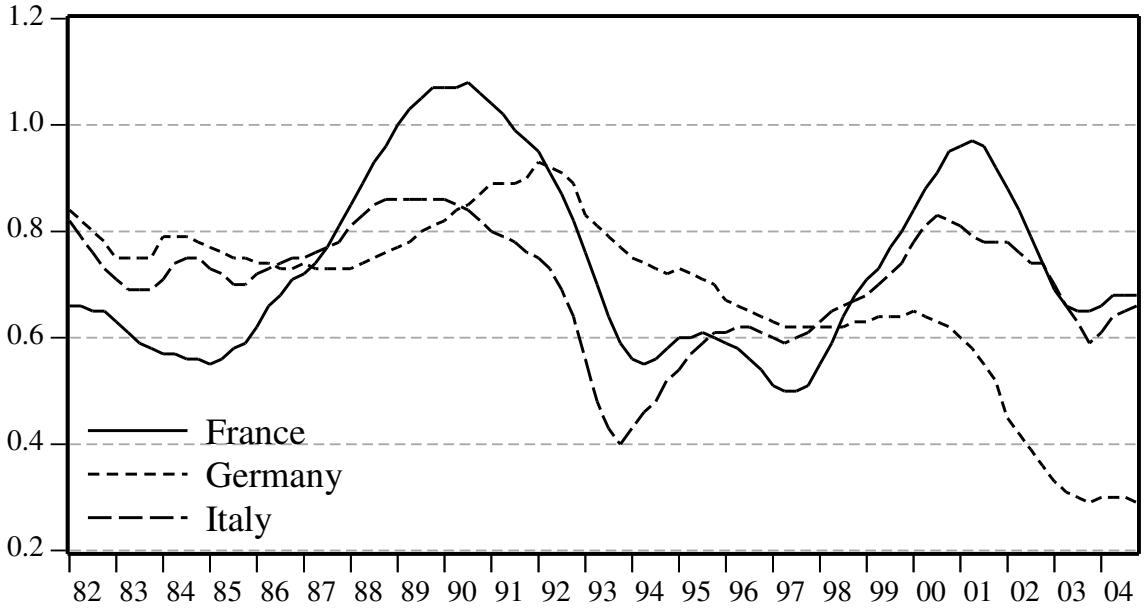
A deeper look at the data reveals that, in all three countries, the contribution by capital, given by $\alpha_{kt}\Delta k_t$, was strongly supported by the stable rise, in the whole sample, of the capital share α_{kt}.[32] As we did for the labour input, we shall leave aside for the time being any consideration about what this means in terms of profitability for firms (the issue will be addressed in section 5) and focus on Δk_t. Though characterised by relatively small cyclical fluctuations, the rate of increase of the capital stock in the three countries slowed down: on average for the 1980s it was equal to 2.7, 2.6 and 2.7 per cent in France, Germany and Italy respectively;[33] in the following thirteen years (1991-2003), the yearly rates decreased to 2.1 in the first two countires and 2.0 in Italy.

[31] See, for example, Blanchard (2005).

[32] Proxied by (1-a_{lt}) on the basis of the assumptions made in the present exercise.

[33] For Germany, gross capital stock since the net one is available only starting in 1991.

Figure 5: Capital contribution to potential GDP growth



Note: percentage points.
Source: elaborations on national statistics.

Combining these dynamics with those from the labour market and with the reduction in the labour costs recorded in France and Italy[34] provides further evidence in favour of interpreting the developments in the 1990s in these two countries as being characterised by a process of partial substitution of labour for capital. This seems to be confirmed by the deceleration of their capital-labour ratio (Figure 6) and can also help to explain why, despite the recovery in the second part of the last decade, the contribution from capital remained at relatively low levels.[35]

Once again, the outlook seems quite different for Germany: in line with a less favourable development of the cost of labour, its capital-labour ratio increased much faster than in the other two countries, which means that factor substitution cannot be blamed for the slowdown in capital accumulation in this country. In fact, the declining contribution of capital to potential output, in conjunction with a similarly sluggish employment growth, seems to reflect the difficulties in profitably harnessing the factors of production.

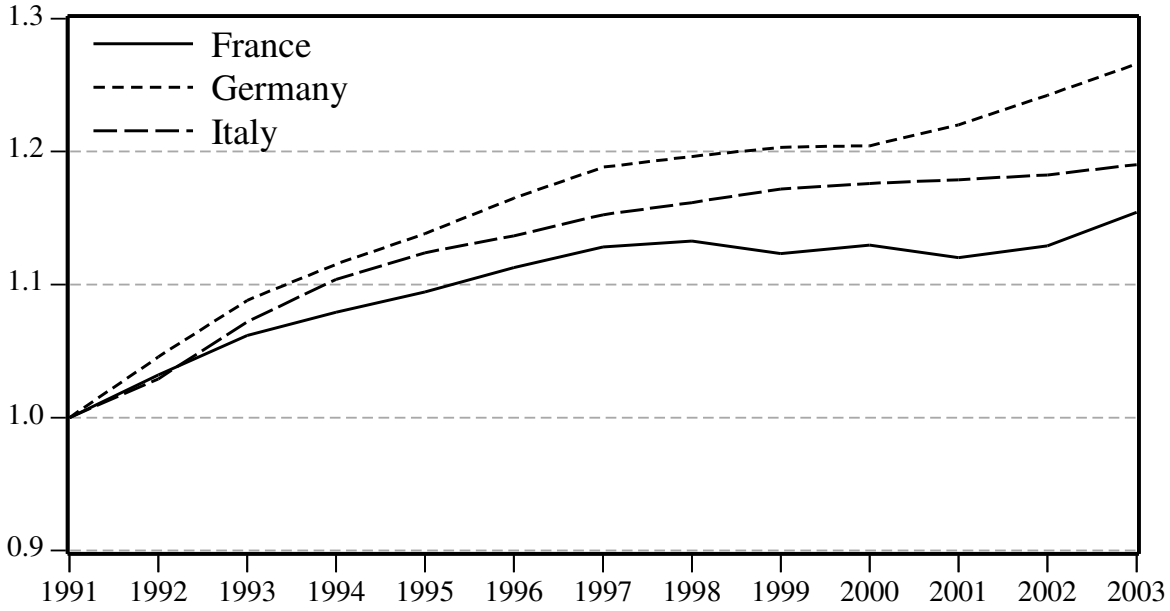
The role of TFP

Finally, we consider the role played by the trend of total factor productivity (a_t^*): the developments shown in Figure 7 depict an extremely negative picture. In the last fifteen

[34] In section 5 we will show that in France, in the second half of the 1990s, the labour cost per efficiency unit fell (followed by a slight recovery); the decrease was even sharper in Italy where, in 2001, the cost was about 10 per cent lower than in 1991.

[35] The increase in the French ratio in recent years is mainly due to the sharp deceleration of employment.

Figure 6: Capital-Labour ratio



Note: index 1991=1. Net capital stock; labour measured in terms of number of employed persons.
Source: elaborations on national statistics.

years in Germany the growth rate of trend TFP steadily dropped from 1.5 per cent in 1990 to 0.4 per cent in 2004. In Italy the decrease is even worse: since 2001 growth has entered negative territory, approaching -0.5 in 2004. In France the reduction has been less severe thanks to the brief stabilisation in the late 1990s; nonetheless this country has also seen decreasing rate of productivity growth since 1999, to 0.7 per cent per year at last report.

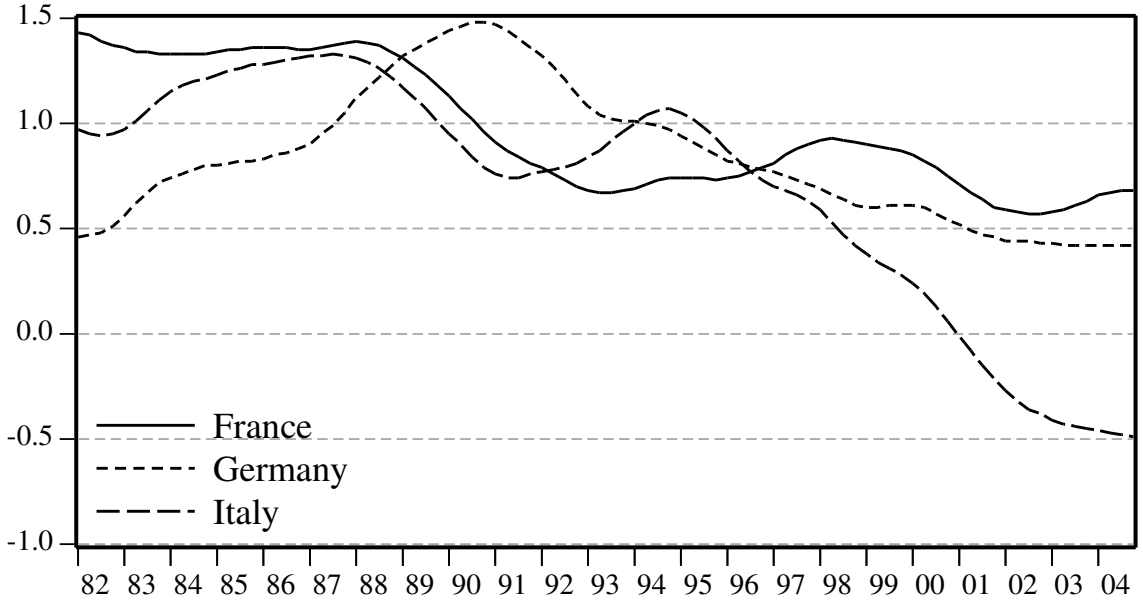
A comparison with some other European economies aggravates the picture: according to European Commission estimates, in the 1995-2004 period total factor productivity increased at an average rate of 1.4 and 1.9 in the U.K. and Sweden, respectively, with signs of accelerations in recent years.[36]

Such a disappointing outlook deserved a huge effort by empirical researchers, focusing on the dynamics of TFP at the industry level and on their respective contributions to overall productivity. Since a disaggregated analysis is beyond the scope of this paper, we draw from some results of previous work to gain insights into recent developments.

Among the three countries, in the second half of the 1990s some relevant heterogeneities emerged in the manufacturing sector: while in Germany and, above all, in France, total factor productivity kept growing at a relatively fast pace (thanks also to the good performance of ICT manufacturers),[37] in Italy it stalled, with a sharp and sudden slowdown

[36]On the other hand, Spain performed the worst, with an average rate of 0.1.
[37]See, for example, Inklaar et al. (2003).

Figure 7: Trend TFP contribution to potential GDP growth



Note: percentage points.
Source: elaborations on national statistics.

relative to the previous periods.[38] The deceleration, which was particularly severe for non-durables industries, came in anticipation of an even worse development that led to Italian manufacturing TFP undergoing a marked generalised decline in the current decade. The available evidence on the service sector, unfortunately, appears much more homogeneous: since the mid-1990s all of the three countries underwent increasingly extreme TFP slowdowns. In a marked departure from the experience of the U.S., the U.K. and the Northern European countries, the poor productivity performance has been particularly pronounced with respect to ICT-using industries, such as wholesale and retail trade.[39] This fact has raised questions about the role that could have been played by higher levels of ICT capital stock in France, Germany and Italy: in fact, despite the substantial increase during the late 1990s, their respective ICT shares of total gross fixed capital formation and, more generally, the adoption of new technologies are still lagging behind the evidence available for the U.S., the U.K. and the Scandinavian countries.[40] However, although one can cer-

[38] See Bassanetti et al. (2004).

[39] As regards financial intermediation, another well-performing ICT-using industry in the U.S., the decreasing TFP contribution in the French economy has coincided with the recovery in Germany and in Italy (Inklaar et al. (2003); Bassanetti et al. (2004)). In the last country the result was supported by the extensive re-organisational process that took place in the last decade, allowing matching efficiency gains; however in the 2000-2003 period this sector was also caught up in the general Italian productivity slump (see Daveri and Jona-Lasino (2005), for most recent Italian updates).

[40] See, for example, Colecchia and Schreyer (2002).

tainly think of possible positive network effects to enhance productive efficiency, the link between ICTs and TFP is still the object of research in the empirical literature. Much effort has also been devoted to investigating the possible relationship between the product market regulatory settings and the dynamics of productivity, arguing that a higher degree of competition and lower administrative burdens tend to improve the efficiency of the economic system and TFP growth.[41]. In any case, our reading of recent developments implies a broad definition of TFP, according to which its decline might suggest that France, Germany and Italy still have possibilities of stimulating potential GDP growth by improving the environmental and institutional factors, both internal and external to the firms, through the removal of rigidities and the introduction of innovative organisational forms. At this juncture it is worth mentioning the possibility that, particularly in France and in Italy, the relatively easy and increased use of low-cost part-time and fixed-term contracts, quite often for unskilled work, may have reduced the stimulus to undertake deeper and efficient re-organisational processes during the last ten years. This is an issue that certainly deserves a place on the agenda for future research.

4 A growth accounting exercise

To complete the analysis and gain further insights, we applied the same growth accounting framework described in section 2 to annual data;[42] this time, however, we did not filter out any cyclical fluctuation from the determinants of growth. We used value added at basic prices as a measure of aggregate output and net capital stock data from the national statistical institutes.[43] As for labour input, we used both the number of full time equivalent employed[44] and the hours worked. Unfortunately, however, in the case of France we were able to find hours worked only with reference to the business sector; therefore for this country we limit the exercise to the use of the first measure of labour input.

Bearing in mind the caveats mentioned in section 2 about the growth accounting framework adopted, we present the results in Table 1; for brevity, they are shown as five-year averages. The left panel of the table broadly confirms the findings that emerged in the context of the potential output estimation. These include: the substantially stable contribution from capital over the last twenty years (which we now know is the result of an increasing capital share and a decelerating capital stock); the recovery of labour's contribution since the mid-1990s in France and especially Italy (coinciding with a sharp decline in wage shares) and the contemporaneous relatively poor performance of the German labour

[41]See, for example, Nicoletti and Scarpetta (2003). Further, a number of studies tried to investigate the possible relationships between product market reforms and labour market performances, and also the impact of employment protection on innovative activity (see, for example, Nicoletti et al. (2001)); results, however, are not always clear cut.

[42]We adopted the same standard assumptions described in the potential output methodology and keep on using the wage shares available in the European Commission's AMECO database.

[43]For Germany the net capital stock at constant prices has been available only from 1991 on; for previous periods, therefore, we had to use the dynamics of the gross capital stock.

[44]With the exception of Germany, where only data on the number of employed persons are available.

market; the pronounced worsening of TFP in the recent period, common to all of the three countries but particularly marked in Italy, where it did not recover even during a cyclical expansion, as transpired in the second half of the past decade.

In Italy the same results are found when measuring the labour input recurring to the hours worked (right-hand panel of the table). In Germany, instead, the contribution by labour has sizable differences with respect to the exercise based on the number of employed persons, though the alternation of downturns and recoveries is substantially the same; this is also reflected in the estimates of TFP. This result is due to a large extent to the changed institutional setting in the German labour market: several laws have promoted the development of "mini-jobs", especially since the second half of the 1990s. Moreover, reductions in working hours were a long-standing goal pursued by Germany's trade unions. Last, there was a substantial increase in part-time work during the sample. All this has contributed to the fact that the employment measured in terms of the number of persons looks somewhat more favourable than employment measured in hours.

By subtracting Δl_t from both sides of equation (1), the growth accounting exercise can be easily modified to assess the dynamics of labour productivity, which is composed of the contribution by capital deepening and TFP.

From Table 2 it emerges that, since the mid 1990s, labour productivity markedly decelerated in France, Germany and Italy, with a further worsening occurring during the current decade, when Italian growth stalled.[45] The labour productivity movements reflect, to a very large extent, those of the TFP, which we already described in the previous section, both at the aggregate and at the industry level.

It has to be added, however, that the slowdown in the second half of the last decade has been also the consequence of the strong reduction of the contribution of capital deepening, reflecting the capital-labour deceleration shown in Figure 6. This is true not only for France and Italy, but also for Germany. Whereas in France and Italy the small support from capital deepening also continued in recent years, its small rise in Germany is due to the worsening of the employment situation rather than to increased accumulation; in fact, during this period the rate of growth of the German capital stock further decelerated.

Once again, a disaggregated analysis is left for further research: the assessment of the capital deepening dynamics for different kinds of capital goods and in different sectors would probably help to shed some light on the issue. As an example, Daveri and Jona-Lasino (2005) argue that in Italy, once buildings are netted out, capital accumulation actually resembled TFP growth;[46] Inklaar et al. (2003) argue that in France and in Germany the declining contribution of non-ICT capital deepening in 1995-2000 can explain a large percentage of the labour productivity slowdown with respect to the 1979-1995 period, pointing, as we also do, to movements in relative factor prices as a possible explanation of these developments.

[45] For productivity developments in Germany, see also Deutsche Bundesbank (2002).

[46] It has to be said, however, that they use the OECD database; the same argument should be checked on the basis of the official data released by the Italian national statistical institute.

Table 1: Results from growth accounting

	In terms of the number of full time equivalent employed (1)				In terms of hours worked		
Period	Contribution of			Value	Contribution of		
	Capital (2)	Labour	TFP	added	Capital (2)	Labour	TFP
				France			
1981 – 1985	0.7	−0.3	1.4	1.8	(−)	(−)	(−)
1986 – 1990	0.8	1.0	0.9	2.8	(−)	(−)	(−)
1991 – 1995	0.8	−0.3	0.8	1.2	(−)	(−)	(−)
1996 – 2000	0.7	0.8	1.3	2.8	(−)	(−)	(−)
2001 – 2004	0.5	0.5	0.5	1.5	(−)	(−)	(−)
				Germany			
1981 – 1985	0.8	0.1	0.5	1.2	0.8	−0.6	1.1
1986 – 1990	0.8	1.3	1.4	3.4	0.8	0.5	2.2
1991 – 1995	0.9	0.0	1.2	2.0	0.9	−0.4	1.6
1996 – 2000	0.7	0.5	1.0	1.8	0.7	0.0	1.6
2001 – 2004	0.4	−0.1	0.6	0.5	0.4	−0.4	0.8
				Italy			
1981 – 1985	0.8	0.3	0.7	1.8	0.8	0.3	0.7
1986 – 1990	0.8	0.5	1.5	2.8	0.8	0.8	1.2
1991 – 1995	0.6	−0.5	1.2	1.3	0.6	−0.5	1.2
1996 – 2000	0.7	0.5	0.7	1.9	0.7	0.5	0.7
2001 – 2004	0.7	0.7	−0.3	1.1	0.7	0.5	−0.3

Note: percentage points. (1) For Germany, number of persons employed. (2) For Germany, gross capital stock for 1980-1990; net capital stock from 1991 onwards.

Source: elaborations on national statistics.

Table 2: Labour productivity and its determinants

	In terms of the number of full time equivalent employed (1)			In terms of hours worked		
Period	Labour productivity	Capital (2) deepening	TFP	Labour productivity	Capital (2) deepening	TFP
			France			
1981 – 1985	2.2	0.8	1.4	(–)	(–)	(–)
1986 – 1990	1.3	0.3	0.9	(–)	(–)	(–)
1991 – 1995	1.7	0.9	0.8	(–)	(–)	(–)
1996 – 2000	1.5	0.3	1.3	(–)	(–)	(–)
2001 – 2004	0.8	0.3	0.5	(–)	(–)	(–)
			Germany			
1981 – 1985	1.3	0.8	0.5	2.2	1.0	1.1
1986 – 1990	1.6	0.2	1.4	2.7	0.5	2.2
1991 – 1995	2.1	0.8	1.2	2.7	1.0	1.6
1996 – 2000	1.4	0.4	1.0	2.2	0.7	1.6
2001 – 2004	1.1	0.5	0.6	1.4	0.6	0.8
			Italy			
1981 – 1985	1.3	0.6	0.7	1.4	0.7	0.7
1986 – 1990	2.1	0.6	1.5	1.6	0.4	1.2
1991 – 1995	2.1	0.8	1.2	2.1	0.8	1.2
1996 – 2000	1.1	0.4	0.7	1.1	0.4	0.7
2001 – 2004	0.0	0.3	−0.3	0.2	0.4	−0.3

Note: percentage points. (1) For Germany, number of persons employed. (2) For Germany, gross capital stock for 1980-1990; net capital stock from 1991 onwards.

Source: elaborations on national statistics.

5 Evidence from some measures of profitability and wage pressure

In the previous sections, labour market performance was found to be markedly heterogeneous in the three countries under analysis, possibly reflecting differences in the corresponding wage setting mechanisms and in regulations. We now present some measures of profitability and wage pressure in order to assess the role of the wage dynamics in the economic performance of France, Germany and Italy.

We first consider the evolution of the labour share: though not completely satisfactory either as a measure of profitability or of wage pressure, it nevertheless has its uses in detecting changes in the labour market equilibrium after adding other indicators. As observed in the literature, factor shares showed large fluctuations during the 1970s and 1980s in most developed countries, the most pronounced being in continental Europe. These fluctuations were related to the wage push of the 1970s, which would have initially prompted a rise in the labour share, followed by a reversal during the 1980s when firms adjusted their capital stock substituting capital for labour, reducing labour demand and inducing a slowdown in real wage dynamics (Blanchard (1997, 2000)).

By using data from the OECD STAN database and focusing on the 1980-2003 period, we compute the labour share correcting for self-employment income at the industry level, namely by attributing to self-employed workers the same remuneration as employees working in the same industry.[47] Specifically the share (WS) is given by:

$$WS = \frac{1}{Y} \sum_i W_i (L_i / E_i) \tag{5}$$

where Y is total value added whereas W_i, L_i and E_i stand, respectively, for compensation of employees, total employment and employees in industry i.

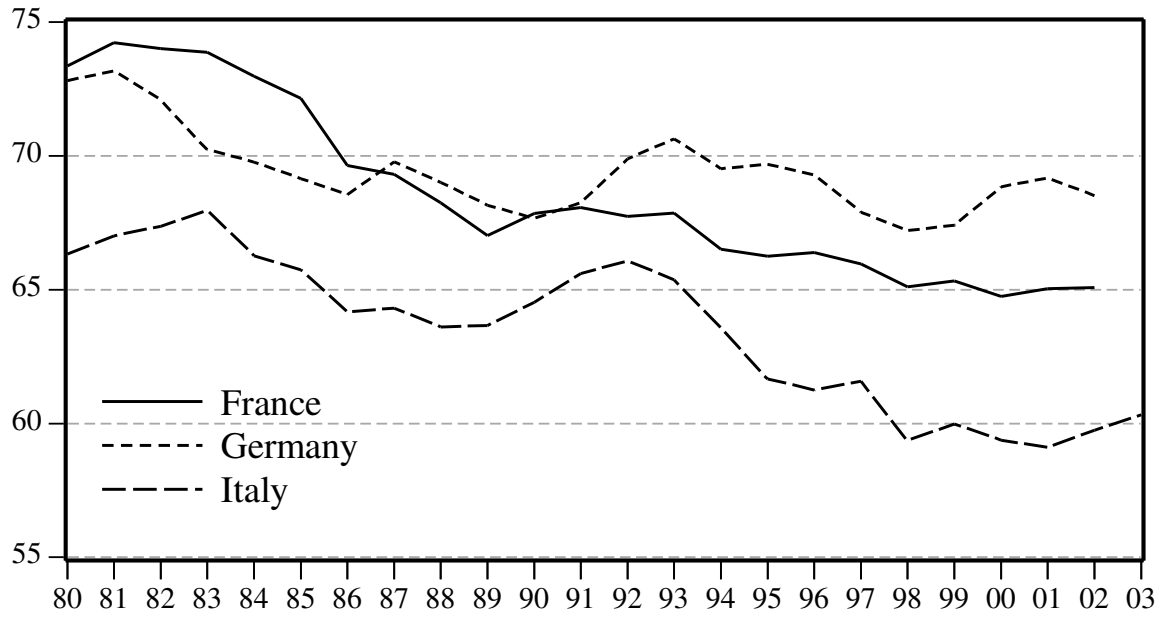
Consistently with previous findings, our measure of the labour share declined in the 1980s in all of the three countries,[48] offsetting the 1970s rise; in the 1990s, it continued to decline at a slower pace in France and unified Germany, and plummeted in Italy (see Table A1 in Appendix II).[49]

[47] Unlike what we did in the non-parametric estimation of potential output and in the growth accounting exercise, in the present section we chose the OECD STAN over the more up-to-date European Commission AMECO database. The choice is due to the fact that STAN provides greater detail regarding sectors, allowing us to single out a measure for the business sector. Moreover it enables us to get rid of the real estate sector, whose output (rents) mostly consists of the services provided by the stock of houses; as a consequence, variations in the price of housing services affects the weights of the real estate sector on aggregate value added, changing the aggregate wage share irrespective of any change in wage dynamics.

[48] Data for Germany refer to West Germany only.

[49] A tax reform in 1998 explains part of the decline of labour share in Italy in the late 1990s. A new tax on value added (IRAP) was introduced, substituting for some payroll taxes. This reform reduced total compensation of employees while leaving the value added measured at basic prices unchanged, as this includes taxes levied on production. As a consequence of this reform the wage share of value added dropped, although firms profitability was not affected. To evaluate the impact of this reform we have computed a corrected labour share, by applying to total compensation of employees the dynamics observed

Figure 8: Wage shares



Note: percentage points, business sector net of real estate.
Source: elaborations on OECD STAN data.

Limiting the analysis to the business sector and excluding real estate, similar results are found in France and in Italy; in Germany, on the other hand, the labour share in the total economy net of real estate increased during the 1990s, while remaining fairly stable in the business sector (Figure 8). As a result, in 2002 the labour share in the German business sector was 3.8 and 8.2 percentage points higher than in France and Italy respectively; a decade earlier, in 1991, in Germany and in France it was virtually the same, while in Italy it was less than 3 percentage points lower than in the other two countries.

The picture shown in Figure 8 is part of the evidence of the change in the relative price of inputs that took place in France and in Italy in the second half of the 1990s. The cheaper cost of labour induced the process of substitution of labour for capital that we described in section 3. In this respect, further confirmation emerges from Figure 9, where we report the developments of labour productivity and of the producer labour cost (measured by the ratio of compensation per employee to the value added deflator) in the business sector net of real estate.

The increase in German labour productivity, the largest among the three economies, was matched by a similar rise in real compensation per employee; in France, by contrast, productivity improvement was lower, but the real cost of labour lagged even behind, as it

for wages and salaries, which were not affected by the introduction of this new tax. It turns out that the introduction of IRAP accounts for a drop in the labour share of roughly 1 percentage point (see Table A1 in Appendix II).

did to a greater extent in Italy.

Similar signals can be deduced from the analysis of the developments of the labour cost per efficiency unit of labour, proposed by Blanchard as a measure of wage pressure (Figure 10; see Appendix III for its calculation).[50]

In Italy the decline in this indicator and the contemporaneous drop in the labour share point to a reduction in wage pressure beginning in the early 1990s. Although this did not immediately translate to a rise in employment,[51] it set the stage for the rapid recovery starting in the mid-1990s and continued in the first half of the 2000s. In France there is similar, although less pronounced, evidence, whereas in Germany, consistently with the evolution of the labour share, real wages per efficiency unit displayed greater dynamics, remaining well above their starting levels of 1991.

With regard to profitability, we constructed a measure of the return on capital stock as the ratio of the value added net of labour costs to the capital stock at substitution prices (Table A2 in Appendix II).[52] In the business sector net of dwellings, the rate of return has been rising in France since the mid-1990s, while remaining fairly stable in Germany and in Italy (Figure 11).

Considering the drop in real interest rates, we can argue that in all three countries the return on capital with respect to its user cost increased during the last decade, though the development was most pronounced in France.[53] This further rises the puzzle of the slowdown of the capital accumulation described in section 3. Though the developments of relative input prices can contribute to the explanation, there remains much to be understood.

Finally, focusing on the manufacturing industry, whereas in France the rate of return followed the same pattern as the entire business sector, in Italy and to some extent in Germany it was much less favourable (Table A2 in Appendix II). Part of the better performance observed in France was due to the fact that in the business sector the capital deflator grew less quickly than the value added deflator, and in the manufacturing sector labour efficiency grew much faster than in the other countries.

Overall, the measures of wage pressure and profitability depict, for France and Italy, a more favourable context for employment growth than for Germany, helping to explain the largest labour contribution resulting from previous sections.

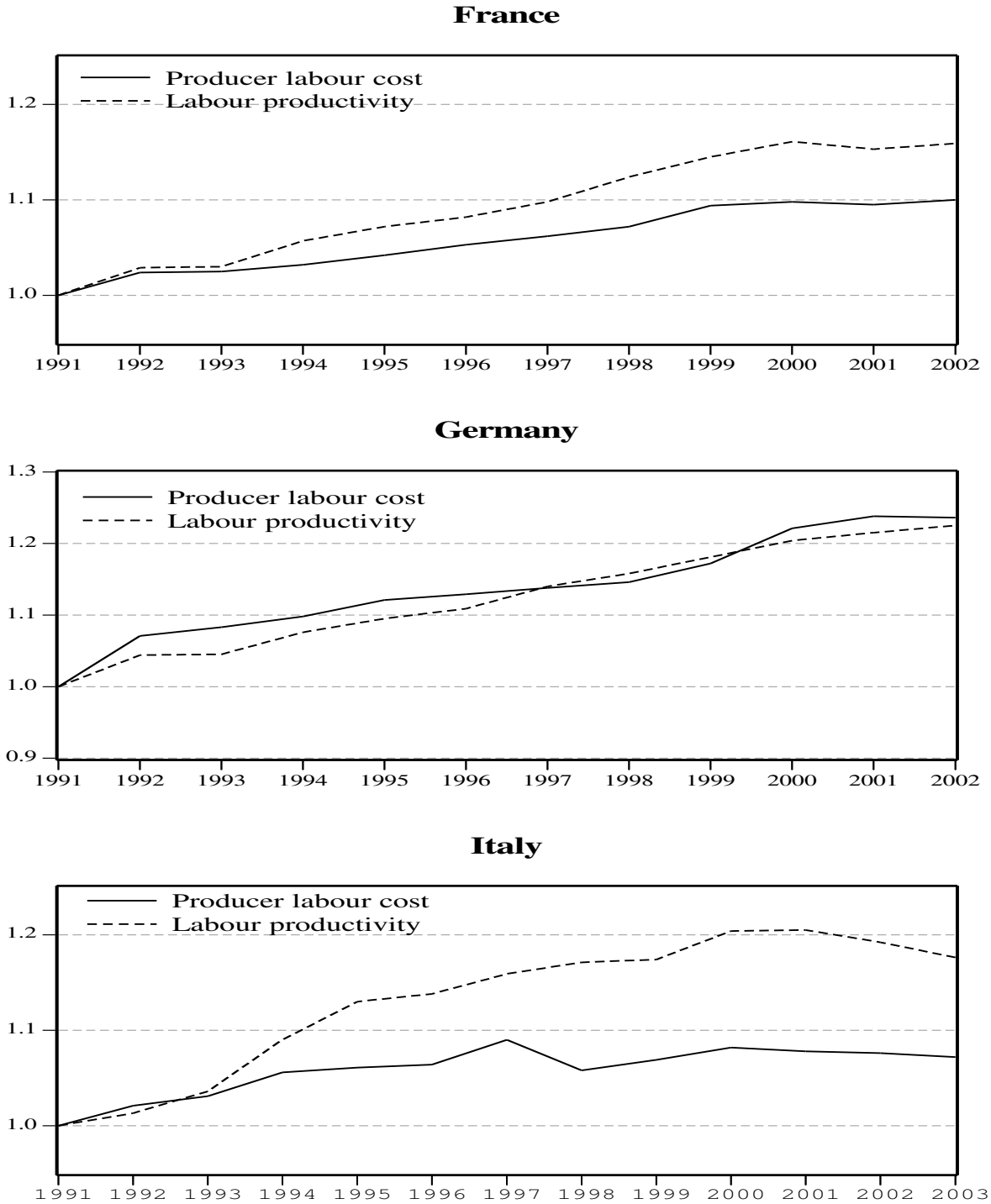
[50] In a balanced growth path, if wages grow at the same pace as labour efficiency, the ratio of capital to labour in efficiency unit should remain constant. This is not the case if wages grow at the same pace as labour productivity, which also depends on capital deepening. In fact if workers appropriate productivity gains due to capital deepening, this could prompt a further rise in the capital-labour ratio, and a reduction in labour demand.

[51] Actually, during the recession in the early 1990s employment dropped for the first time in thirty years, due to the drastic restructuring of private and state-owned companies and to the stop imposed by budget constraints to public employment growth (Torrini (2005a)).

[52] In order to calculate the rate of return on capital, we computed the capital stock at substitution prices applying to the capital stock at 1995 prices the deflator of capital formation.

[53] Comparing the levels of the rate of return, France's was highest, followed by Italy and Germany.

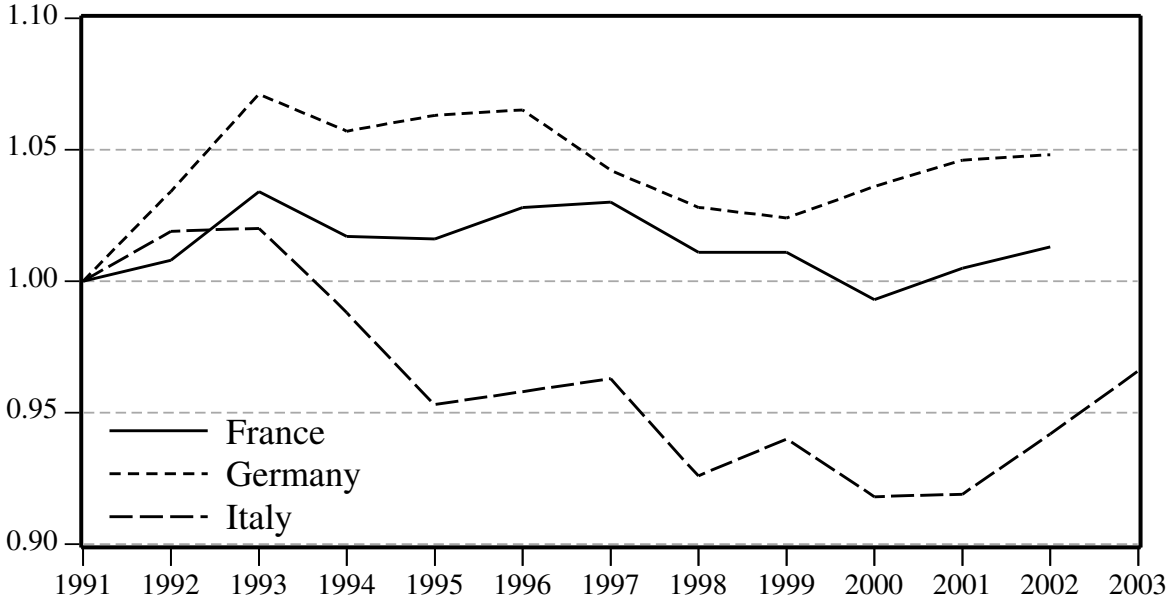
Figure 9: Labour productivity and producer labour cost



Note: index 1991=1; business sector net of real estate; labour measured in terms of employed persons. The three figures have the same scale to facilitate comparison.

Source: elaborations on OECD STAN data.

Figure 10: Cost of labour per efficiency unit



Note: index 1991=1.
Source: elaborations on OECD STAN data.

6 Conclusions

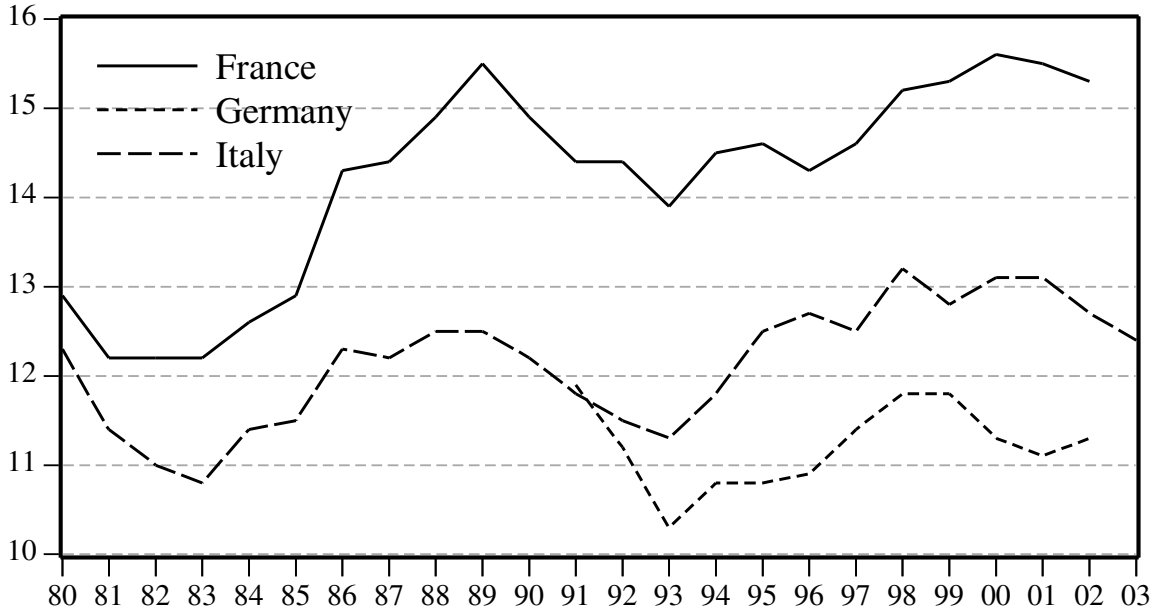
The paper analyses recent supply side conditions in France, Germany and Italy by estimating their respective potential GDP growth. The adoption of a non-parametric framework, fundamentally based on a growth accounting setting, allows us to decompose the potential output dynamics into contributions by long-term developments in employment, capital and total factor productivity.

We find that, since 2000, potential growth has been sharply decreasing in all three countries; in Germany and in Italy the same findings also characterised most of the 1990s. These performances was revealed to be relatively poor not only in comparison with the U.S., but also with other European countries such as Spain, Sweden and the U.K..

Despite the fact that the three economies we examine share a meagre rate of growth, relevant heterogeneities are at the basis of their recent developments, especially concerning the contribution of labour input. While in France and, above all, in Italy it recovered significantly since the mid-1990s, triggered by the restrain of labour costs induced by the policies adopted in the last decade, in Germany it decreased in the post-reunification period and subsequently stabilised at low levels. All three countries, however, still share a high level of unemployment and of its structural component.

The change in relative input prices induced by the wage moderation observed in France and in Italy also contributed to a process of substitution of capital with labour, inducing

Figure 11: Returns on gross capital stock



Note: business sector net of real estate.
Source: elaborations on OECD STAN data.

a slowdown in the accumulation activity and limiting its support of growth. However, additional research would be necessary to understand the further elements that underpin the incentives for more intensive investment in capital goods. In the German case, the relative price movements seem less relevant, and a more general difficulty of harnessing both factors of production profitably characterised the last fifteen years.

Total factor productivity contribution to economic growth declined in the three countries, particularly in Italy. This points to the need of enhancing the institutional environments in which firms operate and of deep re-organisation of the production systems.

A large part of the recent economic debate focused on the need for structural reforms, mainly in the product and labour markets. Some of them have been implemented, though the process certainly remains to be completed. In the past few years a strand of literature highlighted the existence of a trade-off between efficiency-improving reforms and the degree of employment security and equity. While completing the process in order to adapt our institutional framework to increased global competition, the trade-off related issues should be addressed as well, with the goal of dealing with the possibility of an adverse impact on family incomes, in this way also expanding the political consensus on the reform process.

References

Apel, M. and Jansson, P. (1999), "A theory-consistent system approach for estimating potential output and the NAIRU", *Economics Letters*, 64, pp. 271-275.

Barro, R. (1999), "Notes on Growth accounting", *Journal of Economic Growth*, Vol. 4, No. 2, pp. 119-137.

Bassanetti, A., Iommi, M., Jona-Lasinio, C. and Zollino, F. (2004), "La crescita dell'economia italiana negli anni novanta tra ritardo tecnologico e rallentamento della produttività", Banca d'Italia, *Temi di discussione*, No. 539.

Basu, S. and Fernald, J. G. (2002), "Aggregate Productivity and Aggregate Technology", *European Economic Review*, Vol. 46, No. 6, pp. 963-991.

Blanchard, O.J. (1997), "The medium run", *Brooking Papers on Economic Activity*, No. 2, pp. 89-158.

Blanchard, O.J. (2000), "The economics of unemployment. Shocks, institutions, and interactions", Lionel Robbins Lecture, MIT mimeo.

Blanchard, O.J. (2005), "European unemployment: the evolution of facts and ideas", MIT, *Department of Economics Working Paper Series*, No. 05-24.

Brandolini, A., Casadio, P., Cipollone, P., Magnani, M., Rosolia, A. and Torrini, R. (2005), "Employment growth in Italy in the 1990s: institutional arrangements and market forces", Banca d'Italia, mimeo.

Camba-Mendez, G. and Rodriguez-Palenzuela, D. (2003), "Assessment criteria for output gap estimates", *Economic Modelling*, 20, pp. 529-562.

Colecchia, A. and Schreyer, P. (2002), "The contribution of information and communication technologies to economic growth in nine OECD countries", *OECD Economic Studies*, No. 34.

Daveri, F. and Jona-Lasino, C. (2005), "Italy's decline : getting the facts right", mimeo.

Deutsche Bundesbank (2002), "Productivity developments in Germany", *Monthly Report*, September, pp. 47-61.

Deutsche Bundesbank (2003), "The development of production potential in Germany", *Monthly Report*, March, pp. 41-52.

Deutsche Bundesbank (2004), "Greater flexibility on the German labour market", *Monthly Report*, September, pp. 43-57.

Estevao, M. and Nargis, N. (2005), "Structural labor market changes in France", *IZA Discussion Paper Series*, No. 1621, Bonn.

Fabiani, S. and Mestre, R. (2001), "A system approach for measuring the euro area NAIRU", *ECB Working Paper Series*, No. 65.

Harvey, A.C. (1989), "Forecasting, structural time series models and the Kalman filter", Cambridge University Press.

Harvey, A.C. and Jaeger, A. (1993), "Detrending, stylised facts and the business cycle", *Journal of Applied Econometrics*, Vol. 8, pp. 231-247.

Harvey, A.C. and Trimbur, T.M. (2003), "General model-based filters for extracting cycles and trends in economic time series", *The Review of Economics and Statistics*, Vol. 85, pp. 244-255.

Hodrick, R.J. and Prescott, E.C. (1997), "Postwar US business cycles: an empirical investigation", *Journal of Money, Credit, and Banking*, Vol. 29, pp. 1-16.

Inklaar, R., O'Mahony, M. and Timmer, M. (2003), "ICT and Europe's productivity performance. Industry-level growth account comparisons with the United States", *Groningen Growth and Development Centre, Research Memorandum* GD-68.

Nicoletti, G., Bassanini, A., Ernst, E., Jean, S., Santiago, P. and Swaim, P. (2001), "Product and labour markets interactions in OECD countries", *OECD Economics Department Working Papers*, No. 312.

Nicoletti, G. and Scarpetta, S. (2003), "Regulation, productivity and growth: OECD evidence", *OECD Economics Department Working Papers*, No. 347.

Pisani-Ferry, J. (2003), "The surprising French employment performance: what lessons?", University Paris-Dauphine, mimeo.

Runstler, G. (2002), "The information content of real-time output gap estimates: an application to the euro area", *ECB Working Paper Series*, No. 182.

Tödter, K.-H. (2002), "Exponential smoothing as an alternative to the Hodrick-Prescott filter?", in Mittnik, S. and Klein, I. (eds.), *Contributions to modern econometrics - From data analysis to economic policy*, Kluwer Academic Publishers, Dordrecht, Boston, London, pp. 223-237.

Tödter, K.-H. and L. von Thadden (2001), "A non-parametric framework for potential output in Germany". Deutsche Bundesbank, mimeo.

Torrini R. (2005a) "Profit share and returns to capital in Italy: the role of privatisations behind the rise of the 1990s", *CEP Working Paper*.

Torrini, R. (2005b) "Quota dei profitti e redditività del capitale in Italia: un tentativo di interpretazione", *Banca d'Italia, Temi di discussione*, No. 551.

Zizza, R. (2005), "A measure of Nairu for France, Germany and Italy: an unobserved component approach", Banca d'Italia, mimeo.

Zizza, R. (2006), "A measure of output gap for Italy through unobserved component models", *Journal of Applied Statistics*, forthcoming.

A Appendix

A.1 Estimating the NAIRU: the unobserved component approach

In a *structural* time series framework, a variable of interest y (in our case, the unemployment rate) can be decomposed into two components: one accounting for the trend - μ_t (*permanent component*) - and the other - ϕ_t (*transitory component*) - for the cycle, plus a disturbance term (ε_t)

$$y_t = \mu_t + \phi_t + \varepsilon_t, \quad t = 1, ..., T$$

The two parts are modelled separately. Usually, the permanent component is taken to be a local linear trend (LLT), where both the level (μ) and the slope (β) are stochastic and evolve as random walks; moreover it is supposed to be affected by two shocks, one (η) hitting its level, the other (ζ) its slope.

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t \quad \eta \sim NID(0, \Sigma_\eta)$$

$$\beta_t = \beta_{t-1} + \zeta_t \quad \zeta \sim NID(0, \Sigma_\zeta)$$

The transitory component can be either modelled as an autoregressive process or, more generally, as a stochastic cycle, according to the following specification:

$$\begin{bmatrix} \phi_t \\ \phi_t^* \end{bmatrix} = \rho \begin{bmatrix} \cos\lambda_c \sin\ \lambda_c \\ -\sin\lambda_c \cos\ \lambda_c \end{bmatrix} \begin{bmatrix} \phi_{t-1} \\ \phi_{t-1}^* \end{bmatrix} + \begin{bmatrix} \kappa_t \\ \kappa_t^* \end{bmatrix}$$

where ρ is a damping factor and $0 < \lambda_c \leq \pi$ the frequency of the cycle in radians; $\kappa_t \approx NID(0, \sigma_\kappa^2)$ and $\kappa_t^* \approx NID(0, \sigma_{\kappa^*}^2)$ are mutually independent.[54]

This structural model can be cast in a state space form (SSF):

$$y_t = Z_t \alpha_t + \varepsilon_t \quad \alpha_1 \sim N(0, P)$$

$$\alpha_{t+1} = T_t \alpha_t + \xi_t$$

[54]Note that ϕ_t^* is introduced only to allow ϕ_t to be generated iteratively in the state space form, with no intrinsic relevance.

The first equation is the measurement equation, linking the observable variables to the state vector $\alpha_t = (\mu_t, \beta_t, \varphi_t, \varphi_t^*)'$ The second is the transition equation, describing the dynamics of the state vector, where $\xi_t = (\eta_t, \zeta_t, \kappa_t, \kappa_t^*)'$. The system matrices are $Z_t = [1, 0, 1, 0]$ and

$$T = \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & \rho\cos\lambda_c & \rho\sin\lambda_c \\ 0 & 0 & -\rho\sin\lambda_c & \rho\cos\lambda_c \end{bmatrix}$$

Once the model is in SSF, the application of the Kalman filter (a recursive algorithm) allows us to obtain the optimal (MMSE) estimate of the state vector based on past and current observations, given the initial values. In practice, parameters are unknown and need to be estimated by maximising a likelihood function (Harvey (1989)). The framework can be easily generalised to a bivariate case, considering output and the unemployment rate as variables of interest. Specifically, let denote the log transformation of real GDP and u the unemployment rate. Both potential output (the GDP permanent component) and the NAIRU are assumed to be characterised by stochastic trends: potential output (μ) is modelled as a random walk with drift (β) , whereas the NAIRU (u^*) follows a pure random walk. Accordingly, the model becomes

$$y_t = \mu_t + \varphi_t + \varepsilon_t^Y$$

$$u_t = u_t^* + \varphi_t + \varepsilon_t^U$$

$$\mu_t = \beta_t + \mu_{t-1} + \varepsilon_t^\mu$$

$$u_t^* = u_{t-1}^* + \varepsilon_t^N$$

where φ is the common (stochastic) cycle. Once it is translated in SSF, the state vector is $\alpha_t = (\mu_t, u_t^*, \varphi_t, \varphi^*)'$.

The system matrices are

$$Z = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix}$$

and

$$T = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & \rho\cos\lambda_c & \rho\sin\lambda_c \\ 0 & 0 & -\rho\sin\lambda_c & \rho\cos\lambda_c \end{bmatrix}$$

The vector $c = (\beta, 0, 0, 0)'$ must be finally added to the right-hand side of the transition equation. The same considerations relative to the estimation in the univariate framework apply here as well.

A.2 Measures for profitability and wage pressure

Labour shares are computed based on value added at current basic prices, correcting for self-employment income at the industry level. This was done by imputing to self-employed workers the same average compensation as for employees working in the same industry.

The rate of return on capital is computed as the ratio of value added at current prices, net of compensation of workers, to the gross capital stock measured at substitution prices.

Real wage per efficiency unit is computed as the index number of the following variable:

$$WE_i = \frac{W_i/D_i}{L_i * e_i}$$

where
W = compensation of employees
L = dependent workers
D = industry value added deflator
$e_i = \exp\left[\sum_t \frac{SolowResidual_t}{\alpha_t}\right]$
with e equal to 1 at the starting period. It measures the efficiency of labour in industry i.
α = labour share.

A.3 Tables

Table 3: Appendix Table A1: Wage Shares

Year	Total Economy	Total Economy net of Real Estate	Business Sector	Business Sector net of Real Estate	Business Sector net of Real Estate and Agriculture	Business Sector net of Real Estate, Agriculture and Manufacturing
			France			
1980	69.9	76.4	65.6	73.3	73.0	73.1
1981	70.4	77.1	66.1	74.2	73.9	74.2
1982	70.4	77.0	66.0	74.0	74.2	73.7
1983	70.0	76.7	65.7	73.9	73.6	73.3
1984	69.1	75.9	64.7	73.0	72.4	72.4
1985	68.5	75.3	63.8	72.1	71.7	72.0
1986	66.2	72.9	61.5	69.6	69.3	68.6
1987	65.4	72.2	60.9	69.3	68.9	68.0
1988	64.1	71.0	59.8	68.2	67.7	67.6
1989	63.1	70.1	58.6	67.0	66.8	66.7
1990	63.5	70.6	59.2	67.8	67.8	67.7
1991	63.5	70.9	59.1	68.1	67.9	67.4
1992	63.1	70.8	58.4	67.7	67.8	67.7
1993	63.0	70.9	58.0	67.9	67.9	67.5
1994	62.0	69.8	56.8	66.5	67.0	66.8
1995	62.0	69.9	56.5	66.2	66.9	67.4
1996	62.1	70.1	56.5	66.4	67.1	67.3
1997	61.8	69.8	56.1	66.0	66.9	67.7
1998	61.3	69.2	55.4	65.1	66.2	67.5
1999	61.6	69.5	55.7	65.3	66.3	67.5
2000	61.4	69.0	55.4	64.7	65.5	66.7
2001	61.7	69.3	55.8	65.0	65.8	67.3
2002	61.7	69.3	55.6	65.1	65.7	67.3

Note: percentage points.
Source: elaborations on OECD STAN data.

Table 4: Appendix Table A1: Wage Shares, continued

Year	Total Economy	Total Economy net of Real Estate	Business Sector	Business Sector net of Real Estate	Business Sector net of Real Estate and Agriculture	Business Sector net of Real Estate, Agriculture and Manufacturing
			West Germany			
1980	68.9	74.5	65.9	72.8	71.0	69.6
1981	68.8	74.7	65.9	73.2	71.5	69.5
1982	67.8	74.0	64.6	72.1	70.8	68.8
1983	66.0	72.4	62.5	70.2	68.7	66.8
1984	65.3	71.9	61.8	69.8	68.4	66.3
1985	64.9	71.5	61.2	69.1	67.7	66.0
1986	64.5	71.1	60.6	68.6	67.2	66.1
1987	65.3	72.1	61.4	69.8	68.4	66.1
1988	64.5	71.4	60.7	69.0	67.9	66.1
1989	63.7	70.6	59.9	68.1	67.3	65.3
1990	63.2	70.1	59.5	67.7	66.9	64.3
1991	63.2	70.0	59.3	67.5	66.6	63.3
			Germany			
1991	64.3	70.6	60.3	68.3	66.5	61.6
1992	65.2	71.9	61.4	69.9	68.3	63.1
1993	65.5	72.8	61.6	70.6	69.1	63.7
1994	64.5	72.0	60.4	69.5	68.1	63.2
1995	64.5	72.4	60.2	69.7	68.4	63.3
1996	64.0	72.3	59.4	69.3	68.2	63.4
1997	63.0	71.3	58.2	67.9	67.0	62.2
1998	62.6	70.8	57.8	67.2	66.3	61.8
1999	63.0	71.2	58.0	67.4	66.5	62.0
2000	64.0	72.4	59.3	68.8	68.0	63.7
2001	64.1	72.7	59.4	69.2	68.5	64.2
2002	63.5	72.2	58.6	68.5	67.8	63.9
2003	63.3		58.0			

Note: percentage points.
Source: elaborations on OECD STAN data.

Table 5: Appendix Table A1: Wage Shares, continued

Year	Total Economy	Total Economy net of Real Estate	Business Sector	Business Sector net of Real Estate	Business Sector net of Real Estate and Agriculture	Business Sector net of Real Estate, Agriculture and Manufacturing
			Italy			
1980	66.6	70.4	62.1	66.3	65.3	65.1
1981	67.6	71.3	62.7	67.0	66.1	66.0
1982	67.8	71.6	63.0	67.4	66.8	66.7
1983	67.9	71.9	63.3	68.0	67.1	66.5
1984	66.3	70.8	61.2	66.3	65.3	65.1
1985	65.8	70.2	60.7	65.7	64.8	64.6
1986	64.3	68.8	59.0	64.1	63.4	62.8
1987	64.1	68.8	58.9	64.3	63.6	63.3
1988	63.6	68.3	58.2	63.6	62.8	62.2
1989	63.5	68.3	58.2	63.7	63.2	62.2
1990	64.4	69.4	58.7	64.5	64.1	62.2
1991	65.1	70.4	59.4	65.6	65.5	63.1
1992	64.8	70.6	59.3	66.1	65.9	63.6
1993	63.9	70.1	58.2	65.4	65.2	62.7
1994	62.1	68.5	56.2	63.6	63.6	61.3
1995	60.3	66.8	54.3	61.7	61.9	59.8
1996	59.9	66.6	53.6	61.2	61.6	58.8
1997	60.3	67.0	53.9	61.6	62.0	58.8
1998	57.9	64.3	52.0	59.4	59.8	56.7
1999	58.2	64.8	52.4	60.0	60.6	57.5
2000	57.8	64.3	52.0	59.4	59.9	56.9
2001	57.6	64.0	51.7	59.1	59.6	56.7
2002	57.8	64.5	52.0	59.8	60.3	57.2
2003	58.1	65.0	52.3	60.3	60.9	57.4
			Corrected for the impact of the tax reform of 1998			
1998	58.9	65.4	52.8	60.2	60.6	57.3
1999	59.2	65.9	53.1	60.8	61.4	58.2
2000	58.8	65.4	52.7	60.2	60.7	57.5
2001	58.5	65.1	52.4	59.9	60.4	57.3
2002	58.8	65.6	52.7	60.6	61.1	57.8
2003	59.1	66.2	53.0	61.2	61.7	58.0

Note: percentage points.
Source: elaborations on OECD STAN data.

Table 6: Appendix Table A2: Returns on gross capital stock

Year	Total Economy	Total Economy net of Real Estate	Business Sector	Business Sector net of Real Estate	Business Sector net of Real Estate and Agriculture	Business Sector net of Real Estate, Agriculture and Manufacturing
			France			
1980	6.0	8.8	6.7	12.9	13.7	12.7
1981	5.8	8.5	6.5	12.2	13.0	12.0
1982	5.8	8.5	6.5	12.2	12.7	12.2
1983	6.0	8.6	6.6	12.2	13.0	12.5
1984	6.2	9.0	6.8	12.6	13.5	12.9
1985	6.3	9.2	7.0	12.9	13.8	13.1
1986	7.0	10.3	7.7	14.3	15.3	15.3
1987	7.2	10.6	7.9	14.4	15.3	15.7
1988	7.6	11.1	8.2	14.9	16.0	16.2
1989	8.0	11.5	8.7	15.5	16.4	16.6
1990	7.9	11.3	8.6	14.9	15.7	16.2
1991	7.7	11.0	8.3	14.4	15.2	16.1
1992	7.9	11.0	8.5	14.4	15.1	15.9
1993	7.8	10.8	8.4	13.9	14.7	15.7
1994	8.1	11.2	8.7	14.5	15.0	15.8
1995	8.1	11.2	8.7	14.6	15.0	15.3
1996	8.0	10.9	8.6	14.3	14.6	15.1
1997	8.1	11.1	8.7	14.6	14.8	15.0
1998	8.3	11.5	9.0	15.2	15.5	15.4
1999	8.4	11.5	9.2	15.3	15.6	15.6
2000	8.4	11.7	9.3	15.6	16.0	16.1
2001	8.4	11.6	9.2	15.5	15.9	15.8
2002	8.3	11.6	9.1	15.3	15.8	15.7

Note: percentage points.
Source: elaborations on OECD STAN data.

Table 7: Appendix Table A2: Returns on gross capital stock, continued

Year	Total Economy	Total Economy net of Real Estate	Business Sector	Business Sector net of Real Estate	Business Sector net of Real Estate and Agriculture	Business Sector net of Real Estate, Agriculture and Manufacturing
			Germany			
1991	7.0	9.1	7.8	11.9	13.6	14.1
1992	6.9	8.7	7.6	11.2	12.6	13.7
1993	6.6	8.1	7.2	10.3	11.6	13.2
1994	6.8	8.4	7.5	10.8	12.1	13.4
1995	6.8	8.3	7.5	10.8	11.9	13.3
1996	6.8	8.3	7.6	10.9	11.9	13.2
1997	7.0	8.6	7.8	11.4	12.5	13.5
1998	7.1	8.9	7.9	11.8	12.9	13.7
1999	7.1	8.8	7.8	11.8	12.9	13.8
2000	6.8	8.5	7.6	11.3	12.2	12.9
2001	6.8	8.3	7.5	11.1	12.0	12.6
2002	6.9	8.5	7.6	11.3	12.2	12.7
2003	7.0		7.8			

Note: percentage points.
Source: elaborations on OECD STAN data.

Table 8: Appendix Table A2: Returns on gross capital stock, continued

Year	Total Economy	Total Economy net of Real Estate	Business Sector	Business Sector net of Real Estate	Business Sector net of Real Estate and Agri-cul-ture	Business Sector net of Real Estate, Agriculture and Manu-facturing
			Italy			
1980	6.7	9.2	7.8	12.3	13.6	13.6
1981	6.2	8.5	7.2	11.4	12.6	12.8
1982	6.0	8.3	7.0	11.0	12.1	12.4
1983	6.0	8.2	6.9	10.8	11.9	12.7
1984	6.4	8.6	7.4	11.4	12.6	13.3
1985	6.5	8.7	7.5	11.5	12.7	13.5
1986	7.0	9.4	8.0	12.3	13.6	14.6
1987	7.1	9.4	8.0	12.2	13.4	14.3
1988	7.2	9.6	8.2	12.5	13.8	14.7
1989	7.3	9.6	8.3	12.5	13.7	14.7
1990	7.1	9.4	8.1	12.2	13.4	15.0
1991	6.9	9.0	7.9	11.8	12.8	14.5
1992	6.9	8.8	7.8	11.5	12.5	14.2
1993	6.8	8.6	7.8	11.3	12.2	14.1
1994	7.2	9.0	8.2	11.8	12.7	14.4
1995	7.6	9.5	8.7	12.5	13.4	14.8
1996	7.8	9.7	8.9	12.7	13.5	15.3
1997	7.7	9.5	8.8	12.5	13.2	15.1
1998	8.1	10.3	9.1	13.2	14.0	15.8
1999	8.0	10.0	9.0	12.8	13.5	15.4
2000	8.1	10.2	9.1	13.1	13.8	15.9
2001	8.2	10.3	9.2	13.1	13.9	16.0
2002	8.0	10.0	9.0	12.7	13.4	15.6
2003	7.9	9.8	8.8	12.4	13.0	15.4
			Corrected for the impact of the tax reform of 1998			
1998	7.9	10.0	9.0	12.9	13.7	15.6
1999	7.8	9.7	8.8	12.5	13.2	15.2
2000	7.9	9.9	9.0	12.8	13.5	15.7
2001	8.0	10.0	9.0	12.9	13.6	15.8
2002	7.8	9.7	8.8	12.4	13.1	15.4
2003	7.7	9.5	8.7	12.1	12.8	15.3

The following Discussion Papers have been published since 2005:

Series 1: Economic Studies

1	2005	Financial constraints and capacity adjustment in the United Kingdom – Evidence from a large panel of survey data	Ulf von Kalckreuth Emma Murphy
2	2005	Common stationary and non-stationary factors in the euro area analyzed in a large-scale factor model	Sandra Eickmeier
3	2005	Financial intermediaries, markets, and growth	F. Fecht, K. Huang, A. Martin
4	2005	The New Keynesian Phillips Curve in Europe: does it fit or does it fail?	Peter Tillmann
5	2005	Taxes and the financial structure of German inward FDI	Fred Ramb A. J. Weichenrieder
6	2005	International diversification at home and abroad	Fang Cai Francis E. Warnock
7	2005	Multinational enterprises, international trade, and productivity growth: Firm-level evidence from the United States	Wolfgang Keller Steven R. Yeaple
8	2005	Location choice and employment decisions: a comparison of German and Swedish multinationals	S. O. Becker, K. Ekholm, R. Jäckle, M.-A. Muendler
9	2005	Business cycles and FDI: evidence from German sectoral data	Claudia M. Buch Alexander Lipponer
10	2005	Multinational firms, exclusivity, and the degree of backward linkages	Ping Lin Kamal Saggi

11	2005	Firm-level evidence on international stock market comovement	Robin Brooks Marco Del Negro
12	2005	The determinants of intra-firm trade: in search for export-import magnification effects	Peter Egger Michael Pfaffermayr
13	2005	Foreign direct investment, spillovers and absorptive capacity: evidence from quantile regressions	Sourafel Girma Holger Görg
14	2005	Learning on the quick and cheap: gains from trade through imported expertise	James R. Markusen Thomas F. Rutherford
15	2005	Discriminatory auctions with seller discretion: evidence from German treasury auctions	Jörg Rocholl
16	2005	Consumption, wealth and business cycles: why is Germany different?	B. Hamburg, M. Hoffmann, J. Keller
17	2005	Tax incentives and the location of FDI: evidence from a panel of German multinationals	Thiess Buettner Martin Ruf
18	2005	Monetary Disequilibria and the Euro/Dollar Exchange Rate	Dieter Nautz Karsten Ruth
19	2005	Berechnung trendbereinigter Indikatoren für Deutschland mit Hilfe von Filterverfahren	Stefan Stamfort
20	2005	How synchronized are central and east European economies with the euro area? Evidence from a structural factor model	Sandra Eickmeier Jörg Breitung
21	2005	Asymptotic distribution of linear unbiased estimators in the presence of heavy-tailed stochastic regressors and residuals	J.-R. Kurz-Kim S.T. Rachev G. Samorodnitsky

22	2005	The Role of Contracting Schemes for the Welfare Costs of Nominal Rigidities over the Business Cycle	Matthias Paustian
23	2005	The cross-sectional dynamics of German business cycles: a bird's eye view	J. Döpke, M. Funke S. Holly, S. Weber
24	2005	Forecasting German GDP using alternative factor models based on large datasets	Christian Schumacher
25	2005	Time-dependent or state-dependent price setting? – micro-evidence from German metal-working industries –	Harald Stahl
26	2005	Money demand and macroeconomic uncertainty	Claus Greiber Wolfgang Lemke
27	2005	In search of distress risk	J. Y. Campbell, J. Hilscher, J. Szilagyi
28	2005	Recursive robust estimation and control without commitment	Lars Peter Hansen Thomas J. Sargent
29	2005	Asset pricing implications of Pareto optimality with private information	N. R. Kocherlakota Luigi Pistaferri
30	2005	Ultra high frequency volatility estimation with dependent microstructure noise	Y. Aït-Sahalia, P. A. Mykland, L. Zhang
31	2005	Umstellung der deutschen VGR auf Vorjahres-preisbasis – Konzept und Konsequenzen für die aktuelle Wirtschaftsanalyse sowie die ökono-metrische Modellierung	Karl-Heinz Tödter

32	2005	Determinants of current account developments in the central and east European EU member states – consequences for the enlargement of the euro erea	Sabine Herrmann Axel Jochem
33	2005	An estimated DSGE model for the German economy within the euro area	Ernest Pytlarczyk
34	2005	Rational inattention: a research agenda	Christopher A. Sims
35	2005	Monetary policy with model uncertainty: distribution forecast targeting	Lars E.O. Svensson Noah Williams
36	2005	Comparing the value revelance of R&D report-ing in Germany: standard and selection effects	Fred Ramb Markus Reitzig
37	2005	European inflation expectations dynamics	J. Döpke, J. Dovern U. Fritsche, J. Slacalek
38	2005	Dynamic factor models	Sandra Eickmeier Jörg Breitung
39	2005	Short-run and long-run comovement of GDP and some expenditure aggregates in Germany, France and Italy	Thomas A. Knetsch
40	2005	A“wreckers theory” of financial distress	Ulf von Kalckreuth
41	2005	Trade balances of the central and east European EU member states and the role of foreign direct investment	Sabine Herrmann Axel Jochem
42	2005	Unit roots and cointegration in panels	Jörg Breitung M. Hashem Pesaran
43	2005	Price setting in German manufacturing: new evidence from new survey data	Harald Stahl

1	2006	The dynamic relationship between the Euro overnight rate, the ECB's policy rate and the term spread	Dieter Nautz Christian J. Offermanns
2	2006	Sticky prices in the euro area: a summary of new micro evidence	Álvarez, Dhyne, Hoeberichts Kwapil, Le Bihan, Lünnemann Martins, Sabbatini, Stahl Vermeulen, Vilmunen
3	2006	Going multinational: What are the effects on home market performance?	Robert Jäckle
4	2006	Exports versus FDI in German manufacturing: firm performance and participation in inter-national markets	Jens Matthias Arnold Katrin Hussinger
5	2006	A disaggregated framework for the analysis of structural developments in public finances	Kremer, Braz, Brosens Langenus, Momigliano Spolander
6	2006	Bond pricing when the short term interest rate follows a threshold process	Wolfgang Lemke Theofanis Archontakis
7	2006	Has the impact of key determinants of German exports changed? Results from estimations of Germany's intra euro-area and extra euro-area exports	Kerstin Stahn
8	2006	The coordination channel of foreign exchange intervention: a nonlinear microstructural analysis	Stefan Reitz Mark P. Taylor
9	2006	Capital, labour and productivity: What role do they play in the potential GDP weakness of France, Germany and Italy?	Antonio Bassanetti Jörg Döpke, Roberto Torrini Roberta Zizza

Series 2: Banking and Financial Studies

1	2005	Measurement matters – Input price proxies and bank efficiency in Germany	Michael Koetter
2	2005	The supervisor's portfolio: the market price risk of German banks from 2001 to 2003 – Analysis and models for risk aggregation	Christoph Memmel Carsten Wehn
3	2005	Do banks diversify loan portfolios? A tentative answer based on individual bank loan portfolios	Andreas Kamp Andreas Pfingsten Daniel Porath
4	2005	Banks, markets, and efficiency	F. Fecht, A. Martin
5	2005	The forecast ability of risk-neutral densities of foreign exchange	Ben Craig Joachim Keller
6	2005	Cyclical implications of minimum capital requirements	Frank Heid
7	2005	Banks' regulatory capital buffer and the business cycle: evidence for German savings and cooperative banks	Stéphanie Stolz Michael Wedow
8	2005	German bank lending to industrial and non-industrial countries: driven by fundamentals or different treatment?	Thorsten Nestmann
9	2005	Accounting for distress in bank mergers	M. Koetter, J. Bos, F. Heid C. Kool, J. Kolari, D. Porath
10	2005	The eurosystem money market auctions: a banking perspective	Nikolaus Bartzsch Ben Craig, Falko Fecht
11	2005	Financial integration and systemic risk	Falko Fecht Hans Peter Grüner

12	2005	Evaluating the German bank merger wave	Michael Koetter
13	2005	Incorporating prediction and estimation risk in point-in-time credit portfolio models	A. Hamerle, M. Knapp, T. Liebig, N. Wildenauer
14	2005	Time series properties of a rating system based on financial ratios	U. Krüger, M. Stötzel, S. Trück
15	2005	Inefficient or just different? Effects of heterogeneity on bank efficiency scores	J. Bos, F. Heid, M. Koetter, J. Kolatri, C. Kool

Visiting researcher at the Deutsche Bundesbank

The Deutsche Bundesbank in Frankfurt is looking for a visiting researcher. Among others under certain conditions visiting researchers have access to a wide range of data in the Bundesbank. They include micro data on firms and banks not available in the public. Visitors should prepare a research project during their stay at the Bundesbank. Candidates must hold a Ph D and be engaged in the field of either macroeconomics and monetary economics, financial markets or international economics. Proposed research projects should be from these fields. The visiting term will be from 3 to 6 months. Salary is commensurate with experience.

Applicants are requested to send a CV, copies of recent papers, letters of reference and a proposal for a research project to:

Deutsche Bundesbank
Personalabteilung
Wilhelm-Epstein-Str. 14

D - 60431 Frankfurt
GERMANY