Orkestra
THE INSTITUTE
OF KOMPETITIVENESS
+DEVELOPMENT

Orkestra Working Paper Series
in Territorial Competitiveness
Number 2008-01 (EN)
ISSN 1989-1288

The Sources of Economic Growth in the Basque Country, Navarre and Spain during the period 1986-2004

Iñaki Erauskin-Iurrita

Iñaki Erauskin-Iurrita, ESTE, University of Deusto
ineraus@ud-ss.deusto.es

Keywords:
Economic growth accounting, total factor productivity

JEL Codes:
O47

Orkestra
THE INSTITUTE
OF KOMPETITIVENESS
+DEVELOPMENT

The sources of economic growth in the Basque Country, Navarre and Spain during the period 1986-2004

This paper studies the sources of economic growth in the Basque Country and its three historic territories (Araba, Bizkaia, and Gipuzkoa), Navarre, and Spain during 1986-2004, emphasizing the role of infrastructures and Information and Communication Technologies (ICT) on growth, and comparing the results with those of the EU and the US. Labor and capital were the main engines of output growth during 1986-2004. The growth in TFP was residual and even declining in the period 1995-2004 due to the increasing contribution of labor. The performance in the most recent period 2000-2004 is even gloomier due to the negative growth rates of TFP. Those results contrast with the pattern for the US specially, where growth in TFP remained substantial. Infrastructures contributed to around 0,10% of output growth. The contribution of ICT capital to output growth in the Spanish territories was around 0,35% and it increased in the period 1995-2004, but it declined substantially in the most recent period 2000-2004. It is still far from the levels for the EU and specially the US. The growth rate of output per hour was below that for the EU or the US in the period 1986-2004, specially in the Basque Country. Growth in capital intensity was the main source of growth. While the contribution of infrastructures to the growth rate of output per hour declined in the period 1995-2004, that of ICT capital increased. In contrast, ICT contributed less to the growth rate of output per hour in the most recent period 2000-2004. The contribution of ICT capital to the growth rate of output per hour remains behind that for the EU and the US.

Las fuentes del crecimiento económico en el País Vasco, Navarra y España durante el período 1986-2004

Este trabajo analiza las fuentes del crecimiento económico en el País Vasco y sus tres territorios históricos (Araba, Bizkaia y Gipuzkoa), en Navarra y en España durante 1986-2004, poniendo especial énfasis en el papel de las infraestructuras y de las tecnologías de la información (TIC) en el crecimiento, y comparando los resultados con los de la UE y los EE.UU. En primer lugar, la tasa de crecimiento de la producción fue más alta en Navarra y en España que en los EE.UU., y mucho más alta que la de la UE. El País Vasco sólo mostró un mejor desempeño durante 1995-2004. En segundo lugar, el trabajo y el capital fueron los principales motores de crecimiento de la producción. El crecimiento de la PTF fue residual e incluso decreciente en el período 1995-2004 debido al crecimiento en la contribución del trabajo. Estos resultados contrastan especialmente con el modelo de los EE.UU., donde el crecimiento de la PTF sigue siendo sustancial. Tercero, las infraestructuras contribuyeron aproximadamente en 0,10% al crecimiento de la producción. Cuarto, la contribución del capital TIC al crecimiento fue alrededor de 0,35% y aumentó en el período 1995-2004. Sin embargo, todavía está lejos de los niveles de la UE y especialmente los EE.UU. Finalmente, la tasa de crecimiento de la producción por hora se situó en 1,20%, mientras que el País Vasco se mantuvo en una posición más rezagada. El crecimiento en la intensificación del capital fue la principal fuente del crecimiento de la productividad del trabajo. Mientras que la contribución de las infraestructuras a la tasa de crecimiento de la producción por hora se redujo en el período 1995-2004, la del capital TIC aumentó. Sin embargo, la contribución del capital TIC a la tasa de crecimiento de la producción por hora se mantiene por detrás de la de la UE y los EE.UU.

Hazkunde ekonomikoaren iturriak Euskal Autonomi Erkidegoan, Nafarroan eta Espainian 1986-2004 tartean

Lan honek Euskal Erkidego Autonomoaren (EAE) eta bere hiru lurralde historikoen (Araba, Bizkaia, eta Gipuzkoa), Nafarroaren, eta Espainiaren hazkunde ekonomikoaren iturriak aztertzen ditu 1986-2004 tartean. Arreta berezia jartzen zaio azpiegituren eta informazioko eta komunikazioko teknologien (IKT) zereginari hazkundean, eta emaitzak EBkoekin eta AEBkoekin konparatzen dira. Lehenengo, ekoizpenaren hazkunde-tasa handiagoa izan zen Nafarroan eta Espainian, AEBn baino, eta EBn baino askoz ere handiagoa. EAEk 1995-2004 tartean erakutsi zuen portaera hobeagoa. Bigarren, lana eta kapitala izan ziren ekoizpenaren hazkundearen indar nagusiak. Faktoreen ekoizkortasun osoaren hazkundea txikia izan zen eta gainera murriztu zen 1995-2004 tartean lanaren ekarpenaren hazkundearengatik. Emaitza hauek AEBkoen oso desberdinak dira, han faktoreen ekoizkortasun osoak nabarmena izaten jarraitzen baitu. Hirugarren, azpiegiturek ekoizpenaren hazkundeari %0,10eko ekarpena egin zioten. Laugarren, IKT kapitalaren ekarpena hazkunde ekonomikoari %0,35 izan gutxi gorabehera, eta 1995-2004 tartean ekarpen hori handitu zen. Hala ere, EBko eta bereziki AEBko mailetatik urrun dago. Azkenik, orduko ekoizpenaren hazkunde-tasa %1,20 inguruan ibili zen, EAEn hazkunde txikiagoa lortuz. Kapitalaren intentsitatearen hazkundea izan zen lanaren ekoizkortasunaren hazkundearen iturri nagusia. Azpiegiturek orduko ekoizpenaren hazkunde-tasari egindako ekarpena murriztu zen bitartean 1995-2004 urteetan, IKT kapitalarena handitu zen. Halere, IKT kapitalaren ekarpena orduko ekoizpenaren hazkunde-tasari EBkoaren eta AEBkoaren atzetik dago.

1. INTRODUCTION

The average growth of labor productivity has shown a poor performance in Spain and in the European Union (EU) since the mid 1990s[1]. Additionally, the fall in the average growth rate of total factor productivity (TFP), sometimes even becoming negative, has been specially worrisome since it is usually related to the rate of growth of technological change, that is, the contribution to the growth rate of output of everything not directly related to the growth rate of inputs, such as labor (number of hours worked by the labor force) and capital (value of the services capital assets provide to the economy).

However, few studies have analyzed the sources of economic growth for the Autonomous Community of the Basque Country (Basque Country, for simplicity) and each of its three historic territories, Araba, Bizkaia, and Gipuzkoa, and the Foral Community of Navarre (Navarre), as we will show below. Additionally, most of them have used econometric methods even though the literature has preferred the noneconometric approach. Furthermore, those studies have become somewhat outdated as they do not capture the recent evidence. Moreover, the impact of Information and Communications Technologies (ICT) on growth has already been studied for the US, the EU and Spain, but, as far as I know, there is no evidence for the Basque Country (and its historic territories) and Navarre.

This paper studies the sources of economic growth for the Basque Country and each of its three historic territories, Araba, Bizkaia, and Gipuzkoa, Navarre, and Spain during the period 1986-2004. Then these sources are compared with those of the EU, and the US. Special attention is devoted to the impact of Information and Communication Technologies (ICT) on economic growth. The role of infrastructures on growth is also analyzed[2].

Growth accounting is a very useful method to analyze the sources of economic growth of a country since it obtains an approximation to the contribution of inputs to growth. It decomposes the growth rate in aggregate

[1] See, for example, Mas and Quesada (2005), Gual, Jódar and Ruiz (2006), and Escribá and Murgui (2007) for Spain, and O´Mahony and van Ark (2003), Timmer, Ypma and van Ark (2003), Sapir et. al. (2004), and van Ark, O´Mahony and Ypma (2007) for the EU.
[2] See Mas (2006) for a recent revision on the impact of infrastructures and ICT on economic growth.

output into the contribution of the growth rate of inputs (such as labor and capital) plus the growth rate in TFP.

This paper is organized as follows. In Section 2 I revise the standard framework of growth accounting. Section 3 summarizes the results of previous studies. In Section 4 I briefly describe the sources used for this paper. The main results of the analysis are shown in Section 5. Section 6 concludes.

2. THE GROWTH ACCOUNTING METHODOLOGY[3]

Growth accounting is a method best understood as a first approximation to the deep determinants of economic growth. However, it should not be seen as an explanation of the forces that generate growth in each input. That implies that growth accounting does not explain the causes of economic growth, which is ignored very often (Helpman, 2004, p. 26). As a result, growth accounting should be considered as a method to study the proximate causes of growth (Bosworth y Collins, 2003, p. 114). Then the growth rate of inputs, input shares and technological change should be related to economic policy, consumer preferences, natural resources, the initial endowments of physical and human capital, and so on.

The principal framework of analysis for economic growth accounting is based on the pioneer work by Solow (1957).[4] The analysis starts from a standard neoclassical production function,

$$Y_t = A_t \cdot F(L_t, K_{INF,t}, K_{ICT,t}, K_{O,t}), \quad (1)$$

where Y denotes output, A the level of technology (Hicks-neutral or output augmenting), or TFP, L labor, and K capital, with 3 types of capital. Subscript INF refers to (road, water, railway, airport, port and urban) infrastructures, ICT to Information and Communications Technologies (Hardware or Office machinery and computer equipment, Software, and Communications), and O to

[3] The content of this section is mainly based on Barro and Sala-i-Martín (2004, chap. 10), and Mas and Quesada (2005, Ch. 8).

[4] The initial studies on growth accounting go back to the 30s, but Solow (1957) is the main contributor to the literature on growth accounting since it integrates explicitly economic theory in the accounting exercise (Griliches, 2000, p. 12).

other types of (non-residential) capital (such as Constructions other than dwellings and the infrastructures referred earlier, Transport equipment, and Machinery, equipment and other products, except hardware, software or communications)[5]. Labor input is measured as hours worked, unadjusted for human capital. Capital input is measured as the value of the capital services provided (Jorgenson and Griliches, 1967).

Assuming competitive factor markets and constant returns to scale, then the growth rate of production can be disaggregated into the growth rate of TFP, on the one hand, and the growth rate of inputs (adjusted by their contribution to output), on the other hand,

$$\Delta \ln Y_t = \Delta \ln A_t + \overline{\alpha}_{L,t} \cdot \Delta \ln L_t + \overline{\alpha}_{KINF,t} \cdot \Delta \ln K_{INF,t} + \overline{\alpha}_{KICT,t} \cdot \Delta \ln K_{ICT,t} + \overline{\alpha}_{KO,t} \cdot \Delta \ln K_{O,t}, \qquad (2)$$

where

$\overline{\alpha}_{L,t} = \frac{1}{2} \cdot \left[\alpha_{L,t} + \alpha_{L,t-1}\right]$ is the average share of labor compensation in total output,

$\overline{\alpha}_{KINF,t} = \frac{1}{2} \cdot \left[\alpha_{KINF,t} + \alpha_{KINF,t-1}\right]$ is the average share of the value of capital services provided by infrastructures in total output,

$\overline{\alpha}_{KICT,t} = \frac{1}{2} \cdot \left[\alpha_{KICT,t} + \alpha_{KICT,t-1}\right]$ is the average share of the value of capital services provided by information and communications technologies in total output, and

$\overline{\alpha}_{KO,t} = \frac{1}{2} \cdot \left[\alpha_{KO,t} + \alpha_{KO,t-1}\right]$ is the average share of the value of capital services provided by other types of capital in total output.

Then the share of the compensation of employees (including an imputation for self-employed persons), *CE*, in total output, *Y*, is defined as

$$\alpha_{L,t} = \frac{CE_t}{Y_t},$$

the share of the value of capital services provided by infrastructures, VCS_{KINF}, in total output, as

[5] See Mas, Pérez, and Uriel (2005b) for more details.

$$\alpha_{KINF,t} = \frac{VCS_{KINF,t}}{Y_t},$$

the share of the value of capital services provided by ICT, VCS_{KICT}, in total output, as

$$\alpha_{KICT,t} = \frac{VCS_{KICT,t}}{Y_t},$$

and the share of the value of capital services provided by other types of capital, VCS_{KO}, in total output, as

$$\alpha_{KO,t} = \frac{VCS_{KO,t}}{Y_t}, \text{ where}$$

$$\alpha_{L,t} + \alpha_{KINF,t} + \alpha_{KICT,t} + \alpha_{KO,t} = 1.$$

If we have data on the quantities, Y, L, and K, and on the input shares, α_L, α_{KINF}, α_{KICT}, and α_{KO}, then the growth rate of TFP, $\Delta \ln A_t$, can be calculated as the growth rate of output that cannot be attributed to the growth rate of inputs (weighted by their respective contributions),

$$\Delta \ln A_t = \Delta \ln Y_t - \overline{\alpha}_{L,t} \cdot \Delta \ln L_t - \overline{\alpha}_{KINF,t} \cdot \Delta \ln K_{INF,t} - \overline{\alpha}_{KICT,t} \cdot \Delta \ln K_{ICT,t} - \overline{\alpha}_{KO,t} \cdot \Delta \ln K_{O,t}, \quad (3)$$

that is, as a "residual". Thus the term $\Delta \ln A_t$ is usually known as Solow residual[6], or a "measure of our ignorance" (Abramowitz, 1956)[7]. According to Helpman (2004, p. 22), "it represents the aggregate effect of diverse forms of technological change". Hulten (2001, p. 40) points out that "intuitively, it measures the shift in the production function", which can be caused by "technical innovations, organizational and institutional changes, changes in societal attitudes, fluctuations in demand, changes in factor shares, omitted variables, and errors of measurement" (Hulten, ibid.). That is why "the residual

[6] Griliches (2000, p. 5) points out that the first time that the term residual or residual factor is used goes back, it seems, to an article by H.W. Arndt in 1961, even though the paper is not published until 1964. The term is popularized with the publication of a monograph by the OCDE entitled "The residual factor residual and economic growth" (Vaizey et al., 1964). See Griliches (2000, Chapter 1) for more details on the origins of the residual.

[7] Since in this paper labor will not be adjusted for human capital, the impact of changes in the composition of the labor forces (or "labor quality") will be attributed to the growth in TFP.

should *not* be equated to technical change, even though it often is"[8]. In addition, Hulten (Ibid.) points out that "to the extent that productivity is affected by innovation, it is the costless part of technical change that it captures. This "manna from heaven" may reflect spillover externalities thrown off by research projects, or it may simply reflect inspiration and ingenuity". In the same vein, as O´Mahony and van Ark (2003, p. 216) put it, "increases in measured TFP can arise for a number of reasons including investment in innovation-inducing activities such as R&D expenditures, measurement issues including cyclical influences and pure TFP or costless increases in output arising from network externalities or spillovers. The latter encompasses activities that indirectly raise productivity but are not directly remunerated in the market".

Alternatively, equation (2) can be rewritten in intensive terms, that is, measured in hours worked, as

$$\begin{aligned}\Delta \ln Y_t - \Delta \ln L_t &= \Delta \ln A_t + \overline{\alpha}_{KINF,t} \cdot \left(\Delta \ln K_{INF,t} - \Delta \ln L_t\right) \\ &+ \overline{\alpha}_{KICT,t} \cdot \left(\Delta \ln K_{ICT,t} - \Delta \ln L_t\right) + \overline{\alpha}_{KO,t} \cdot \left(\Delta \ln K_{O,t} - \Delta \ln L_t\right),\end{aligned} \qquad (4)$$

where the growth rate of GDP per hour is decomposed into the growth rate in TFP plus the growth rate in capital intensity (weighted by her contribution). Then the growth in TFP can be derived from (4) as,

$$\begin{aligned}\Delta \ln A_t &= \left(\Delta \ln Y_t - \Delta \ln L_t\right) - \overline{\alpha}_{KINF,t} \cdot \left(\Delta \ln K_{INF,t} - \Delta \ln L_t\right) \\ &- \overline{\alpha}_{KICT,t} \cdot \left(\Delta \ln K_{ICT,t} - \Delta \ln L_t\right) - \overline{\alpha}_{KO,t} \cdot \left(\Delta \ln K_{O,t} - \Delta \ln L_t\right),\end{aligned} \qquad (5)$$

Equations (2), (3), (4) or (5) have been obtained using non-econometric procedures, which in addition to being the estimation method most frequently used in the literature, it has important advantages[9].

[8] According to Hulten (2001, p. 8, footnote 5), "The difference between the Hicksian shift parameter, A_t, and the rate of technical change arises for many reasons. The most important is that the shift parameter captures only costless improvements in the way an economy´s resources of labor and capital are transformed into real GDP (the proverbial manna from heaven). Technical change that results from R&D spending will not be captured by A_t *unless* R&D is excluded from L_t and K_t (which it generally is not). A second general reason is that changes in the institutional organization of production will also shift the function, as will systematic changes in worker effort."

[9] The main advantage of the econometric method is that there is no need to assume that the marginal social product of inputs coincide with the observed prices of inputs. However, it has

The econometric estimation of equation (1) implies usually adopting a Cobb-Douglas production function under constant returns to scale. Then a specific functional form is suggested for the TFP term A_t. Substituting this term in equation (1) and taking logs, the production function is estimated, thus obtaining the impact of different inputs on output. Additionally, based on those results, the level of TFP and the sources of growth can be estimated[10].

3. RESULTS OF PREVIOUS STUDIES

Several studies have analyzed the sources of economic growth for Spain as a whole using different methodologies. However, very few have studied those sources for the autonomous communities and provinces of Spain. Escribá and Murgui (1998) found that the main contribution to the growth rate of gross value added (GVA) for the period 1980-1993 was explained both by the growth rate of TFP and private capital using noneconometric procedures. The growth rate of labor played a minor role. Those results applied broadly to the private productive sector as a whole and to the 5 big private productive industries (agriculture, manufacturing, energy, construction, and privates productive services) in Spain and in its autonomous communities, even though there were remarkable differences from some territories to others and from some industries to others.

Gallastegui (2000) estimated the sources of growth in the Basque Country as a whole for the period 1985-1994 in 18 industries econometrically. The evidence showed that the evolution of the stock of private productive capital, employment, the stock of public capital (infrastructures), the training of workers, and the expenditure in research and development were the variables that most contributed to the growth rate of GVA: they all explained approximately 60% of the growth rate in the Basque Country. In contrast, technological change accounted for 30% of the growth rate[11].

---

many disadvantages. First, the growth rate of inputs cannot be taken as exogenous with respect to the changes in the growth rate of TFP. Second, in case measurement errors arise in the growth rate of inputs, then the estimates would be inconsistent. This is specially relevant for capital. Finally, the regression equation should be extended so that changes in input shares and the growth rate of TFP are allowed as time evolves (Barro and Sala-i-Martin, 2004, pp. 441-442).

[10] For more details, see Goerlich and Mas (2001, Chapter VI), for example,

[11] The remaining 10% was due to cyclical factors and to specific variables in each industry.

Goerlich and Mas (2001) studied the sources of economic growth for Spain as a whole and for each of the provinces in Spain based on econometric procedures. As we can see in Table 1, the results were qualitatively quite similar to those of Escribá and Murgui (1998): the growth rate in TFP was the most important source of economic growth during 1965-1996, followed by the contribution of private capital, while the contribution of labor (and other variables such as human capital and public capital) was very low, or even negative in some territories[12].

Timmer, Ypma and van Ark (2003) analyzed the impact of ICT on the growth rate in the EU, comparing it with that in the US[13]. The EU performed worse than the US in terms of growth in the periods 1980-1995 and 1995-2001 (2,11% and 2,42% vs. 2,93% and 3,52%) (See Tables 2 and 3). The sources of growth in the EU changed very much from one period to the other. Whereas growth in output was explained mainly both by growth in TFP and capital in the period 1980-1995, the increasing contribution of labor, and not the contribution of ICT capital (even though it increased), was the main feature of the recent period in the EU. On the other hand, the contribution of all the sources to economic growth (but labor) increased in the US from one period to the other, but relative contributions maintained more or less stable. Higher labor and capital growth accounted for higher US growth in the first period, whereas capital and labor growth were the engines of growth in the second. The contribution of ICT capital to GDP growth increased both in the EU and in the US, but it was clearly higher in the US. On the other hand, the growth rate in Spain was higher than in the EU in both periods, but lower than in the US in the first period. Additionally, the sources of growth for Spain resembled very much those of the EU. However, the main contribution of TFP growth in the period 1980-1995 was stronger in Spain than in the EU (1,57% vs. 1,13%), and the increasing role of labor in the second period was even higher in Spain, thus turning negative the growth in TFP, 1,16%-point behind that of the EU (-0,62%

[12] Additionally, they found that part of the growth rate could be attributed to structural change (mainly due to the loss of agricultural employment). However, most of the evolution of the GVA was explained by the accumulation of capital, instead of the evolution in sectorial employment.
[13] See Jorgenson, Ho, and Stiroh (2005) for a recent survey on the impact of ICT on economic growth in the US.

vs. 0,46%). The contribution of ICT capital increased a meager 0,01%-point in Spain from the first period to the second.

Focusing on the sources of labor productivity growth, "the story is different", as Timmer, Ypma and van Ark (2003, p. 12) put it. Tables 4 and 5 show the results. The broader picture is nicely summed up by O´Mahony and van Ark (2003, p. 17) in the introduction of one of their recent studies: "Since the mid 1990s the average growth rates of real GDP, labour productivity and total factor productivity in the European Union have fallen behind those in the United States. What makes this remarkable is that this is the first time since World War II that these performance measures have shown lower growth rates for the EU for several years in a row." In the period 1980-1995 the higher growth rate in the EU was mainly based on the higher contributions of TFP and non-ICT capital deepening, much higher than those of the US. In the recent period the lower growth rate in the EU was explained by lower contributions of TFP and ICT capital deepening than in the US. The performance of labor productivity growth for Spain was again quite similar and more extreme than that for the EU. In the period 1980-1995, when the EU grew more than the US, Spain (2,78%) grew even more than the EU: the contribution of TFP fuelled higher growth. In the period 1995-2001, when the EU grew less than the US, Spain (-0,40%) grew even less than the EU: the contribution of capital deepening (both ICT and non-ICT) was very low and that of TFP was even negative.

The impact of ICT capital on economic growth for the period 1985-2002 was studied by Mas and Quesada (2005). The results for output growth (Table 6) are broadly similar to those by Timmer, Ypma and van Ark (2003): GVA growth was around 3% and two were the main engines of growth in the whole period, labor and capital growth, both accounting for around 85% of output growth, and thus leaving a residual role for the combined contribution of TFP and human capital. However, whereas the contribution of ICT capital was around one third of the contribution of total capital in Mas and Quesada (2005)[14], in the case of Timmer, Ypma and van Ark (2003) it reached around

[14] The weight of the contribution of ICT capital on total capital implied a much higher weight than that of the value of ICT capital stock over the total value of capital stock (Mas and Quesada, ibid., p. 285).

20%. More similarities are also found if we focus on the results for the two subperiods. Important changes took place in the sources of growth between 1985-1995 and 1995-2002. While (non-ICT) capital growth was the biggest contributor to output growth in the first period, labor growth mainly backed output growth in the second. Additionally, TFP plus human capital growth declined substantially from the first period to the second. In terms of labor productivity (Table 7), capital deepening was the main contributor to the growth rate of GDP per hour, even if we consider both subperiods separately. Additionally, the recent subperiod was characterized by lower growth of output per hour, explained by lower capital deepening and much lower TFP growth, as in Timmer, Ypma and van Ark (2003).

Erauskin (2005) analyzed the sources of economic growth for the Basque Country (and its historic territories), Navarre and Spain for the period 1986-2000 in the 5 big private productive industries (agriculture, energy, manufacturing, construction, and private productive services) and in the productive private sector (the 5 big private productive industries altogether). He found that output growth in the Basque Country and its historic territories, Navarre and Spain was mainly explained by the growth rates of private capital and TFP during 1986-1995. The contribution of TFP to growth was very positive. On the other hand, while labor was the main contributor to output growth in the recent period 1995-2000, the contribution of TFP growth to output growth declined substantially (as in Timmer, Ypma and van Ark (2003), and Mas and Quesada (2005)), except for Navarre. The performance of TFP was specially poor in Gipuzkoa and Araba.

Finally, the EU KLEMS Productivity Report, first released in March 2007, provides new data on economic growth, productivity, employment creation, and capital formation at the industry level for EU member states, Japan and the US from 1970 onwards. According to the Report, focusing on the aggregate evidence, labor productivity slowed down since 1995 in the EU-15, from 2,4% during 1970-1995 to 1,4% during 1995-2004, with remarkable differences from some countries to others. The performance of Spain was specially poor since productivity improved only 0,3% in the period 1995-2004. On the other hand,

the higher output growth rate in the EU-10[15] during 1995-2004 (2,2% vs. 1,9% during 1980-1995) was backed mainly by capital (whereas the contribution of ICT capital increased in the recent period, that of non-ICT capital declined) and a higher contribution of labor. In contrast, labor was by far the main contributor of the higher output growth rate in Spain during 1995-2004. In addition, the contribution of ICT capital to output growth increased slightly in the recent period. Thus TFP growth fell significantly both in the EU and Spain, but the figure for Spain was specially disappointing, -0,9%. More evidence will be provided in Section 5.

4. DATA SOURCES

The data for the EU and the US is based entirely on the recently released EU KLEMS Growth and Productivity Accounts database: gross value added, gross value added (volume indices), number of hours, labor compensation, capital compensation, ICT share, Non-ICT share, Labor services (volume indices), ICT capital services (volume indices), Non-ICT capital services (volume indices), and so on.

The data on National Accounts for the Spanish territories is based on the Contabilidad Regional de España database from the Instituto Nacional de Estadística (INE), for the periods 1986-1995 (base 1986), 1995-2000 (base 1995), and 2000-2004 (base 2000): Gross Value Added at factor prices (until 1995), Gross Value Added at basic prices (from 1995 to 2000), Total Gross Value Added (from 2000 onward), GVA deflator, total employment, number of employees, gross compensation of employees, and so on. The data on the number of hours worked has been obtained from the EU KLEMS database.

Fundación BBVA and Instituto Valenciano de Investigaciones Económicas (FBBVA-IVIE) provide the database for the estimates of the capital stock in the Spanish territories so that the value of capital services can be computed. Mas, Pérez and Uriel (2005b) were the first estimating the capital stocks for Spain as a whole (1964-2002), following the new methodology suggested by the OECD (2001a; 2001b)[16]. The first estimates for Spain and

[15] That is, EU-15 excluding Greece, Ireland, Luxembourg, Portugal, and Sweden.
[16] See Mas, Pérez and Uriel (2006b) for a brief summary of the new methodology.

each of its provinces (1964-2003) can be found in Mas, Pérez and Uriel (2006a). The methodology to obtain the value of capital services in this paper follows Mas, Pérez and Uriel (2005b) with the most recent data provided by Mas, Pérez and Uriel (2007) for the period 1964-2004 (disaggregated by provinces).

5. THE RESULTS

The evidence on the sources of economic growth for Spain, the Basque Country, Navarre, Araba, Bizkaia and Gipuzkoa will be shown for the whole period 1986-2004, and for three subperiods, 1986-1995, 1995-2004, and 2000-2004, in order to capture the increasing importance of ICT on the performance of the economy and make reasonable comparisons with previous studies[17]. First, the sources of output growth are analyzed (Tables 8, 9, 10, and 11 for the four periods analyzed) and then the growth rates of output per hour (Tables 12, 13, 14, and 15 again for the four periods)[18].

In the period 1986-2004, as shown in Table 8, output growth was above 3% in Navarre and Spain, slightly higher than in the US and much higher than in the EU, whereas the Basque Country grew around 2,5% (Gipuzkoa had the highest growth rate, while Bizkaia the lowest one)[19]. Labor and capital growth were clearly the main engines of economic growth, thus growth in TFP playing a residual role, specially in Gipuzkoa and Araba (0,11% or below). Bizkaia achieved a higher growth rate in TFP than other territories due to an atypical low contribution of capital. On the other hand, capital and labor fuelled output growth in the EU and the US. Additionally, while the EU achieved similar TFP growth rates to other Spanish territories (except Gipuzkoa and Araba), the US

[17] Some reasons can explain why the results for this paper do not coincide with those of previous studies. First, the periods considered are not the same in some cases. Second, no adjustment has been made other than excluding residential capital from the analysis. For instance, since residential capital was excluded, Timmer, Ypma, and van Ark (2003) made some adjustments to exclude actual and imputed rents paid in the case of owner-occupied dwellings, and Mas and Quesada (2005) excluded rents from output, and the contribution of domestic service from output and employment.

[18] The Annex shows the same results for each of the territories for the whole period and the three subperiods.

[19] The contribution of labor includes changes in the composition of the labor force (or "quality of labor"), as well as changes in the number of hours worked in the results for the EU and the US. Additionally, the evidence on growth accounting for the EU refers only to 10 "old" European countries (EU-15 except Greece, Ireland, Luxembourg, Portugal, and Sweden).

got the highest TFP growth rate, closely followed by Bizkaia. The minor contribution of TFP growth contrasts to the results about the Basque Country in previous studies, such as those by Escribá and Murgui (1998), or Goerlich and Mas (2001), where the growth in TFP was, by far, the fundamental variable, and to a lesser extent that by Gallastegui (2000). However, the results of this paper are broadly similar to those of a recent study by Erauskin (2005).

The contribution of infrastructures to output growth was around 0,10%: Spain had the highest contribution (0,12%) while Araba had the lowest one (0,08%). In addition, while ICT capital contributed 0,28% to growth in Bizkaia (being the lowest contribution), Navarre achieved 0,36%, and Spain and Araba, 0,35% (the highest values). The contributions of ICT capital were generally sligthly below those for the EU and clearly well below those for the US. It is worth pointing out that even the contribution of hardware in its own (above 16%) was higher than that of infrastructures. However, other type of non-ICT capital was the main contributor in total capital (more than 60%).

Table 9 shows the results for the period 1986-1995. Output growth rates were generally lower in this period than during 1986-2004, with important differences from some territories to others. They almost reached 3% in Spain and Navarre, well above the values for the US (2,54%) and the EU (2,36%), while the growth rates for the Basque Country were much lower, from the highest one in Gipuzkoa (2,32%) to the lowest one in Bizkaia (1,38%). Capital was the main contributor to output growth. However, most TFP growth rates were around 0,70% in this period, whereas Spain achieved more than 1%. Additionally, there were important differences in the contributions of capital (above 1% in Navarre, the EU, Spain, Araba, and the US, and below it in Gipuzkoa and Bizkaia), and labor (around 0,75%, but much lower in the EU, Araba, and Bizkaia). On the other hand, the contribution of public infrastructures was around 12% (higher in Spain and Bizkaia, and lower in Araba), while that of ICT capital was low in the Basque Country (0,26%), while Spain (0,30%) and specially Navarre (0,34%) achieved higher contributions, somewhat lower than those for the EU, but well below those for the US again.

The recent period 1995-2004 (Table 10) was characterized mainly by high output growth (above 3%) and high labor growth contributions (above 2%), except for the EU. Navarre was the highest growing territory, closely followed by

Araba, Spain, Bizkaia, the US, and Gipuzkoa. The sources of economic growth changed notably from the period 1986-1995 to the period 1995-2004 in the Spanish territories: labor was the main contributor in the recent period by far. The growth in TFP declined substantially and it even became negative in Gipuzkoa, Araba, and Spain, while Bizkaia achieved a remarkably high growth rate in TFP due to a significant fall in the contributions of infrastructures and other non-ICT capital. In contrast, capital was the main source of growth in the EU and the US, and while the EU followed the declining trend of TFP growth, the US did just the opposite, as in Bizkaia. Infrastructures contributed to output growth slightly less than in the previous period in the Spanish territories (generally around 7-8%). The contributions of ICT capital increased enormously in the period 1995-2004, and almost doubled in some cases, but they are still far from the level in the US: the contributions were around 0,40%, and Bizkaia lagged behind (0,32%).

The most recent period 2000-2004 (Table 11) exhibited lower output growth rates, below 3%, than in the period 1995-2004. The main contribution of labor declined notably, along with that of capital, ICT capital specially. Public infrastructures contributed slightly less than in the period 1995-2004. Thus the growth rate of TFP was disappointingly negative in all the territories, around –0,40%, except in the US, where it increased. Public infrastructures contributed slithgly less than in the period 1995-2004.

In terms of labor productivity (Table 12), growth rates were above 1,20% in the whole period 1986-2004, except for the Basque Country: the EU, the US, Navarre, and Spain were the territories with the highest growth rates. Capital deepening (non-ICT primarily) was the most important source of labor productivity growth, except for the US and Bizkaia, still leaving an important role to TFP growth, around 0,50% and with significant differences[20]: Gipuzkoa (0,11%) and Araba (0,02%) were the worst performers in TFP growth, while the US (0,68%) and Bizkaia (0,65%) were the best ones, due to an atypically low contribution of non-ICT capital per hour. Public infrastructures contributed to the growth rate of output per hour more in Bizkaia and Spain, and less in Navarre, Araba and Gipuzkoa. Additionally, ICT capital contributed more to output growth

[20] The contribution of labor composition per hour calculates the impact of changes in the composition of the labor force (in terms of hours worked) for the EU-10 and the US.

in Araba and Navarre (0,30%), but well below the US or the EU, while Bizkaia lagged behind. It is remarkable that the contribution of ICT capital was higher than that of infrastructures, but lower than that of non-ICT capital (except for Bizkaia and the US).

In the period 1986-1995 the growth rates of output per hour were high (Table 13). The EU, Spain and Navarre grew above 1,8%, while the Basque Country did around 1,45%, much higher than in the US. Both TFP and capital deepening (non-ICT mainly) growth contributed more or less equally to growth in output per hour, except for the EU, Navarre and Araba, where capital deepening played a leading role. The rates of growth of TFP were above 0,65%, except for Araba and the US: Spain had the highest growth rate. The contribution of infrastructures was around 0,09%, Bizkaia and Spain having the highest contributions (0,14% and 0,12%, respectively). ICT capital contributed more to output growth in Navarre (0,31%) and Spain (0,28%) than in the Basque Country (0,27% at most). They all were slightly lower than for the EU and the US, both with similar figures. In addition, the contribution of ICT capital was higher than that of infrastructures, but well below that of non-ICT capital, except for the US.

In the recent period 1995-2004 the results changed considerably from the previous period (Table 14). Output per hour grew much less than during 1986-1995 in the Spanish territories due to the much stronger contribution of labor: growth rates lied between 0,40% and 0,80%, except Gipuzkoa (0,10%). The EU followed the same pattern, while the US achieved a much higher growth rate in the period 1995-2004. However, their growth rates were much above those for the Spanish territories. Capital deepening backed mainly the growth rate of output per hour in most territories, except for Bizkaia and the US. The lower growth rates of output per hour were fuelled primarily by lower capital deepening (non-ICT especially), while there was no TFP growth at all, except for the US, Bizkaia, the EU, and Navarre. The most negative growth rates of TFP were in Gipuzkoa (-0,47%) and Araba (-0,48%). The contribution of infrastructures and other non-ICT capital to growth fell drastically in the recent period. In contrast, the contribution of ICT capital to growth increased sligthly in the recent period. However, the contribution of ICT capital to growth is still below the levels for the EU and the US, specially.

The most recent period 2000-2004 was characterized by low growth rates in output per hour in the Spanish territories (Table 15). On the contrary, the EU and specially the US had high growth rates. Capital was generally the main source of output growth. It is striking that the contribution of ICT capital declined substantially in the period, while that of non-ICT capital increased slightly. The performance of TFP was specially unsatisfactory, except for the US.

6. CONCLUSIONS

The average growth rates of labor productivity and TFP have performed poorly since the mid 1990s in Spain and in the EU. This is a very worrying issue since the rate of growth of TFP is related to the rate of growth of technological change. More precisely, the growth of TFP is equal to the growth rate of output minus the growth rate of inputs, such as labor (number of hours worked by the labor force) and capital (value of the services capital assets provided to the economy, computed through the FBBVA-IVIE database), weighted by their respective contributions, through growth accounting. However, few studies have decomposed the contribution of inputs and TFP to the economic growth in the Basque Country and Navarre.

This paper studies the sources of economic growth in the Basque Country and its three historic territories, Navarre, and Spain during 1986-2004, comparing them with those of the EU and the US, and paying special attention to the role of public infrastructures and ICT capital on growth. The main conclusions can be divided into five categories.

First, the rate of growth of output in the period 1986-2004 was generally lower than that of the US and higher than that of the EU: Gipuzkoa, Araba, the Basque Country, and Bizkaia, in descending order. Only Navarre and Spain achieved higher growth than in the US. The period 1995-2004 was characterized by high growth: Navarre, Araba, Bizkaia, Spain, and Gipuzkoa, in descending order. The figures were clearly above that for the US, and much above that for the EU. The most recent period 2000-2004 showed a poorer performance.

Second, labor and capital were generally the main engines of output growth, and TFP growth played a residual role during 1986-2004. Additionally, while the contribution of labor increased substantially in the recent period 1995-2004, the growth in TFP declined drastically in most territories (except the US) and it even turned negative in some of them: the performance of Gipuzkoa, Araba, and Spain was specially poor. This contrasts with most previous studies for the Basque Country, where the growth in TFP was crucial, but it coincides with some recent work. The results for the most recent period 2000-2004 are even gloomier.

Third, the contribution of infrastructures to output growth was around 10% in the period 1986-2004, from the highest level in Spain to the lowest one in Araba. Additionally, it declined in the recent period 1995-2004, ranging from 0,11% (in Spain) to 0,07% (in Navarre, Araba, and Gipuzkoa).

Fourth, ICT capital contributed approximately 0,35% to output growth during 1986-2004. Navarre and Spain were the highest contributors, whereas Bizkaia was the lowest. Most of these figures were slightly below that for the EU, and undoubtedly below the contribution in the US. The contribution increased during 1995-2004: Araba, Gipuzkoa, Spain, and Navarre were the territories that ICT most contributed to output growth, while Bizkaia was the lowest. However, even though they generally have slightly lower levels than that of the EU, they are still far behind the US. It is specially remarkable that the contribution of ICT capital (or even hardware in its own) to output growth was higher than that of infrastructures. The contribution of ICT to output growth in the recent period 2000-2004 declined substantially.

Finally, labor productivity grew above 1,10% during 1986-2004, except for Araba and specially Gipuzkoa. Growth in capital deepening was the main contributor to the growth rate of output per hour, except for Bizkaia. Infrastructures contributed more than 0,04% (Navarre, Araba and Gipuzkoa) to the growth rate of output per hour (0,09% was the maximum for Spain and Bizkaia). On the other hand, the contribution of ICT capital to growth ranged between 0,24% (Bizkaia) and 0,30% (Navarre and Araba), which are far from those for the EU, and still further from the US. The recent period 1995-2004 showed more differences in the growth rate of output per hour: while the US, and the EU were the territories with the highest growth rates (above 1%),

Gipuzkoa had a very low rate. Again growth in capital intensity was generally the main source of growth in output per hour. The contribution of infrastructures to the growth rate of output per hour was very low and in some territories it became even nil or negative (Navarre, Araba, and Gipuzkoa). Finally, the contribution of ICT capital increased in all the territories during 1995-2004, from the highest contributions in Araba, Gipuzkoa, Spain and Navarre to the lowest one in Bizkaia. They all are still below the figures for the EU and the US. It is worth noting that in some territories the contribution of ICT capital was even higher than that for non-ICT capital: the contribution of other non-ICT capital fell dramatically while the contribution of ICT capital increased. The situation for the most recent period 2000-2004 is even gloomier than for the period 1995-2004: lower growth rates of output per hour, negative growth rates of TFP, and lower contributions of ICT capital to output.

REFERENCES

Abramowitz, Moses (1956). “Resource and output trends in the United States since 1870”. *American Economic Review*, 46(2): 5-23.

Arndt, H.W. (1964). “The residual factor.” in U.N. Economic Commission for Europe, ed., *Economic survey of Europe in 1961, Part II: Some factors in economic growth in Europe in the 1950s*, pp. 1-9. Geneva: United Nations. Reimpressed in H.W. Arndt, *50 years of Development Studies* (Camberra, Australian National University, 1993), pp. 53-59.

Barro, Robert J. and Xavier Sala-i-Martín (2004). *Economic growth. Second edition.* McGraw-Hill, New York..

Bosworth, Barry P. and Susan M. Collins (2003). “The empirics of growth: an update”. *Brookings Papers on Economic Activity*, nº 2: 113-179.

Escribá-Pérez, F. Javier; and Mª José Murgui-García (1998). *La productividad total de los factores entre sectores y regiones de la economía española (1980-1993)*. Working paper D-98005. Downloadable at http://www.sgpg.pap.meh.es/SGPG/Cln_Principal/Presupuestos/Documentacion/Documentosdetrabajo.htm (Secretaría de Estado de Hacienda y Presupuestos).

Escribá-Pérez, F. Javier; and Mª José Murgui-García (2007). *Análisis sectorial de la productividad total de los factores en la economía española (1980-2003)*. Working paper D-2007-01. Downloadable at http://www.sgpg.pap.meh.es/SGPG/Cln_Principal/Presupuestos/Documentacion/Documentosdetrabajo.htm (Secretaría de Estado de Hacienda y Presupuestos).

Erauskin-Iurrita, Iñaki (2005). “Las fuentes del crecimiento económico en la Comunidad Autónoma del País Vasco, la Comunidad Foral de Navarra y España durante el período 1986-2000”. Unpublished manuscript.

EUKLEMS Database, March 2007, see Marcel Timmer, Mary O´Mahony & Bart van Ark, *The EU KLEMS Growth and Productivity Accounts: an overview,* University of Groningen & University of Birmingham; downloadable at www.euklems.net.

Gallastegui-Zulaica, Inmaculada (Dir.) (2000). *El crecimiento económico vasco. Aproximación a sus factores explicativos*. Caja Laboral Popular, Mondragón, Spain.

Goerlich-Gisbert, Francisco J. And Matilde Mas-Ivars (2001). *La evolución económica de las provincias españolas (1955-1998). Volumen I: Capitalización y crecimiento.* Fundación BBVA, Bilbao, Spain.

Griliches, Zvi (2000). *R&D, education, and productivity. A retrospective*. Harvard University Press, Cambridge, Massachusetts.

Gual, Jordi; Sandra Jódar-Rosell, and Álex Ruiz-Posino (2006). *El problema de la productividad en España. ¿Cuál es el papel de la regulación?.* Documentos de Economía de "la Caixa". Available at http://www.pdf.lacaixa.comunicacions.com/de/esp/de01_esp.pdf

Helpman, Elhanan (2004). *The mistery of economic growth*. The Belknap press of Harvard University Press, Cambridge, Massachusetts.

Hulten, Charles R. (2001). "Total factor productivity: a short biography", in Hulten, Charles R., Edwin R. Dean and Michael J. Harper (Eds.) (2001). *New developments in productivity analysis*. National Bureau of Economic Research, Conference on research in income and wealth. The University of Chicago Press, Chicago.

Instituto Nacional de Estadística. *Contabilidad regional de España*. Downloadable at www.ine.es

Jorgenson, Dale W. and Zvi Griliches (1967). "The explanation of productivity change", *Review of economic studies*, 34:249-283.

Jorgenson, Dale W.; Mun S. Ho and Kevin J. Stiroh (2005). *Productivity. Volume 3: Information technology and the American growth resurgence.* MIT Press, Cambridge, Massachussets.

Mas-Ivars, Matilde (2006). "Infrastructures and ICT: measurement issues and impact on economic growth". EU KLEMS working paper series (no. 12). Downloadable at www.euklems.net .

Más-Ivars, Matilde; and Javier Quesada-Ibañez (Dirs.) (2005). *Las nuevas tecnologías y el crecimiento económico en España*. Fundación BBVA, Bilbao, Spain.

Mas-Ivars, Matilde; and Paul Schreyer (Eds.) (2006). *Growth, capital and new technologies.* Fundación BBVA, Bilbao, Spain.

Más-Ivars, Matilde; Francisco Pérez-García and Ezequiel Uriel-Jiménez (2005a). *El stock de capital en España y su distribución territorial (1964-2002).* Fundación BBVA, Bilbao, Spain.

Mas-Ivars, Matilde; Francisco Pérez-García and Ezequiel Uriel-Jiménez (2005b). *El stock y los servicios de capital en España (1964-2002). Nueva metodología.* Fundación BBVA, Bilbao, Spain.

Mas-Ivars, Matilde; Francisco Pérez-García and Ezequiel Uriel-Jiménez (2006a). *El stock y los servicios de capital en España y su distribución territorial (1964-2003). Nueva metodología.* Fundación BBVA, Bilbao, Spain.

Mas-Ivars, Matilde; Francisco Pérez-García and Ezequiel Uriel-Jiménez (2006b). "Capital stocks in Spain, 1964-2002". New estimates", in Mas-Ivars, Matilde; and Paul Schreyer (Eds.) (2006). *Growth, capital and new technologies*: 67-91.

Mas-Ivars, Matilde; Francisco Pérez-García and Ezequiel Uriel-Jiménez (2007). *El stock y los servicios de capital en España y su distribución territorial (1964-2005). Nueva metodología.* Fundación BBVA, Bilbao, Spain.

OECD (2001a). *Measuring capital. Measurement of capital stocks, consumption of fixed capital and capital services.* OECD Manual, Paris.

OECD (2001b). *Measuring productivity. Measurement of aggregate and industry-level productivity growth.* OECD Manual, Paris.

O´Mahony, Mary and Bart van Ark (Eds.) (2003). *EU productivity and competitiveness: an industry perspective. Can Europe resume the catching-up process?*. European Commission, Office for Official Publications of the European Communities, Luxembourg.

Sapir, André; Philippe Aghion, Giuseppe Bertola, Martin Hellwig, Jean Pisani-Ferry, Dariusz Rosati, José Viñals and Helen Wallace (2004). *An agenda for a growing Europe: the Sapir report*. Oxford University Press, Oxford, United Kingdom.

Solow, Robert M. (1957). "Technical change and the aggregate production function", *Review of economics and statistics*, 39(august): 312-320.

Timmer, Marcel, Gerard Ypma and Bart van Ark (2003). "IT in the European Union: Driving productivity divergence?". *Research Memorandum GD-67, Groningen Growth and Development Centre*, Netherlands. Memorandum

downloadable at http://www.ggdc.net/pub/online/gd67(online).pdf. Appendix database downloadable at http://www.ggdc.net.

Timmer, Marcel; Mary O´Mahony and Bart van Ark, *The EU KLEMS Growth and Productivity Accounts: An overview*, University of Groningen & University of Birmingham, March 2007. Downloadable at www.euklems.net.

Timmer, Marcel; Ton van Moergastel, Edwin Stuivenwold, Gerard Ypma; Mary O´Mahony and Mari Kangasniemi (Prepared by them on behalf of the EU KLEMS consortium) (2007). *EU KLEMS growth and productivity accounts. Version 1.0. Part I Methodology.* Groningen Growth and Development Centre and National Institute of Economic and Social Research. Downloadable at www.euklems.net.

Vaizey, John, et al., (Study group in the economics of education) (1964). *The residual factor and economic growth*. OECD, Paris.

Van Ark, Bart; Mary O´Mahony, and Gerard Ypma (Edited by them with contributions of individual consortium members) (March 2007). *The EU KLEMS Productivity Report. Issue 1.* University of Groningen & University of Birmingham, March 2007. Downloadable at www.euklems.net.

TABLES

Table 1. The sources of economic growth in Spain, the historic territories of the Basque Country, and Navarre, 1965-1996

	Growth rate of GVA	Contribution of labor	Contribution of private capital	Contribution of human capital	Contribution of public capital	Contribution of TFP
Spain	3,21	-0,10	0,95	0,11	0,10	2,14
Gipuzkoa	2,12	-0,27	0,41	0,10	0,10	1,77
Bizkaia	2,29	-0,40	0,59	0,10	0,13	1,87
Araba	3,98	0,60	1,04	0,11	0,11	2,12
Navarre	3,59	0,07	0,94	0,12	0,09	2,38

Source: Goerlich and Mas (2001, p. 350)

Table 2. The sources of GDP growth in Spain, the EU, and the US, 1980-1995

	GDP growth	Contribution of labor	Contribution of ICT capital	Contribution of non-ICT capital	Contribution of TFP
Spain	2,49	-0,30	0,27	0,94	1,57
EU	2,11	-0,16	0,32	0,83	1,13
US	2,93	1,10	0,55	0,58	0,70

Source: Timmer, Ypma and van Ark (2003, p. 51)

Table 3. The sources of GDP growth in Spain, the EU, and the US, 1995-2001

	GDP growth	Contribution of labor	Contribution of ICT capital	Contribution of non-ICT capital	Contribution of TFP
Spain	3,67	2,77	0,28	1,24	-0,62
EU	2,42	0,69	0,46	0,81	0,46
US	3,52	1,13	0,82	0,75	0,82

Source: Timmer, Ypma and van Ark (2003, p. 51)

Table 4. The sources of growth for GDP per hour in Spain, the EU, and the US, 1980-1995

	Growth GDP per hour	Contribution of ICT capital per hour	Contribution of non-ICT capital per hour	Contribution of TFP
Spain	2,78	0,27	0,93	1,57
EU	2,33	0,32	0,88	1,13
US	1,37	0,48	0,19	0,70

Source: Timmer, Ypma, and van Ark (2003, p. 52).

Table 5. The sources of growth for GDP per hour in Spain, the EU, and the US, 1995-2001

	Growth GDP per hour	Contribution of ICT capital per hour	Contribution of non-ICT capital per hour	Contribution of TFP
Spain	-0,36	0,17	0,09	-0,62
EU	1,37	0,42	0,48	0,46
US	1,87	0,72	0,33	0,82

Source: Timmer, Ypma, and van Ark (2003, p. 52).

Table 6. The sources of output growth in Spain.

Period	GVA growth	Contribution of labor	Contribution of ICT capital	Contribution of non-ICT capital	Contribution of human capital	Contribution of TFP
1985-2002	3,03	1,37	0,39	0,82	1,02	-0,56
1985-1995	2,85	0,93	0,35	0,85	0,48	0,25
1995-2002	3,25	2,06	0,51	0,73	1,84	-1,88

Source: Mas and Quesada (2005, p. 283), and own elaboration.

Table 7. The sources of growth for output per hour in Spain.

Period	Growth GVA per hour	Contribution of ICT capital per hour	Contribution of non-ICT capital Per hour	Contribution of human capital	Contribution of TFP
1985-2002	1,21	0,32	0,43	1,02	-0,56
1985-1995	1,60	0,31	0,56	0,48	0,25
1995-2002	0,54	0,39	0,19	1,84	-1,88

Source: Mas and Quesada (2005, p. 283), and own elaboration.

Table 8. Sources of output growth, 1986-2004.

	EU-10	US	Spain	The Basque Country	Navarre	Araba	Bizkaia	Gipuzkoa
GVA growth. (1)	2,21	2,89	3,14	2,50	3,15	2,52	2,36	2,73
Contribution of labor. (2)	0,55	1,02	1,48	1,17	1,41	1,17	0,94	1,55
Contribution of capital, Total. (3)=(4)+(7)	1,20	1,18	1,21	0,97	1,34	1,34	0,76	1,07
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,76	0,60	0,87	0,66	0,97	0,99	0,48	0,74
Contribution of capital, Public infrastructure. (5)			0,12	0,10	0,09	0,08	0,11	0,10
Contribution of capital, Other Non-ICT. (6)			0,74	0,56	0,88	0,91	0,37	0,64
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,44	0,58	0,35	0,31	0,36	0,35	0,28	0,33
Contribution of capital, Hardware. (8)			0,18	0,17	0,20	0,20	0,16	0,19
Contribution of capital, Software. (9)			0,08	0,07	0,07	0,06	0,07	0,06
Contribution of capital, Communications. (10)			0,09	0,07	0,10	0,09	0,06	0,08
Contribution of TFP. (10)=(1)-(2)-(3)	0,47	0,68	0,44	0,36	0,40	0,02	0,65	0,11

Sources: EU KLEMS database (for the EU and the US), INE, FBBVA-IVIE database and EU KLEMS database (for other territories), and own elaboration. The contribution of labor includes the impact of changes in the composition of the labor force for the EU-10 and the US.

Table 9. Sources of output growth, 1986-1995.

	EU-10	US	Spain	The Basque Country	Navarre	Araba	Bizkaia	Gipuzkoa
GVA growth. (1)	2,36	2,56	2,96	1,73	2,89	1,69	1,38	2,32
Contribution of labor. (2)	0,42	1,27	0,74	0,22	0,81	0,13	-0,06	0,71
Contribution of capital, Total. (3)=(4)+(7)	1,18	1,00	1,15	0,85	1,38	1,05	0,74	0,91
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,81	0,57	0,85	0,60	1,04	0,78	0,50	0,64
Contribution of capital, Public infrastructure. (5)			0,14	0,12	0,12	0,09	0,13	0,12
Contribution of capital, Other Non-ICT. (6)			0,71	0,47	0,92	0,69	0,37	0,52
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,37	0,44	0,30	0,26	0,34	0,28	0,24	0,27
Contribution of capital, Hardware. (8)			0,14	0,13	0,17	0,14	0,12	0,14
Contribution of capital, Software. (9)			0,08	0,07	0,09	0,06	0,07	0,07
Contribution of capital, Communications. (10)			0,08	0,05	0,09	0,07	0,05	0,06
Contribution of TFP. (10)=(1)-(2)-(3)	0,76	0,29	1,07	0,66	0,70	0,51	0,69	0,70

Sources: EU KLEMS database (for the EU and the US), INE, FBBVA-IVIE database and EU KLEMS database (for other territories), and own elaboration. The contribution of labor includes the impact of changes in the composition of the labor force for the EU-10 and the US.

Table 10. Sources of output growth, 1995-2004.

	EU-10	US	Spain	The Basque Country	Navarre	Araba	Bizkaia	Gipuzkoa
GVA growth. (1)	2,06	3,19	3,33	3,28	3,41	3,36	3,33	3,14
Contribution of labor. (2)	0,67	0,76	2,23	2,12	2,02	2,20	1,94	2,38
Contribution of capital, Total. (3)=(4)+(7)	1,22	1,35	1,28	1,10	1,29	1,63	0,78	1,23
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,71	0,63	0,88	0,73	0,91	1,21	0,46	0,84
Contribution of capital, Public infrastructure. (5)			0,11	0,08	0,07	0,07	0,08	0,07
Contribution of capital, Other Non-ICT. (6)			0,77	0,65	0,84	1,13	0,38	0,76
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,51	0,72	0,39	0,36	0,39	0,43	0,32	0,40
Contribution of capital, Hardware. (8)			0,22	0,21	0,22	0,25	0,19	0,23
Contribution of capital, Software. (9)			0,07	0,06	0,06	0,07	0,06	0,06
Contribution of capital, Communications. (10)			0,10	0,09	0,11	0,11	0,07	0,11
Contribution of TFP. (10)=(1)-(2)-(3)	0,17	1,08	-0,18	0,06	0,10	-0,48	0,61	-0,47

Sources: EU KLEMS database (for the EU and the US), INE, FBBVA-IVIE database and EU KLEMS database (for other territories), and own elaboration. The contribution of labor includes the impact of changes in the composition of the labor force for the EU-10 and the US.

Table 11. Sources of output growth, 2000-2004.

	EU-10	US	Spain	The Basque Country	Navarre	Araba	Bizkaia	Gipuzkoa
GVA growth. (1)	1,43	2,07	2,97	2,46	2,83	2,71	2,36	2,50
Contribution of labor. (2)	0,46	-0,21	2,13	1,87	1,88	1,78	1,86	1,93
Contribution of capital, Total. (3)=(4)+(7)	1,00	0,85	1,19	1,05	1,11	1,82	0,77	1,05
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,62	0,33	0,90	0,78	0,83	1,50	0,52	0,75
Contribution of capital, Public infrastructure. (5)			0,11	0,07	0,05	0,07	0,06	0,07
Contribution of capital, Other Non-ICT. (6)			0,79	0,71	0,77	1,43	0,46	0,68
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,38	0,53	0,29	0,27	0,29	0,31	0,25	0,30
Contribution of capital, Hardware. (8)			0,15	0,16	0,15	0,18	0,14	0,17
Contribution of capital, Software. (9)			0,06	0,05	0,05	0,05	0,05	0,04
Contribution of capital, Communications. (10)			0,08	0,07	0,09	0,09	0,06	0,08
Contribution of TFP. (10)=(1)-(2)-(3)	-0,03	1,43	-0,35	-0,46	-0,16	-0,88	-0,27	-0,48

Sources: EU KLEMS database (for the EU and the US), INE, FBBVA-IVIE database and EU KLEMS database (for other territories), and own elaboration. The contribution of labor includes the impact of changes in the composition of the labor force for the EU-10 and the US.

Table 12. Sources of growth for output per hour, 1986-2004.

	EU-10	US	Spain	The Basque Country	Navarre	Araba	Bizkaia	Gipuzkoa
GVA per hour growth. (1)	1,77	1,66	1,23	0,97	1,31	0,98	1,11	0,74
Contribution of labor composition per hour (2)	0,26	0,21						
Contribution of capital per hour, Total. (3)=(4)+(7)	1,05	0,77	0,79	0,61	0,92	0,96	0,46	0,63
Contribution of capital per hour, Non-ICT. (4)=(5)+(6)	0,63	0,24	0,51	0,35	0,61	0,66	0,22	0,36
Contribution of capital per hour, Public infrastructure. (5)			0,08	0,06	0,04	0,04	0,08	0,04
Contribution of capital per hour, Other Non-ICT. (6)			0,43	0,29	0,57	0,62	0,14	0,32
Contribution of capital per hour, ICT. (7)=(8)+(9)+(10)	0,42	0,53	0,28	0,26	0,30	0,30	0,24	0,27
Contribution of capital per hour, Hardware . (8)			0,16	0,16	0,17	0,18	0,15	0,17
Contribution of capital per hour, Software. (9)			0,06	0,05	0,06	0,05	0,05	0,05
Contribution of capital per hour, Communications. (10)			0,06	0,05	0,07	0,07	0,04	0,05
Contribution of TFP. (9)=(1)-(2)-(3)	0,46	0,68	0,44	0,36	0,40	0,02	0,65	0,11

Sources: EU KLEMS database (for the EU and the US), INE, FBBVA-IVIE database and EU KLEMS database (for other territories), and own elaboration. The contribution of labor composition per hour captures the impact of changes in the composition of the labor force per hour for the EU-10 and the US.

Table 13. Sources of growth for output per hour, 1986-1995.

	EU-10	US	Spain	The Basque Country	Navarre	Araba	Bizkaia	Gipuzkoa
GVA per hour growth. (1)	2,25	0,93	2,01	1,43	1,84	1,53	1,45	1,38
Contribution of labor composition per hour (2)	0,34	0,18						
Contribution of capital per hour, Total. (3)=(4)+(7)	1,14	0,47	0,94	0,78	1,14	1,02	0,75	0,69
Contribution of capital per hour, Non-ICT. (4)=(5)+(6)	0,78	0,09	0,66	0,53	0,83	0,75	0,51	0,45
Contribution of capital per hour, Public infrastructure. (5)			0,12	0,12	0,09	0,09	0,14	0,09
Contribution of capital per hour, Other Non-ICT. (6)			0,55	0,41	0,74	0,66	0,37	0,35
Contribution of capital per hour, ICT. (7)=(8)+(9)+(10)	0,37	0,38	0,28	0,25	0,31	0,27	0,24	0,24
Contribution of capital per hour, Hardware . (8)			0,13	0,13	0,16	0,14	0,13	0,13
Contribution of capital per hour, Software. (9)			0,08	0,07	0,08	0,06	0,07	0,06
Contribution of capital per hour, Communications. (10)			0,07	0,05	0,07	0,07	0,05	0,05
Contribution of TFP. (9)=(1)-(2)-(3)	0,76	0,29	1,07	0,66	0,70	0,51	0,69	0,70

Sources: EU KLEMS database (for the EU and the US), INE, FBBVA-IVIE database and EU KLEMS database (for other territories), and own elaboration. The contribution of labor composition per hour captures the impact of changes in the composition of the labor force per hour for the EU-10 and the US.

Table 14. Sources of growth for output per hour, 1995-2004.

	EU-10	US	Spain	The Basque Country	Navarre	Araba	Bizkaia	Gipuzkoa
GVA per hour growth. (1)	1,28	2,39	0,46	0,50	0,78	0,42	0,78	0,10
Contribution of labor composition per hour (2)	0,17	0,24						
Contribution of capital per hour, Total. (3)=(4)+(7)	0,96	1,07	0,64	0,44	0,69	0,90	0,17	0,57
Contribution of capital per hour, Non-ICT. (4)=(5)+(6)	0,48	0,39	0,35	0,17	0,40	0,57	-0,06	0,28
Contribution of capital per hour, Public infrastructure. (5)			0,03	0,01	0,00	-0,01	0,02	-0,01
Contribution of capital per hour, Other Non-ICT. (6)			0,32	0,16	0,40	0,58	-0,09	0,28
Contribution of capital per hour, ICT. (7)=(8)+(9)+(10)	0,47	0,69	0,29	0,27	0,29	0,32	0,23	0,30
Contribution of capital per hour, Hardware . (8)			0,19	0,18	0,19	0,21	0,17	0,20
Contribution of capital per hour, Software. (9)			0,04	0,04	0,03	0,04	0,04	0,03
Contribution of capital per hour, Communications. (10)			0,06	0,05	0,07	0,07	0,03	0,06
Contribution of TFP. (9)=(1)-(2)-(3)	0,16	1,08	-0,18	0,06	0,10	-0,48	0,61	-0,47

Sources: EU KLEMS database (for the EU and the US), INE, FBBVA-IVIE database and EU KLEMS database (for other territories), and own elaboration. The contribution of labor composition per hour captures the impact of changes in the composition of the labor force per hour for the EU-10 and the US.

Table 15. Sources of growth for output per hour, 2000-2004.

	EU-10	US	Spain	The Basque Country	Navarre	Araba	Bizkaia	Gipuzkoa
GVA per hour growth. (1)	0,99	2,78	0,23	0,04	0,39	0,33	-0,05	0,06
Contribution of labor composition per hour (2)	0,18	0,26						
Contribution of capital per hour, Total. (3)=(4)+(7)	0,85	1,09	0,58	0,51	0,55	1,22	0,22	0,53
Contribution of capital per hour, Non-ICT. (4)=(5)+(6)	0,49	0,53	0,40	0,31	0,35	0,99	0,05	0,32
Contribution of capital per hour, Public infrastructure. (5)			0,04	0,02	0,00	0,02	0,01	0,02
Contribution of capital per hour, Other Non-ICT. (6)			0,36	0,30	0,35	0,97	0,04	0,30
Contribution of capital per hour, ICT. (7)=(8)+(9)+(10)	0,36	0,56	0,19	0,19	0,20	0,23	0,16	0,21
Contribution of capital per hour, Hardware . (8)			0,13	0,13	0,13	0,15	0,12	0,14
Contribution of capital per hour, Software. (9)			0,02	0,02	0,02	0,02	0,02	0,02
Contribution of capital per hour, Communications. (10)			0,04	0,04	0,05	0,05	0,02	0,05
Contribution of TFP. (9)=(1)-(2)-(3)	-0,04	1,43	-0,35	-0,46	-0,16	-0,88	-0,27	-0,48

Sources: EU KLEMS database (for the EU and the US), INE and FBBVA-IVIE database (for other territories), and own elaboration. The contribution of labor composition per hour captures the impact of changes in the composition of the labor force per hour for the EU-10 and the US.

ANNEX

Table A1. Sources of output growth. Spain, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA growth. (1)	3,14	2,96	3,33	2,97
Contribution of labor. (2)	1,48	0,74	2,23	2,13
Contribution of capital, Total. (3)=(4)+(7)	1,21	1,15	1,28	1,19
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,87	0,85	0,88	0,90
Contribution of capital, Public infrastructure. (5)	0,12	0,14	0,11	0,11
Contribution of capital, Other Non-ICT. (6)	0,74	0,71	0,77	0,79
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,35	0,30	0,39	0,29
Contribution of capital, Hardware. (8)	0,18	0,14	0,22	0,15
Contribution of capital, Software. (9)	0,08	0,08	0,07	0,06
Contribution of capital, Communications. (10)	0,09	0,08	0,10	0,08
Contribution of TFP. (10)=(1)-(2)-(3)	0,44	1,07	-0,18	-0,35

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A2. Sources of growth for output per hour. Spain, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA per hour growth. (1)	1,23	2,01	0,46	0,23
Contribution of capital per hour, Total. (2)=(3)+(6)	0,79	0,94	0,64	0,58
Contribution of capital per hour, Non-ICT. (3)=(4)+(5)	0,51	0,66	0,35	0,40
Contribution of capital per hour, Public infrastructure. (4)	0,08	0,12	0,03	0,04
Contribution of capital per hour, Other Non-ICT. (5)	0,43	0,55	0,32	0,36
Contribution of capital per hour, ICT. (6)=(7)+(8)+(9)	0,28	0,28	0,29	0,19
Contribution of capital per hour, Hardware . (7)	0,16	0,13	0,19	0,13
Contribution of capital per hour, Software. (8)	0,06	0,08	0,04	0,02
Contribution of capital per hour, Communications. (9)	0,06	0,07	0,06	0,04
Contribution of TFP. (9)=(1)-(2)	0,44	1,07	-0,18	-0,35

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A3. Sources of output growth. The Basque Country, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA growth. (1)	2,50	1,73	3,28	2,46
Contribution of labor. (2)	1,17	0,22	2,12	1,87
Contribution of capital, Total. (3)=(4)+(7)	0,97	0,85	1,10	1,05
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,66	0,60	0,73	0,78
Contribution of capital, Public infrastructure. (5)	0,10	0,12	0,08	0,07
Contribution of capital, Other Non-ICT. (6)	0,56	0,47	0,65	0,71
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,31	0,26	0,36	0,27
Contribution of capital, Hardware. (8)	0,17	0,13	0,21	0,16
Contribution of capital, Software. (9)	0,07	0,07	0,06	0,05
Contribution of capital, Communications. (10)	0,07	0,05	0,09	0,07
Contribution of TFP. (11)=(1)-(2)-(3)	0,36	0,66	0,06	-0,46

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A4. Sources of growth for output per hour. The Basque Country, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA per hour growth. (1)	0,97	1,43	0,50	0,04
Contribution of capital per hour, Total. (2)=(3)+(6)	0,61	0,78	0,44	0,51
Contribution of capital per hour, Non-ICT. (3)=(4)+(5)	0,35	0,53	0,17	0,31
Contribution of capital per hour, Public infrastructure. (4)	0,06	0,12	0,01	0,02
Contribution of capital per hour, Other Non-ICT. (5)	0,29	0,41	0,16	0,30
Contribution of capital per hour, ICT. (6)=(7)+(8)+(9)	0,26	0,25	0,27	0,19
Contribution of capital per hour, Hardware . (7)	0,16	0,13	0,18	0,13
Contribution of capital per hour, Software. (8)	0,05	0,07	0,04	0,02
Contribution of capital per hour, Communications. (9)	0,05	0,05	0,05	0,04
Contribution of TFP. (9)=(1)-(2)	0,36	0,66	0,06	-0,46

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A5. Sources of output growth. Navarre, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA growth. (1)	3,15	2,89	3,41	2,83
Contribution of labor. (2)	1,41	0,81	2,02	1,88
Contribution of capital, Total. (3)=(4)+(7)	1,34	1,38	1,29	1,11
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,97	1,04	0,91	0,83
Contribution of capital, Public infrastructure. (5)	0,09	0,12	0,07	0,05
Contribution of capital, Other Non-ICT. (6)	0,88	0,92	0,84	0,77
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,36	0,34	0,39	0,29
Contribution of capital, Hardware. (8)	0,20	0,17	0,22	0,15
Contribution of capital, Software. (9)	0,07	0,09	0,06	0,05
Contribution of capital, Communications. (10)	0,10	0,09	0,11	0,09
Contribution of TFP. (11)=(1)-(2)-(3)	0,40	0,70	0,10	-0,16

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A6. Sources of growth for output per hour. Navarre, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA per hour growth. (1)	1,31	1,84	0,78	0,39
Contribution of capital per hour, Total. (2)=(3)+(6)	0,92	1,14	0,69	0,55
Contribution of capital per hour, Non-ICT. (3)=(4)+(5)	0,61	0,83	0,40	0,35
Contribution of capital per hour, Public infrastructure. (4)	0,04	0,09	0,00	0,00
Contribution of capital per hour, Other Non-ICT. (5)	0,57	0,74	0,40	0,35
Contribution of capital per hour, ICT. (6)=(7)+(8)+(9)	0,30	0,31	0,29	0,20
Contribution of capital per hour, Hardware . (7)	0,17	0,16	0,19	0,13
Contribution of capital per hour, Software. (8)	0,06	0,08	0,03	0,02
Contribution of capital per hour, Communications. (9)	0,07	0,07	0,07	0,05
Contribution of TFP. (9)=(1)-(2)	0,40	0,70	0,10	-0,16

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A7. Sources of economic growth. Araba, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA growth. (1)	2,52	1,69	3,36	2,71
Contribution of labor. (2)	1,17	0,13	2,20	1,78
Contribution of capital, Total. (3)=(4)+(7)	1,34	1,05	1,63	1,82
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,99	0,78	1,21	1,50
Contribution of capital, Public infrastructure. (5)	0,08	0,09	0,07	0,07
Contribution of capital, Other Non-ICT. (6)	0,91	0,69	1,13	1,43
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,35	0,28	0,43	0,31
Contribution of capital, Hardware. (8)	0,20	0,14	0,25	0,18
Contribution of capital, Software. (9)	0,06	0,06	0,07	0,05
Contribution of capital, Communications. (10)	0,09	0,07	0,11	0,09
Contribution of TFP. (11)=(1)-(2)-(3)	0,02	0,51	-0,48	-0,88

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A8. Sources of growth for output per hour. Araba, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA per hour growth. (1)	0,98	1,53	0,42	0,33
Contribution of capital per hour, Total. (2)=(3)+(6)	0,96	1,02	0,90	1,22
Contribution of capital per hour, Non-ICT. (3)=(4)+(5)	0,66	0,75	0,57	0,99
Contribution of capital per hour, Public infrastructure. (4)	0,04	0,09	-0,01	0,02
Contribution of capital per hour, Other Non-ICT. (5)	0,62	0,66	0,58	0,97
Contribution of capital per hour, ICT. (6)=(7)+(8)+(9)	0,30	0,27	0,32	0,23
Contribution of capital per hour, Hardware . (7)	0,18	0,14	0,21	0,15
Contribution of capital per hour, Software. (8)	0,05	0,06	0,04	0,02
Contribution of capital per hour, Communications. (9)	0,07	0,07	0,07	0,05
Contribution of TFP. (9)=(1)-(2)	0,02	0,51	-0,48	-0,88

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A9. Sources of output growth. Bizkaia, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA growth. (1)	2,36	1,38	3,33	2,36
Contribution of labor. (2)	0,94	-0,06	1,94	1,86
Contribution of capital, Total. (3)=(4)+(7)	0,76	0,74	0,78	0,77
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,48	0,50	0,46	0,52
Contribution of capital, Public infrastructure. (5)	0,11	0,13	0,08	0,06
Contribution of capital, Other Non-ICT. (6)	0,37	0,37	0,38	0,46
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,28	0,24	0,32	0,25
Contribution of capital, Hardware. (8)	0,16	0,12	0,19	0,14
Contribution of capital, Software. (9)	0,07	0,07	0,06	0,05
Contribution of capital, Communications. (10)	0,06	0,05	0,07	0,06
Contribution of TFP. (11)=(1)-(2)-(3)	0,65	0,69	0,61	-0,27

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A10. Sources of growth for output per hour. Bizkaia, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA per hour growth. (1)	1,11	1,45	0,78	-0,05
Contribution of capital per hour, Total. (2)=(3)+(6)	0,46	0,75	0,17	0,22
Contribution of capital per hour, Non-ICT. (3)=(4)+(5)	0,22	0,51	-0,06	0,05
Contribution of capital per hour, Public infrastructure. (4)	0,08	0,14	0,02	0,01
Contribution of capital per hour, Other Non-ICT. (5)	0,14	0,37	-0,09	0,04
Contribution of capital per hour, ICT. (6)=(7)+(8)+(9)	0,24	0,24	0,23	0,16
Contribution of capital per hour, Hardware . (7)	0,15	0,13	0,17	0,12
Contribution of capital per hour, Software. (8)	0,05	0,07	0,04	0,02
Contribution of capital per hour, Communications. (9)	0,04	0,05	0,03	0,02
Contribution of TFP. (9)=(1)-(2)	0,65	0,69	0,61	-0,27

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A11. Sources of output growth. Gipuzkoa, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA growth. (1)	2,73	2,32	3,14	2,50
Contribution of labor. (2)	1,55	0,71	2,38	1,93
Contribution of capital, Total. (3)=(4)+(7)	1,07	0,91	1,23	1,05
Contribution of capital, Non-ICT. (4)=(5)+(6)	0,74	0,64	0,84	0,75
Contribution of capital, Public infrastructure. (5)	0,10	0,12	0,07	0,07
Contribution of capital, Other Non-ICT. (6)	0,64	0,52	0,76	0,68
Contribution of capital, ICT. (7)=(8)+(9)+(10)	0,33	0,27	0,40	0,30
Contribution of capital, Hardware. (8)	0,19	0,14	0,23	0,17
Contribution of capital, Software. (9)	0,06	0,07	0,06	0,04
Contribution of capital, Communications. (10)	0,08	0,06	0,11	0,08
Contribution of TFP. (11)=(1)-(2)-(3)	0,11	0,70	-0,47	-0,48

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

Table A12. Sources of growth for output per hour. Gipuzkoa, 1986-2004.

	1986-2004	1986-1995	1995-2004	2000-2004
GVA per hour growth. (1)	0,74	1,38	0,10	0,06
Contribution of capital per hour, Total. (2)=(3)+(6)	0,63	0,69	0,57	0,53
Contribution of capital per hour, Non-ICT. (3)=(4)+(5)	0,36	0,45	0,28	0,32
Contribution of capital per hour, Public infrastructure. (4)	0,04	0,09	-0,01	0,02
Contribution of capital per hour, Other Non-ICT. (5)	0,32	0,35	0,28	0,30
Contribution of capital per hour, ICT. (6)=(7)+(8)+(9)	0,27	0,24	0,30	0,21
Contribution of capital per hour, Hardware . (7)	0,17	0,13	0,20	0,14
Contribution of capital per hour, Software. (8)	0,05	0,06	0,03	0,02
Contribution of capital per hour, Communications. (9)	0,05	0,05	0,06	0,05
Contribution of TFP. (9)=(1)-(2)	0,11	0,70	-0,47	-0,48

Sources: INE, FBBVA-IVIE, EU KLEMS database, and own elaboration.

O R K E S T R A

Instituto Vasco de Competitividad – Fundación Deusto

Mundaiz, 50
20012 Donostia – San Sebastián
t.(+34) 943297327
f. (+34) 943279323

Instituto Vasco de Competitividad
Fundación Deusto
Lehiakortasunerako Euskal Institutua
Deustu Fundazioa

www.orkestra.deusto.es