# Growth and Productivity in Belgium

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**Abstract**

The objective of this report is to provide an overview of the main drivers of economic growth and productivity evolution in Belgium between 1970 and 2004, based on a consistent data set. The growth accounting methodology is applied to explain value added and labour productivity growth for total economy, manufacturing and market services. This decomposition exercise diverges from what has been applied in Belgium up to now, as it uses capital services flows rather than capital stock to measure the contribution of capital factor to production growth. Contributions of the main industries to value added, employment and productivity growth are also estimated.

**Jel Classification** – O11, O33, O40, O47

**Keywords** – growth accounting, growth contribution, productivity, MFP, ICT

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## Table of Contents

## Introduction

The report on growth and productivity in Belgium has been developed from the database created by the Federal Planning Bureau for the EUKLEMS project. The aim of this international project, funded by the European Commission as a part of the 6th Framework Programme, is to study productivity in the European Union at the industry level. In order to be able to perform such analyses, a database of measures of economic growth, productivity, employment creation, capital formation and technological change at the industry level has been created for European Union Member States from 1970 onwards. This dataset is fully compatible with the most recent National Accounts statistics. This dataset also represents methodological progress as it contains the index of capital services in addition to capital stocks allowing a better measure of the contribution of capital factor to production.

The objective of this report consists is to provide an overview of the main drivers of economic growth and productivity evolution in Belgium between 1970 and 2004, based on this consistent data set.

After commenting on evolutions for the total economy, the report successively examines manufacturing, market services, non-market services and other industries.

It has to be noted that GDP is defined in this report as the sum of values added. This definition corresponds to GDP at basic prices.

# 1. Total economy

**Table 1 Summary of main findings**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| **Value added per capita** | 3.4 | 1.8 | 1.5 | 1.2 |
| - VA per hour worked | 4.7 | 2.2 | 1.3 | 1.3 |
| - Hours worked per capita | -1.3 | -0.4 | 0.2 | -0.1 |
| - Hours worked per worker | -1.3 | -0.5 | -0.1 | -0.2 |
| - Employment rate | -0.4 | -0.1 | 0.5 | 0.1 |
| - Working age population on population | 0.4 | 0.3 | -0.2 | 0.0 |
| **Value added** | 3.6 | 1.9 | 1.7 | 1.6 |
| - Labour contribution | -0.7 | -0.2 | 0.3 | 0.2 |
| - ICT capital contribution | 0.6 | 0.7 | 0.7 | 0.6 |
| - NICT capital contribution | 0.9 | 0.4 | 0.6 | 0.6 |
| - MFP | 2.8 | 1.0 | 0.1 | 0.2 |
| **Value added per hour worked** | 4.7 | 2.2 | 1.3 | 1.3 |
| - ICT capital deepening | 0.6 | 0.7 | 0.6 | 0.6 |
| - NICT capital deepening | 1.2 | 0.5 | 0.5 | 0.5 |
| **Value added** | 3.6 | 1.9 | 1.7 | 1.6 |
| - Manufacturing contribution | 0.8 | 0.6 | 0.2 | 0.1 |
| - Market services contribution | 1.5 | 1.1 | 1.0 | 1.2 |
| - Non-market services contribution | 1.1 | 0.3 | 0.3 | 0.3 |
| - Other industries contribution | 0.3 | 0.0 | 0.2 | 0.0 |
| **Hours worked** | -1.1 | -0.3 | 0.5 | 0.3 |
| - Manufacturing contribution | -1.0 | -0.4 | -0.4 | -0.4 |
| - Market services contribution | 0.0 | 0.3 | 0.7 | 0.4 |
| - Non-market services contribution | 0.4 | 0.1 | 0.3 | 0.4 |
| - Other industries contribution | -0.5 | -0.3 | -0.1 | -0.1 |
| **Value added per hour worked** | 4.7 | 2.2 | 1.3 | 1.3 |
| - Manufacturing contribution | 2.0 | 1.2 | 0.7 | 0.5 |
| - Market services contribution | 1.2 | 0.7 | 0.3 | 0.8 |
| - Non-market services contribution | 0.5 | 0.1 | 0.0 | -0.1 |
| - Other industries contribution | 0.7 | 0.2 | 0.3 | 0.1 |

### *1.1 Growth of GDP per capita*

Growth of GDP per capita is one of the most frequently used indicators of economic performance, providing an easily understandable picture of the evolution of the standard of living. However, this indicator is far from giving a complete view of changes in the welfare of an economy. Its main shortcomings are that this indicator does not take into account the degree of inequality of income distribution, the use of non-renewable resources, various aspects of the quality of life, etc. However, as this indicator is generally rapidly available for most industrialised countries, it is widely used in international comparisons. The evolution of GDP per capita is mainly driven by output growth in countries with a quasi constant population such as Belgium. Output growth can result from an increase in hours worked and/or from an increase in the productivity of those hours worked. Therefore, the growth of this indicator can be decomposed into the growth of hours worked per person (which gives an indication of the evolution of the labour utilisation) and value added growth per hour worked (which illustrates the evolution of the labour productivity).

The long term series allows light to be shed on the declining trend of GDP per capita growth. During the seventies, the average annual growth rate of GDP per capita reached 3.4%, decreasing to 1.8% during the eighties before reaching 1.5% in the nineties. Since 2000, GDP per capita has been growing even more slowly at an annual rate of 1.2%. This evolution is also observable in the neighbouring countries such as France, The Netherlands and Germany. The slowness of GDP per capita growth in the European Union on average is the main justification for the adoption of the Lisbon Strategy.

Growth in labour utilisation, strongly negative during the seventies and the first half of the eighties, has turned positive since the end of the eighties. Using the annual average rate, labour utilisation decreased by 1.3% during the seventies and by 0.4% during the eighties. Growth was slightly positive during the nineties with an annual average rate of 0.2%. The largest increase in labour utilisation was recorded during the second half of the nineties. Since 2000, labour utilisation has been slightly decreasing at an annual average rate of 0.1%.

Over the whole period 1970-2004, labour productivity growth was positive but at a decreasing rate. During the seventies, annual average growth of labour productivity reached 4.7% declining to 2.2% during the eighties and to 1.3% during the nineties. However, between 2000 and 2004, labour productivity again increased at an annual average rate of 1.3%, leading to a stabilisation of the trend.

Identifying the factors explaining the evolution of these two components of the growth of standards of living is the objective of the following sections.

Data information: GDP at basic prices is defined as the sum of values added at constant prices (base year = 2000). Hours worked are estimated for the whole economy based on the assumption that self-employed persons work on average the same number of hours as employees expressed in full-time equivalents.

**Figure 1** **GDP per capita**
*annual growth rate in percent*

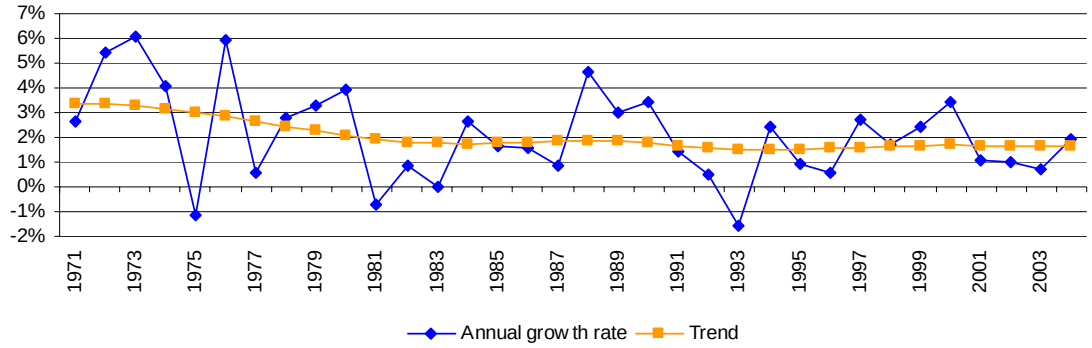



**Figure 2** **Labour utilisation: total hours worked on population**
*annual growth rate in percent*

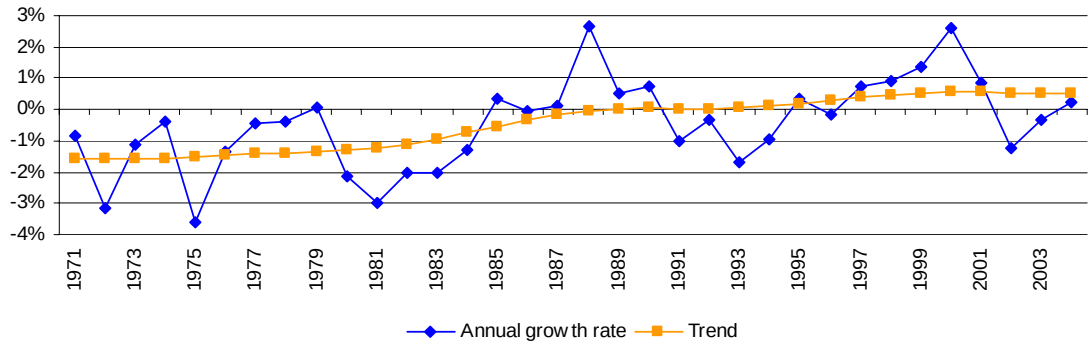
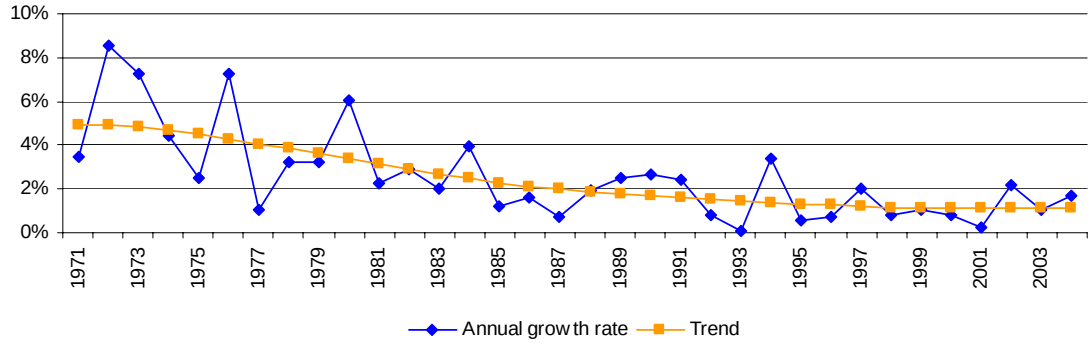



**Figure 3** **GDP per hour worked**
*annual growth rate in percent*



### *1.2 Labour utilisation*

Labour utilisation, i.e. total hours worked divided by the population, is an important factor of growth as labour is one of the most important factors of production. To understand its evolution, it is helpful to decompose this indicator into more familiar elements. This has been done by considering the decomposition of labour utilisation into three factors: firstly, annual hours worked per worker defined as total hours worked divided by the total number of employed workers; secondly, the employment rate defined as the total number of employed workers divided by the working age population and, finally, the share of working age population in total population.

$$\frac{Hours}{Population} = \frac{Hours}{Employd\ workers} \times \frac{Employed\ workers}{Working\ age\ population} \times \frac{Working\ age\ population}{Population}$$

The decrease in labour utilisation between 1970 and 1984 can be explained by a rapid decline in the employment rate from 61.2% in 1970 to 54.8% in 1984 and in the annual hours worked per worker (-15.6%). These negative evolutions were only partly compensated for by an increase in the share of the working age population in the total population, which reached its peak in 1985 at 67.4%.

Since the mid-eighties, labour utilisation has slowly increased under the effect of the rapid growth of the employment rate which reached its peak in 2001 at 61.7% before stabilising around this value. Although this evolution clearly goes in the right direction, the Belgian performance is still far from the Lisbon objective of an employment rate reaching 70% in 2010.

The evolution of annual hours worked per worker influenced slightly negatively labour utilisation from the mid-eighties before becoming neutral since 1996.

Between 1986 and 2001, the share of the working age population in the total population declined due to the rapid increase in the share of persons older than 64 in the total population. Since 2001, the share of the working age population in the total population has been stable at around 65.6%.

Data information: hours worked are estimated for the whole economy based on the assumption that self-employed persons work on average the same number of hours as employees expressed in full time equivalents. The working age population is defined as the population aged between 15 and 64 years.

**Figure 4 Labour utilisation: total yearly hours worked per capita**

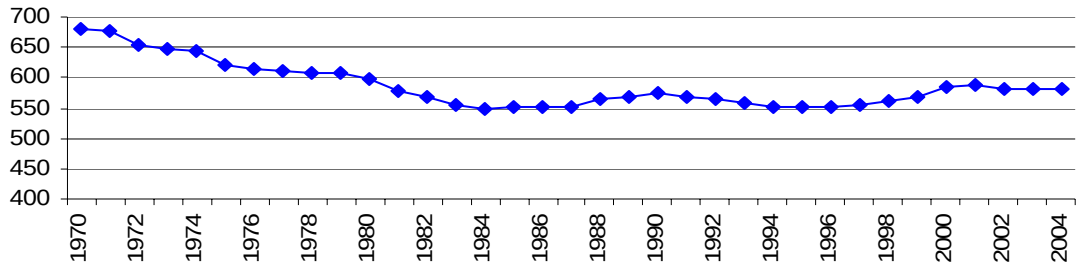



**Figure 5 Annual hours worked per worker**

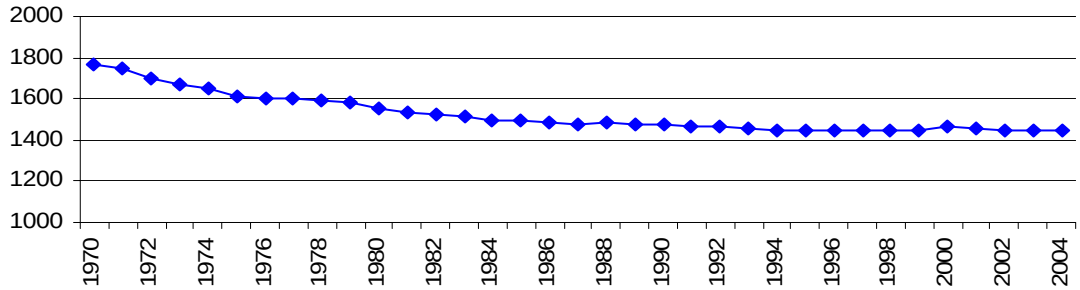



**Figure 6 Employment rate: workers on working age population**

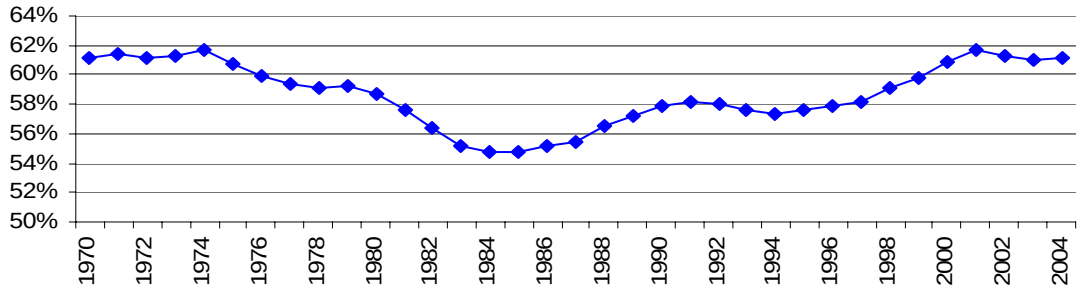
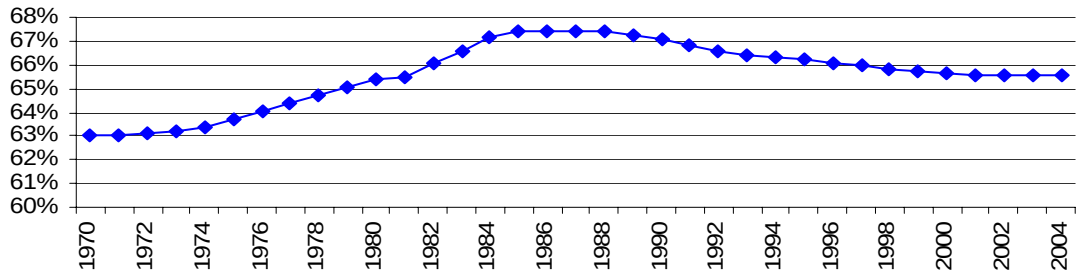



**Figure 7 Working age population on total population**



### *1.3 Labour productivity*

Even if labour utilisation remains unchanged, economic growth can be generated by an increase in labour productivity. The evolution of labour productivity is therefore also a crucial concept in the analysis of growth determinants. Labour productivity is obtained by dividing real GDP by the quantity of labour input used in the production process. However, this labour input can be measured in different ways. The most frequently used measures are the total number of hours worked and the total number of employed persons. After smoothing out cyclical effects using a Hodrick-Prescott filter, the difference in these two measures reflects the evolution of the average duration of work per employee.

The gap between the two labour productivity trends has increased particularly during the seventies and the eighties, indicating a decrease in the average working hours per employee. This is due to a decrease in the monthly contractual number of hours worked per person and to an increase in part-time employment.

Both measures show the same long-term trend: a slowdown in labour productivity growth. However, during the most recent period, 2000-2004, this negative evolution was reversed for the productivity based on hours worked. This is not the case for the productivity measure based on the number of persons. For the rest of the analysis, labour productivity is based on hours worked.

Explaining these evolutions of labour productivity is therefore an important step towards better understanding of the origins of economic growth. The growth accounting model developed by Solow allows, under various assumptions (see annex), to go further into the decomposition of GDP growth and of labour productivity growth.

Data information: hours worked are estimated for the whole economy based on the assumption that self-employed persons work the same number of hours as employees, expressed in full-time equivalents. Labour productivity measured per person is calculated by dividing value added at constant prices by domestic employment, i.e. the number of occupied persons.

**Figure 8** **Trend of labour productivity index**
*HP filter, 1970 = 100*

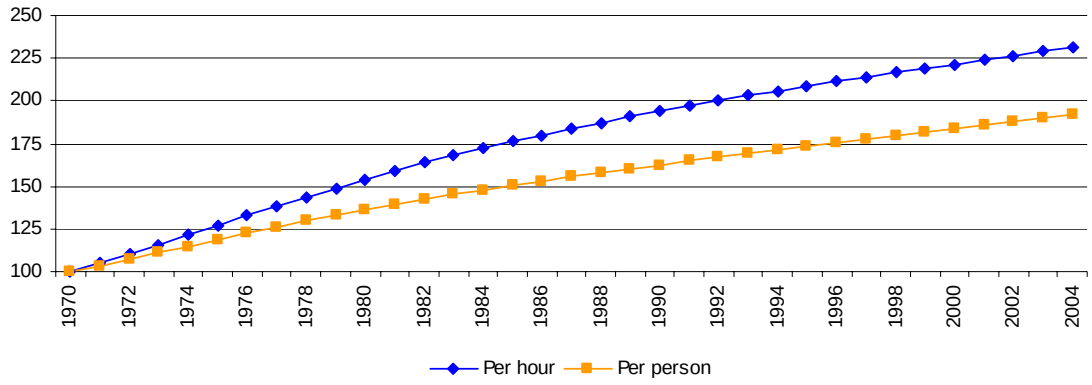



**Figure 9** **Average annual growth rate of labour productivity**
*in percent*

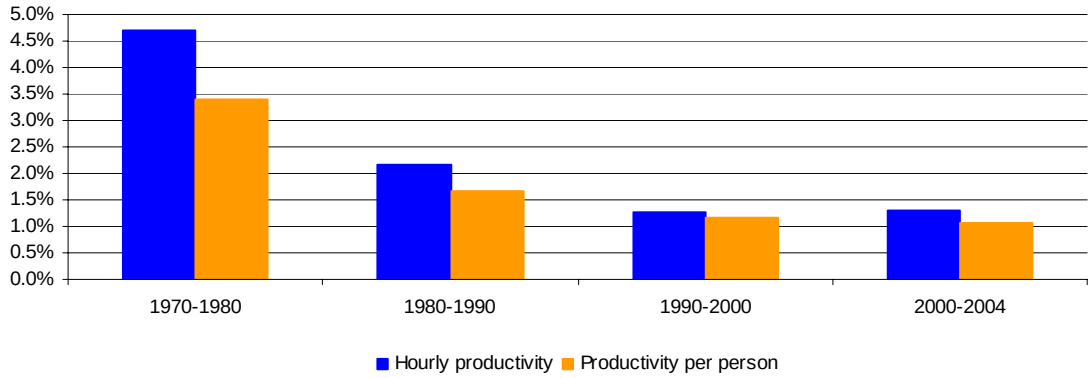



**Table 2** **Average annual growth rate of labour productivity**
*in percent*

| | 70-75 | 75-80 | 80-85 | 85-90 | 90-95 | 95-00 | 00-04 |
|---|---|---|---|---|---|---|---|
| Hourly productivity | 5.2 | 4.2 | 2.5 | 1.9 | 1.5 | 1.1 | 1.3 |
| Productivity per person | 3.3 | 3.5 | 1.7 | 1.7 | 1.1 | 1.3 | 1.1 |

### *1.4 GDP growth decomposition*

The growth accounting model allows GDP growth to be broken down into the contributions of labour, capital and multi-factor productivity (MFP). This last component measures the evolution of the overall efficiency of how the factors of production, i.e. labour and capital, are used together in the economy. As, in this decomposition, capital services are used instead of capital stocks, the quality improvements of capital, i.e. the efficiency gains, are included in capital contribution rather than in MFP[2].

The global picture given by the average contribution calculated by decade shows that the contributions of labour and MFP follow opposite trends. The average labour contribution was negative during the seventies and the eighties before becoming positive for the rest of the period while MFP, after a strong average contribution to growth in the seventies (2.8%), contributed a rapidly decreasing part to GDP growth in the following periods. The contribution of capital was more constant, reaching more than 1% in each decade. This contribution is divided into the ICT capital contribution and the non-ICT capital contribution. Since 1995, on annual average, the contribution of ICT capital has been larger than the contribution of non-ICT capital, indicating the growing penetration of these new technologies inside the economy.

The evolution of the respective contributions of capital, labour and MFP depends crucially on the share of the two factors of production in value added as this share is used as a weight in the contribution estimates. According to the growth accounting model, perfect competition guarantees the absence of economic profit. Therefore, value added is totally allocated to labour and capital. As consequence, the sum of the shares of capital and labour compensations in value added equals one. Fluctuations of the shares of factor compensation in value added were wider at the beginning of the period than after 1990. The share of labour compensation increased rapidly between 1970 and 1981 from 61.5% to 68.2% before decreasing to 63.1% in 1989. Since 1992, this share has continued to fluctuate but has stayed between 65% and 66%.

The same picture of MFP contribution is given by the filtered data allowing identification of trends in MFP evolution by taking out some cyclical effects, mainly the impact of labour hoarding. The trend of MFP was declining until 2000 and has stabilised since then.

Data information: the contribution of labour is the increase in hours worked weighted by the labour share measured as total labour compensation in nominal value added; the contribution of capital is the increase in the volume index of capital services weighted by the capital share measured as capital compensation, including compensation for the capital of self-employed persons, in nominal value added. The growth of the aggregate volume index of capital services is obtained by weighting the growth of the real productive capital stock of each type of asset (9) by the share of the asset in the total value of capital services. The productive capital stock of each asset is obtained by the perpetual inventory method with a geometric rate of depreciation. MFP is the residual component of GDP growth after removing both the labour and the capital contributions.

[2] An estimation of these efficiency gains are given in table 27 in the annex.

**Figure 10** **GDP growth**
*average annual growth rate in percent*

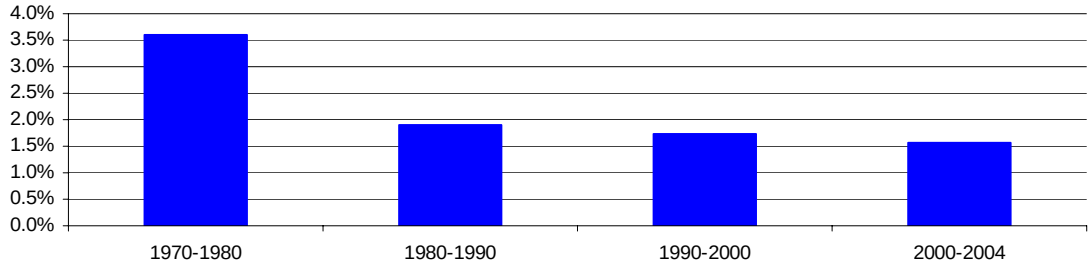



**Figure 11** **Contribution to GDP growth**

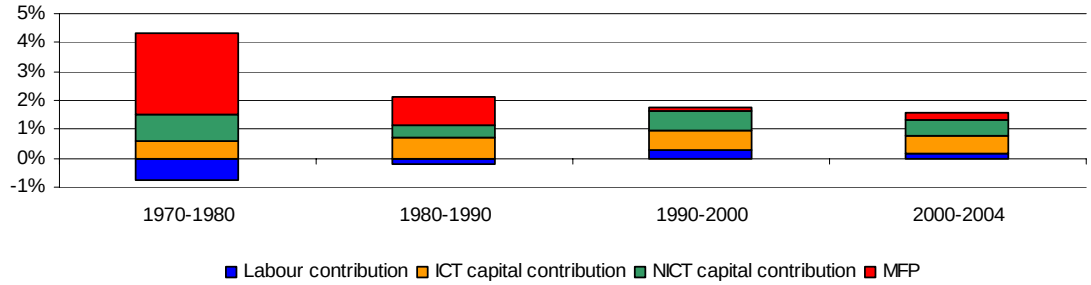



**Figure 12** **Share of labour compensation in value added**

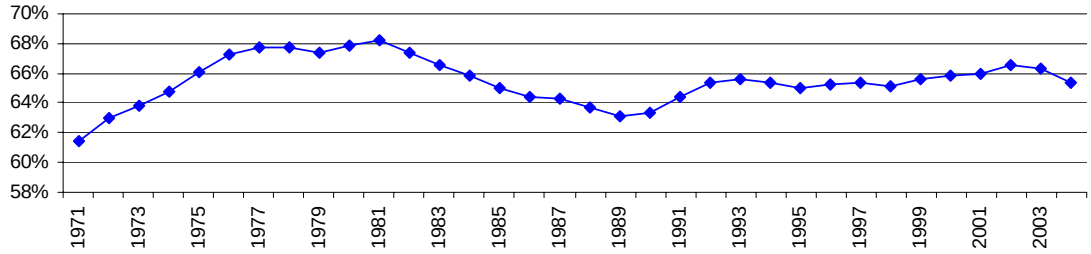
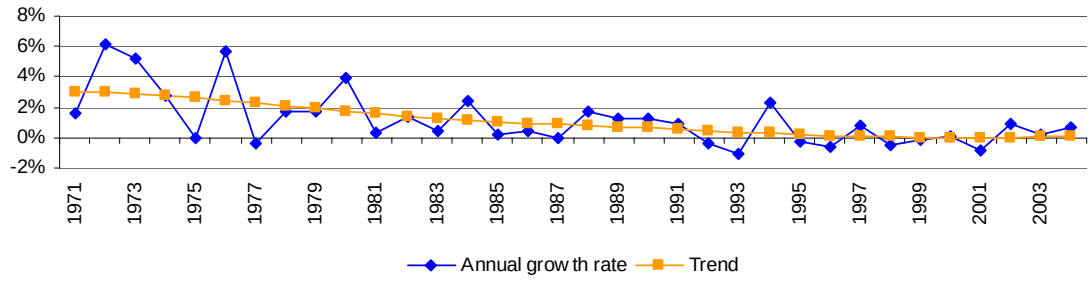



**Figure 13** **Evolution of MFP**
*annual growth rate in percent*



### *1.5 Decomposition of labour productivity growth*

Using the same growth accounting model and rearranging the terms allows labour productivity growth to be broken down into two components: capital deepening, which covers the effect of an increase in labour productivity driven by increases in the quantity, and/or the quality of capital for a constant amount of labour and MFP, as already explained.

Capital deepening is mainly caused by rationalisation investment by which enterprises replace labour by capital in the combination of production in function of the evolution of the relative costs of production factors.

Since the beginning of the seventies, the slowdown of labour productivity growth has been due to both components: a deceleration of capital deepening and of MFP. However, the slowdown of MFP has been much more pronounced than that of capital deepening. Since the beginning of the nineties, on annual average, capital deepening has even been relatively stable and has been responsible for around 1% of labour productivity growth.

This evolution of capital deepening is to a large extent influenced by the evolution of relative prices of production factors. The relative price of labour increased rapidly during the seventies, leading to rationalisation investment, before stabilising during the eighties and then increasing again from the beginning of the nineties, although at a much slower rate.

Since the eighties, ICT capital deepening has been higher than non-ICT capital deepening, indicating the positive effect of these technologies on labour productivity. However, the difference between these two types of capital deepening has been declining.

Data information: labour productivity is defined as value added at constant prices divided by the total number of hours worked. The contribution of capital deepening is the increase in the ratio of capital to hours worked weighted by the capital share measured as total capital compensation, including compensation for the capital of self-employed persons in nominal value added. MFP is the residual component from the growth decomposition. The relative prices of factors are defined as the ratio between labour price calculated as labour compensation divided by hours worked and capital price calculated as capital compensation divided by real productive capital stock.

**Figure 14 Labour productivity growth**
*average annual growth rate in percent*

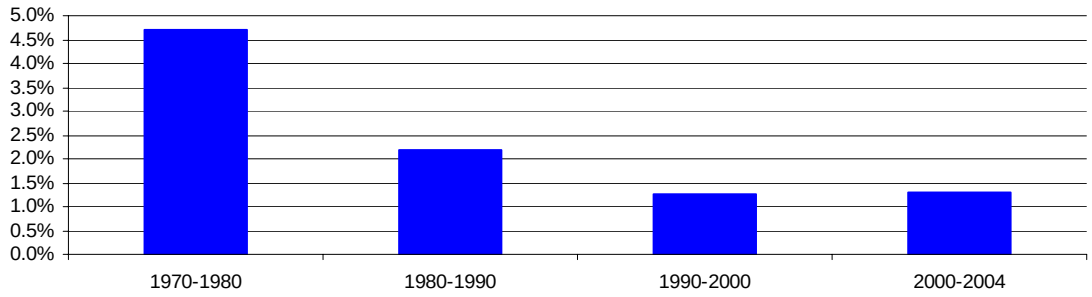



**Figure 15 Contribution to labour productivity growth**

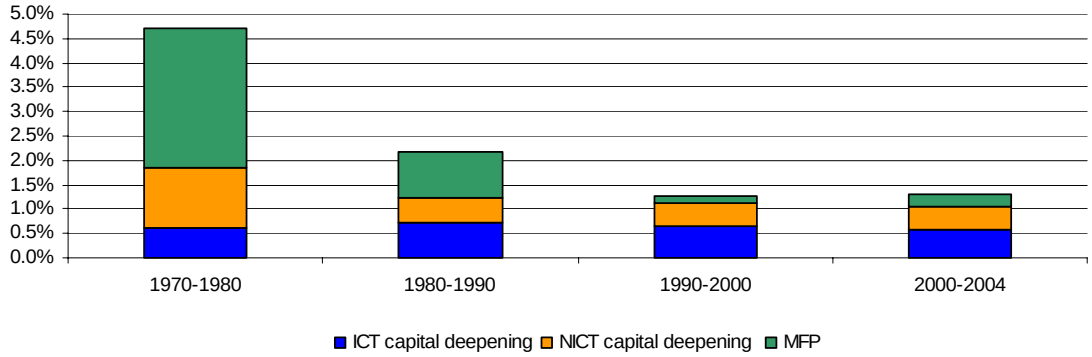
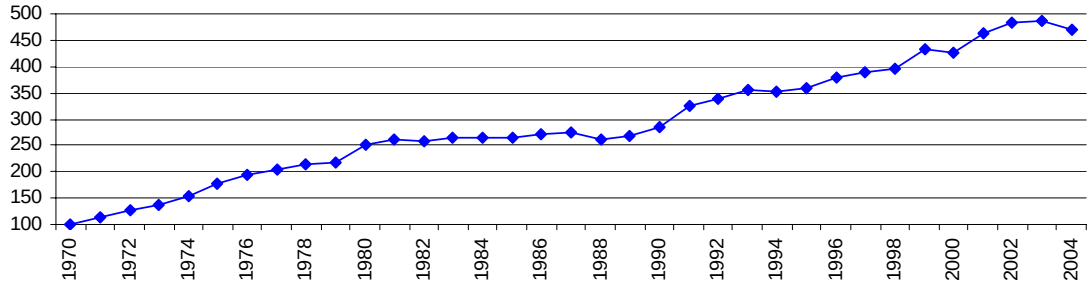



**Figure 16 Relative factor prices**
*labour prices on capital prices indices: 1970 = 100*



### *1.6 Capital productivity and ICT capital*

While labour productivity is the most commonly used productivity measure, capital productivity measured as value added divided by the volume index of capital services provides additional information on productivity evolution. Capital productivity is a physical measure of the value added created per unit of capital. Like other productivity measures, capital productivity varies considerably with the business cycle as no adjustments are made for variations in the rate of capacity utilisation.

Two important drivers shape capital productivity: MFP and the amount of labour input per unit of capital, which is the inverse of capital deepening. The fewer hours worked are available per unit of capital, the lower capital productivity will be. The evolution of the relative cost of inputs, characterised by the decrease of the cost of using capital relative to labour, led to a decline of labour input per capital input as well as the observed fall in capital productivity growth. This evolution was reinforced by the already illustrated declining trend of MFP for most of the time.

The index of capital services is derived by aggregating the productive capital stocks of each type of asset with the user costs of capital as weights. User costs reflect the amount that would be billed on a well functioning market for the renting of an asset for one period. Figure 18 illustrates the impact of the utilisation of user costs as weights instead of market prices (of new assets), usually used to construct a volume index on the basis of net stocks published in the National Accounts. In both cases, stocks are productive capital stocks. Figure 18 shows that the volume index of capital services grows more rapidly when user costs are used as weights. This stronger increase is mainly explained by the larger weights given to ICT assets which recorded a high growth over the considered period.

Among all kinds of capital, ICT capital is particularly important in the development of innovation and productivity. It is an indicator of the penetration of new technologies. The share of ICT in the total value of capital services dramatically increased over the whole period. This share moved up from 4.9% in 1970 to 12.8% in 2004. However, if market price of new assets is used to estimate the value of capital services, instead of the recommended rental price/user cost of capital, a different picture emerges. The relative importance of ICT becomes much lower than its share in the value of capital services. In this case, the ICT share rapidly increased from the mid-eighties until 2001. Since then, it has slightly decreased and in 2004, the share of ICT capital reached 3.3%.

Data information: capital productivity growth is defined as value added growth at constant prices divided by the growth of the volume index of capital services. The share of ICT in total value of capital services is defined as the ratio between the value of ICT capital services and the overall value of capital services. The value of capital services corresponds to the product of the rental price/user cost of capital and the real productive capital stock. In the ratio called ICT share in nominal productive capital stock, the rental price/user cost of the asset is replaced by the market price of the corresponding new asset. The market price of new assets is the measure used to estimate the traditional nominal net capital stock in the National Accounts.

**Figure 17 Capital productivity**
*average annual growth rate in percent*

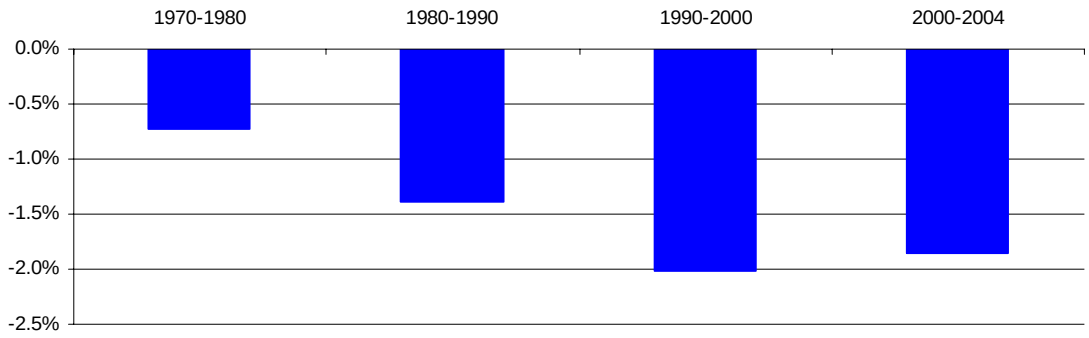



**Figure 18 Growth of the volume index of capital services – user costs versus market prices as weights**
*indices: 1970 = 100*

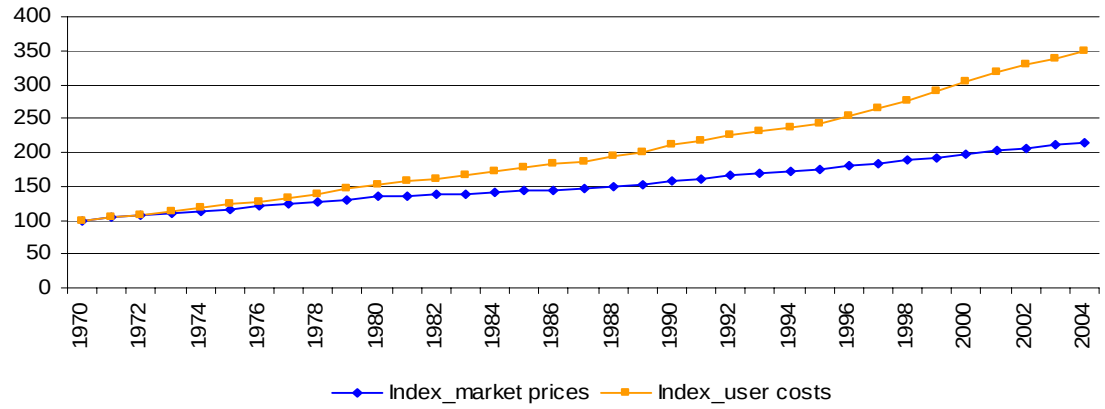
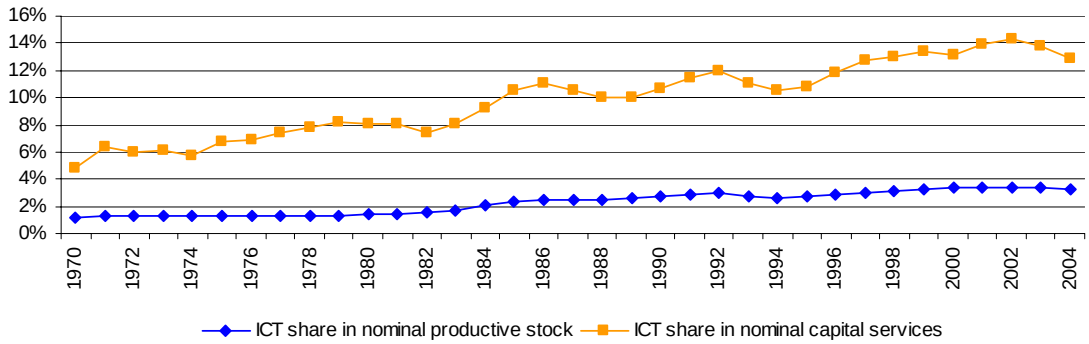



**Figure 19 Relative importance of ICT capital**



### *1.7 Structural changes in activities*

Growth and productivity evolutions are also the result of changes in the structure of the economy. Between 1970 and 2004, activities generating value added and employment growth changed. To identify these evolutions, four large industries have been defined: manufacturing, market services, non-market services and other activities including agriculture, construction and energy.

The share of these industries in real value added has been relatively constant for non-market services, with a share of 22.9% in 1970 and of 22.4% in 2004, and for manufacturing, for which the share slightly increased from 17.8% in 1970 to 18.5% in 2004. Market services recorded a more pronounced increase in their relative importance, from 47.5% in 1970 to 50.5% in 2004, as opposed to the share of other activities, which decreased at the beginning of the eighties before stabilising at about 8.5%.

Evolutions are more visible in terms of shares in employment, measured in hours worked. Manufacturing and services, both market and non-market, followed opposite trends: the share of manufacturing in total hours worked decreased from 32.1% in 1970 to 15.7% in 2004 while the share of market and non-market services increased rapidly, from 31.6 to 44.1% and from 20.4% to 31.4%, respectively. Other activities accounted for a decreasing share of hours worked, from 15.8% in 1970 to 8.8% in 2004.

The combination of these evolutions gives labour productivity developments. As expected, manufacturing and other activities always recorded an increase in labour productivity higher than that of the total economy. On the contrary, labour productivity growth of services, both market and non-market, was always weaker than labour productivity growth of total economy, except for market services, during the last period 2000-2004.

These labour productivity gains can be used by an industry to improve its relative prices by increasing prices more slowly than the rest of the economy, and/or to increase labour compensation by increasing wages faster than the rest of the economy. Large productivity increases have been used by manufacturing to improve its price competitiveness and also to grant labour compensation increases higher than those observed, on average, in the total economy[3]. By contrast, productivity gains in other industries led to an improvement in relative prices but often jointly with improvements in the labour cost competitiveness of these activities. Market services recorded deterioration of their relative prices, with prices in these industries increasing faster than prices in the total economy: during the eighties, labour compensation per hour worked also increased faster in these industries than in the total economy. However, since 1990, labour costs of market services increased at a slower pace than labour costs in the total economy.

3 It has to be noted that labour qualifications have increased over the period. In absence of labour market rigidities, this evolution explains increases in labour compensation.

**Table 3** **Structural changes**
*average annual growth rate in percent*

| Indicators | Period | Total | Manufacturing | Market services | Non-market services | Others |
|---|---|---|---|---|---|---|
| Real value added | 1970-1980 | 3.6 | 4.0 | 3.2 | 4.6 | 2.6 |
| | 1980-1990 | 1.9 | 2.8 | 2.3 | 1.1 | 0.1 |
| | 1990-2000 | 1.7 | 1.2 | 2.1 | 1.4 | 2.0 |
| | 2000-2004 | 1.6 | 0.5 | 2.3 | 1.3 | 0.2 |
| Hours worked | 1970-1980 | -1.1 | -3.4 | -0.1 | 1.5 | -3.1 |
| | 1980-1990 | -0.3 | -1.8 | 0.7 | 0.5 | -2.2 |
| | 1990-2000 | 0.5 | -1.9 | 1.6 | 1.0 | -1.0 |
| | 2000-2004 | 0.3 | -2.3 | 0.8 | 1.2 | -1.1 |
| Productivity | 1970-1980 | 4.7 | 7.4 | 3.3 | 3.1 | 5.7 |
| | 1980-1990 | 2.2 | 4.6 | 1.6 | 0.6 | 2.3 |
| | 1990-2000 | 1.3 | 3.1 | 0.5 | 0.4 | 3.0 |
| | 2000-2004 | 1.3 | 2.8 | 1.5 | 0.1 | 1.3 |
| Relative prices | 1970-1980 | | -2.9 | 1.0 | 2.1 | -0.4 |
| | 1980-1990 | | -1.1 | 1.3 | -0.4 | -1.3 |
| | 1990-2000 | | -1.1 | 0.5 | 0.9 | -2.0 |
| | 2000-2004 | | -1.6 | 0.2 | 1.2 | -1.2 |
| Relative labour costs | 1970-1980 | | 0.0 | -0.3 | -0.3 | 0.1 |
| | 1980-1990 | | 1.2 | 0.1 | -0.9 | -0.9 |
| | 1990-2000 | | 0.4 | -0.4 | 0.3 | 0.1 |
| | 2000-2004 | | 0.4 | -0.2 | 0.1 | -0.2 |

**Figure 20** **Share in real value added**
*in percent*

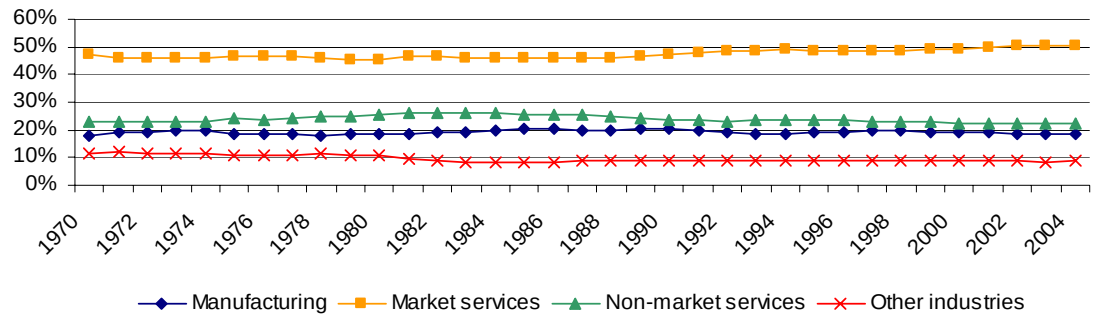
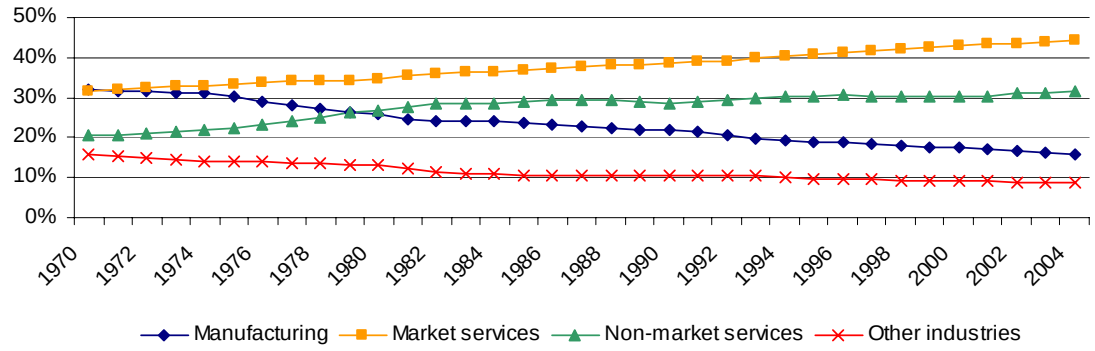



**Figure 21** **Share in hours worked**
*in percent*

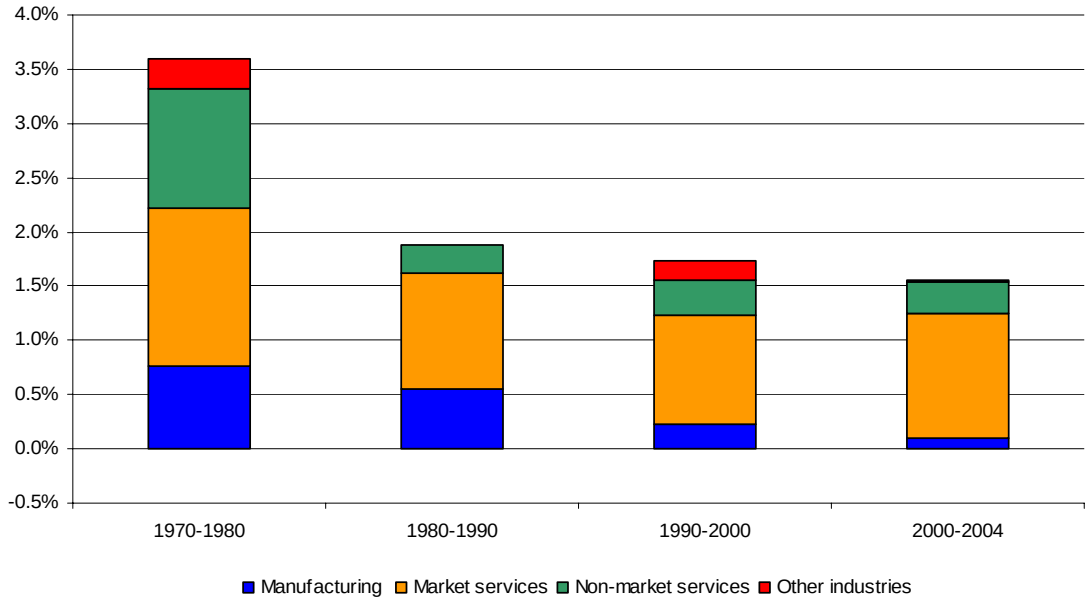


### *1.8 Industry contribution to total value added growth*

To find out which industries were important for total value added growth, a traditional decomposition technique was used. Figure 22 shows that the contribution of manufacturing to aggregate value added growth has experienced a strong reduction over the last twenty years. As such, the contribution of manufacturing became almost negligible in the period 2000-2004. By contrast, an increasing part of aggregate value added growth came from market services. In the most recent period, market services alone accounted for almost 70% of total value added growth. The contribution of other industries, representing less then 10% of total value added, was very limited compared to manufacturing or market services and showed a decreasing evolution over the whole period. In the most recent period, non-market services became the second most important contributor to value added growth. After a sharp deterioration during the eighties, the absolute contribution of non-market services to total value added growth remained almost constant from the nineties onwards.

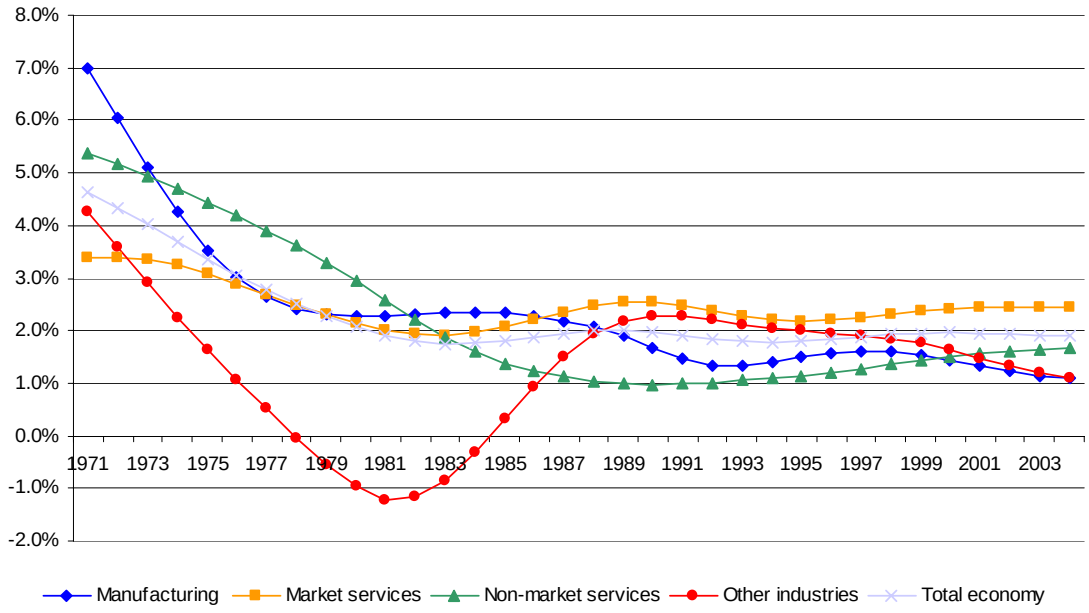
Data information: growth of total value added can be decomposed as the weighted sum of the value added generated in each industry, where weights Si reflect constant-price shares of each industry in value added.

Figure 22 Industry contribution to real value added growth (1970-2004) ***in percent***




Remarks: the industries contributions to the annual average aggregate value added growth have been calculated at the A31 industry level. The weights reflect the average of share of each industry in total value added at the beginning and at the end of the period covered.

**Figure 23 Annual real value added growth by industry (1970-2004)**
*in percent*



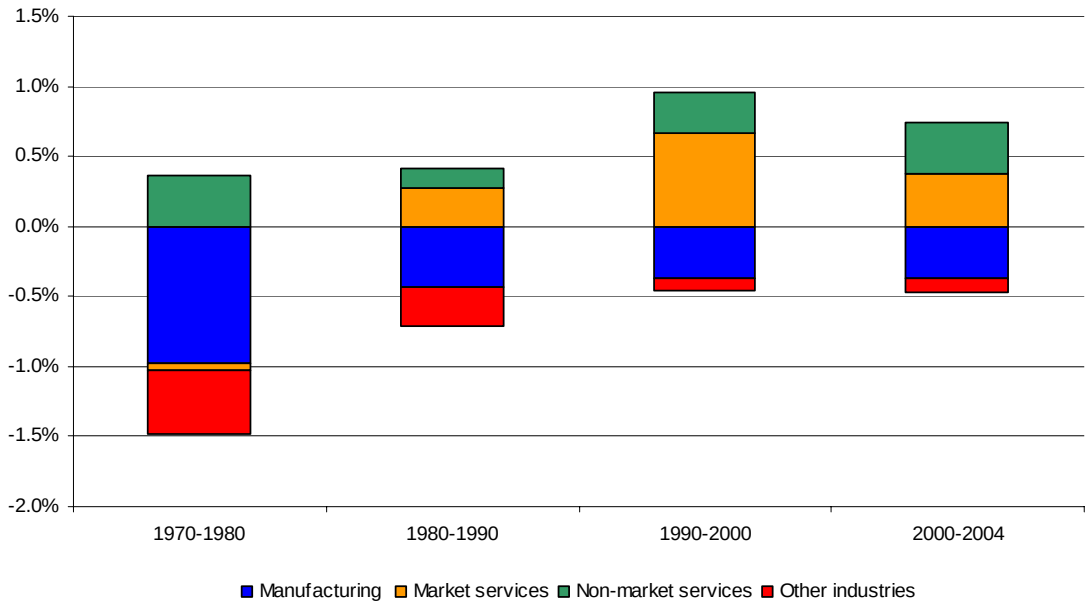

Remarks: annual average growth rates have been corrected for the business cycle, using the Hodrick-Prescott filter.

*1.9 Industry contribution to total labour input growth*

As with value added growth, the main drivers of labour input growth can also be identified through a decomposition formula. Figure 24 shows evidence that total labour input evolution during the period 1970-2004 was strongly driven by the large negative impact of manufacturing. Due to increase in productivity and international restructuring, the share of those branches in total labour input growth shrunk by about 50% within a period of 30 years. This negative contribution of manufacturing, with a peak in the seventies until the beginning of the eighties, was only compensated for by market and non-market services since the second half of the period considered. From 1980 onwards, market services can be identified as the most important source of labour input growth. However, this positive performance of market services seems to have started to decline for the last few years. The impact of other industries on total labour input growth was also negative during the whole period. It can also be observed from Figure 24 and 25 that non-market services is the only sector that showed a positive contribution to aggregate total hours worked for the whole period considered.

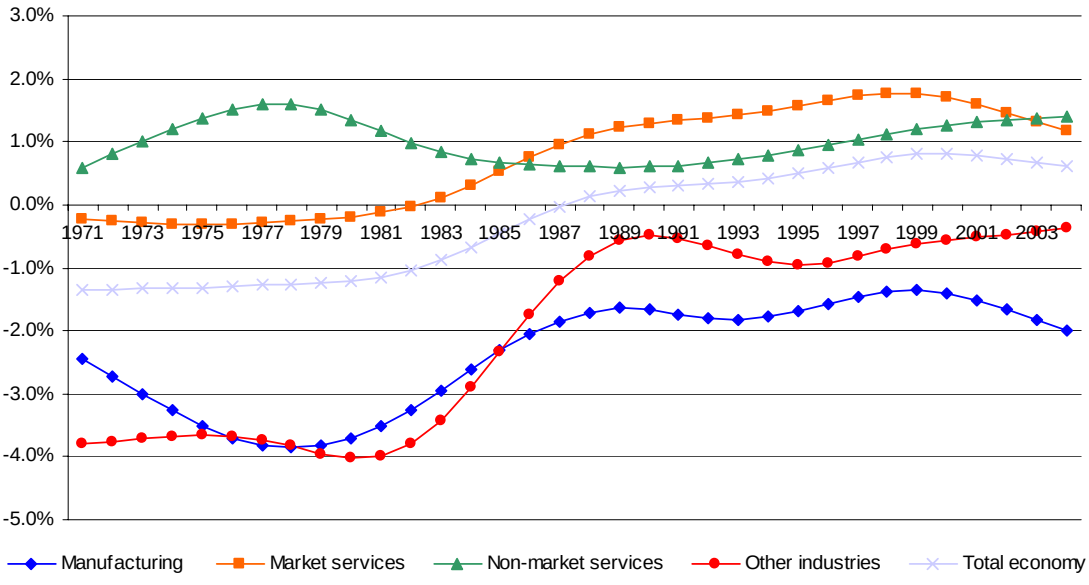
Data information: aggregate labour input growth (total hours worked) can as such be decomposed as the sum of the of the weighted growth rates in the different industries, where weights Si denote the individual industry's average share in total labour input. Total hours worked by self-employed persons have been estimated from total hours worked by full time equivalents at A60 industry level.

**Figure 24 Industry contribution to total labour input growth (1970-2004)**
*in percent*




Remarks: the industries contributions to annual average labour input growth have been calculated at the A31 industry level. The weights reflect the average of the share of each industry in total hours worked at the beginning and at the end of the period covered.

**Figure 25 Annual labour input growth by industry (1970-2004)**
*in percent*




Remarks: annual average growth rates have been corrected for the business cycle, using the Hodrick-Prescott filter.

*1.10 Industry contribution to labour productivity growth*

In this section, the contribution of each industry to labour productivity growth for the total economy is calculated following the approach outlined in the OECD's productivity manual[4]. Such an approach allows identification of the main drivers of labour productivity growth within the period considered. As already mentioned above, the Belgian economy achieved persistent positive but decreasing labour productivity growth rates between 1970 and 2004. It is observed from Figure 27 that all industries underwent a declining trend during the period considered. In the most recent years, only market services showed a limited increase in labour productivity growth evolution.

The results in Figure 26 show that aggregate labour productivity growth was mainly driven by manufacturing and market services throughout the whole period. In the most recent period (2000-2004), market services became the main pillar of aggregate labour productivity growth instead of manufacturing. Figure 26 also illustrates the decreasing contribution of non-market services to labour productivity growth during the period considered. In the most recent sub-period, non-market services even had a slightly negative impact on aggregate productivity growth. However, the negative contribution of this industry was largely compensated for by strong productivity growth rates in all other branches. Other industries showed a substantial variation in their impact on aggregate labour productivity growth between 1970 and 2004, although contribution of those industries to aggregate labour productivity growth remained positive over time.

Data information: aggregate value added based labour productivity growth is defined as the difference between aggregate growth in value added and aggregate growth in total labour input, measured as total hours worked. Following the decomposition equation below, an industry's contribution to aggregate labour productivity growth is the difference between its contribution to total value added and to total labour input (total hours worked). The aggregate rate of change in value added is a share-weighted average of the industry-specific rate of change of value added where weights reflect the current-price share of each industry in value added ($P_{VA}VA$). On the input side, aggregation of industry-level input is calculated by weighting the growth rates of industry labour input with each industry's share in total labour compensation (LAB). The decomposition equation also identifies a reallocation or residual term (R) as industries' contributions do not add up exactly to aggregate labour productivity growth.

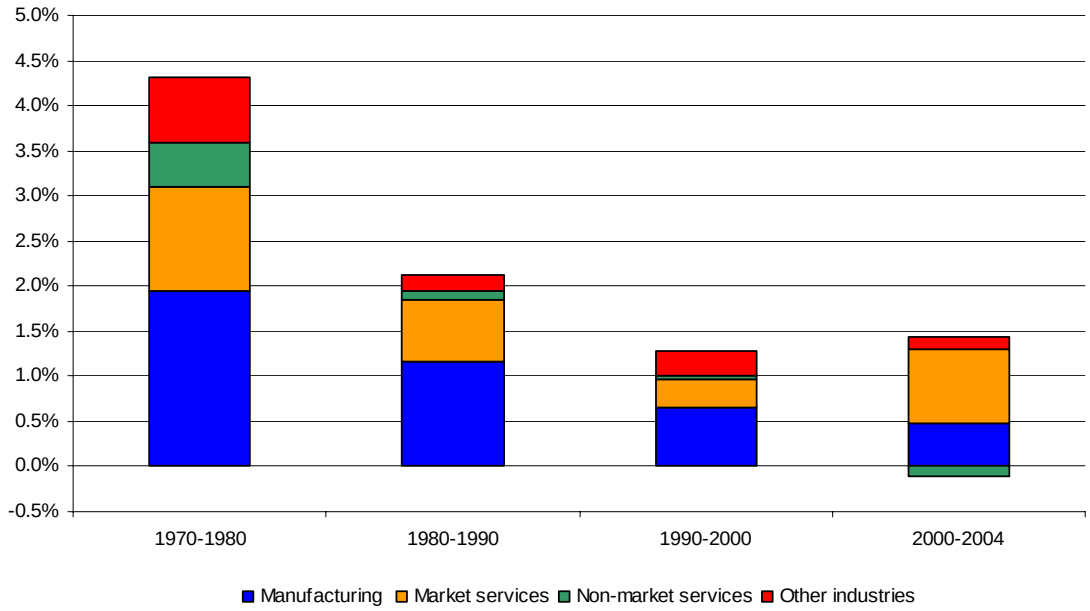
$$\Delta LP^{T} = \sum_{i=1}^{n} \left( \overline{S}^{i}_{VA} \Delta VA_{i} - \overline{S}^{i}_{L} \Delta L_{i} \right) + R$$

$$\overline{S}^{i}_{VA} = \left( \frac{\overline{P^{i}_{VA} VA^{i}}}{P_{VA} VA_{TOT}} \right)$$

$$\overline{S}^{i}_{L} = \left( \frac{\overline{LAB^{i}}}{LAB_{TOT}} \right)$$

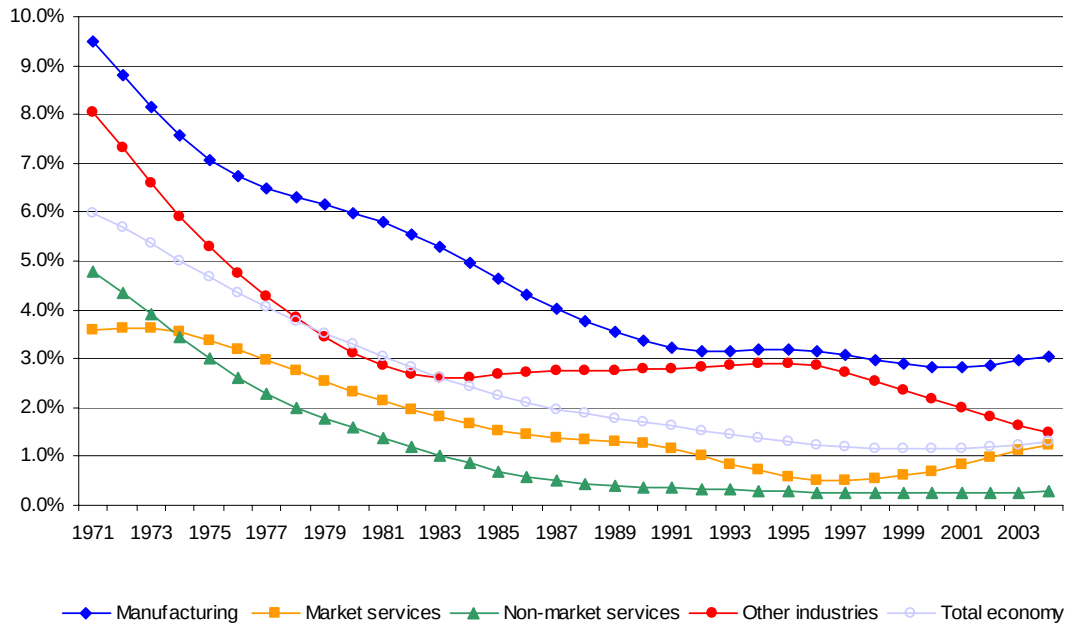
[4] OECD, Productivity Manual, 2001, Paris.

**Figure 26 Industry contribution to aggregate labour productivity growth (1970-2004)**
*in percent*




Remarks: the industries contributions to the annual average labour productivity growth (value added per hour worked) have been calculated at the A31 industry level. This contribution can be negative as it is calculated as the difference between weighted value added growth and weighted labour growth. Thus a labour intensive low growth industry may have a negative effect on aggregate labour productivity growth.

**Figure 27 Annual labour productivity growth by industry (1970-2004)**
*in percent*




Remarks: annual average growth rates of value added per hour worked have been corrected for the business cycle, using the Hodrick-Prescott filter.

### *1.11 Shift-share analysis of labour productivity growth*

Aggregate labour productivity growth can be considered as a weighted average of industrial productivity growth rates. Over time, the aggregate productivity growth rate reflects both the rate of growth at industry level and the change in industry composition of labour inputs. Sectoral shifts of labour inputs have both static and dynamic effects on aggregate labour productivity growth as branches not only differ in their productivity levels, but also in their productivity growth rates. As such, a shift-share analysis aims to decompose labour productivity growth into three effects: the intra-branch productivity growth, a structural change effect (static) identifying change in the sectoral composition of growth and a residual interaction effect (dynamic). Table 4 shows the results of a dynamic shift-share analysis of labour productivity growth for four sub periods in 1970-2004, based on the 29 industries' disaggregation.

It can be observed in Table 4 that the persistent but decreasing labour productivity growth can be explained by the decline in intra-branch labour productivity growth between 1970 and 2000. However, mainly due to the rise of labour productivity growth in market services, intra-branch productivity growth increased somewhat during the years 2000-2004. The positive structural change effect decreased over time. This evolution shows that labour productivity growth was negatively influenced by the structural changes: either labour input shifted towards industries, mainly the service sector, with relatively low labour productivity levels or contracting industries are those with a high level of productivity. In the last period, the structural change effect even became negative. Finally, the interaction effect was negative between 1970 and 2004. This confirms the hypothesis that the industries that are in contraction, as can be observed for the manufacturing industries, are those that have the highest productivity gains.

Data information: shift share analysis allows the decomposition of aggregate labour productivity growth between two periods [T,T-1] into three different components: the intra-branch productivity growth effect (the first term on the right hand side of equation 2), the structural change effect (second term) and the interaction effect (third term). The first component represents the within sectors labour productivity growth, given the economic structure in period T. The second term is the contribution to aggregate labour productivity growth due to structural changes. The latter are caused by a shift of labour input towards industries with a higher or lower productivity level (static). Finally the residual or interaction effect measures the effect of the shift of labour to industries with higher or lower productivity growth rates (dynamic).

$$LP^T = \frac{Y^T}{L^T} = \sum_{i=1}^{n} \frac{Y_i^T L_i^T}{L_i^T L^T} = \sum_{i=1}^{n} LP^T S_i^T \quad (1)$$

$$\Delta LP = LP^T - LP^{T-1} = \sum_{i=1}^{n} \left(LP_i^T - LP_i^{T-1}\right) S_i^{T-1} + \sum_{i=1}^{n} \left(S_i^T - S_i^{T-1}\right) LP_i^{T-1} + \sum_{i=1}^{n} \left(S_i^T - S_i^{T-1}\right)\left(LP_i^T - LP_i^{T-1}\right) \quad (2)$$

**Table 4 Dynamic shift share analysis of labour productivity growth (1970-2004)**
*in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Total labour productivity growth | 4.71 | 2.18 | 1.27 | 1.29 |
| Intra-branch productivity growth effect | 3.98 | 1.50 | 0.74 | 1.41 |
| Structural change effect (static) | 0.74 | 0.71 | 0.58 | -0.08 |
| Interaction effect (dynamic) | -0.02 | -0.04 | -0.05 | -0.04 |

Remarks: the dynamic shift-share analysis was done at the 29 disaggregated industry-level for four sub periods between 1970 and 2004.

# 2. Manufacturing

**Table 5 Summary of main findings**
*average annual growth rates in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| **Value added** | 4.0 | 2.8 | 1.2 | 0.5 |
| - Labour contribution | -2.3 | -1.3 | -1.3 | -1.5 |
| - ICT capital contribution | 0.4 | 0.8 | 0.6 | 0.3 |
| - NICT capital contribution | 0.2 | 0.9 | 0.9 | 0.3 |
| - MFP | 5.7 | 2.4 | 1.0 | 1.5 |
| **Value added per hour worked** | 7.4 | 4.6 | 3.1 | 2.8 |
| - ICT capital deepening | 0.5 | 0.9 | 0.7 | 0.4 |
| - NICT capital deepening | 1.2 | 1.3 | 1.4 | 0.9 |
| **Value added** | 4.0 | 2.8 | 1.2 | 0.5 |
| - Chemicals, chemical products and man-made fibres contribution | 0.6 | 0.9 | 0.8 | 0.2 |
| - Basic metals and fabricated metal products contribution | 0.4 | 0.4 | 0.0 | 0.3 |
| - Food, beverages and tobacco contribution | 0.5 | 0.3 | 0.0 | 0.3 |
| - Transport equipment contribution | 0.5 | 0.4 | 0.1 | 0.0 |
| - Pulp, paper and paper products, publishing and printing contribution | 0.1 | 0.3 | 0.1 | 0.0 |
| **Hours worked** | -3.4 | -1.8 | -1.9 | -2.3 |
| - Chemicals, chemical products and man-made fibres contribution | -0.1 | 0.0 | -0.1 | -0.2 |
| - Basic metals and fabricated metal products contribution | -0.7 | -0.5 | -0.4 | -0.2 |
| - Food, beverages and tobacco contribution | -0.4 | -0.2 | -0.1 | -0.1 |
| - Transport equipment contribution | 0.1 | 0.0 | -0.1 | -0.3 |
| - Pulp, paper and paper products, publishing and printing contribution | -0.2 | 0.0 | -0.1 | -0.2 |
| **Value added per hour worked** | 7.4 | 4.6 | 3.1 | 2.8 |
| - Chemicals, chemical products and man-made fibres contribution | 1.5 | 1.3 | 0.9 | 0.5 |
| - Basic metals and fabricated metal products contribution | 1.2 | 0.9 | 0.4 | 0.5 |
| - Food, beverages and tobacco contribution | 0.7 | 0.4 | 0.1 | 0.4 |
| - Transport equipment contribution | 0.5 | 0.4 | 0.2 | 0.3 |
| - Pulp, paper and paper products, publishing and printing contribution | 0.2 | 0.1 | 0.0 | 0.1 |

### *2.1 Relative importance of manufacturing*

The share of manufacturing in total real value added increased until 1990. Since then, the share of manufacturing has progressively fallen and reached 18.5% in 2004. This erosion was not linear but the share of manufacturing decreased between 1990 and 1995 before recovering between 1995 and 2000 and then decreasing again from 2000. The decrease in the relative importance of manufacturing is trend-related but occurs through cyclical movements.

The decrease in the importance of manufacturing in nominal value added was much more pronounced as its share declined from 29.5% in 1970 to 17.4% in 2004. However this relative decline also occurred in steps.

By contrast, the decrease in the share of hours worked in manufacturing in total hours worked was constant from 1970. In that year, the share amounted to 32.1%, and at the end of the period, in 2004, it was down to 15.7%. Over the whole period, 1970-2004, hours worked in total economy decreased by 8% while hours worked in manufacturing decreased by 55%.

The decline of the importance of manufacturing in the total economy provided by these partial indicators is somewhat overestimated. Indeed, the global contribution of manufacturing to total output estimated through the input-output tables, is higher than the apparent one. This difference is related to the so-called "intermediate gap": the use of services as intermediate input for the production of goods is higher than the converse measure, i.e. the use of goods as intermediate input for the production of services. Moreover, this intermediate gap is widening over time. Therefore, the total contribution of manufacturing to total output is larger than the apparent one obtained from the share of manufacturing value added in total value added. In 2000, the last year for which input-output tables are available, the apparent contribution of manufacturing was 25% while the analytical contribution reached 30%[5] (Avonds, 2005).

Labour productivity growth in manufacturing has helped to moderate value added price increases and has resulted in a much slower growth of the manufacturing deflator than the growth recorded by the total economy deflator.

As applied to the total economy, the growth accounting model can be used to explain value added and productivity growth in manufacturing.

Data information: manufacturing is defined as all industries included in the NACE classification from DA to DN. Definitions of variables are the same as for the total economy.

[5] Avonds Luc, Belgian Input-Output Tables: state of the Art, paper presented at the 15th International Conferences on Input-Output Techniques, Beijing 2005 (can be down loaded at the website of the International Input-Output Association: http://www.iioa.org)

**Figure 28 Relative importance of manufacturing in total economy**
*in percent of total economy*

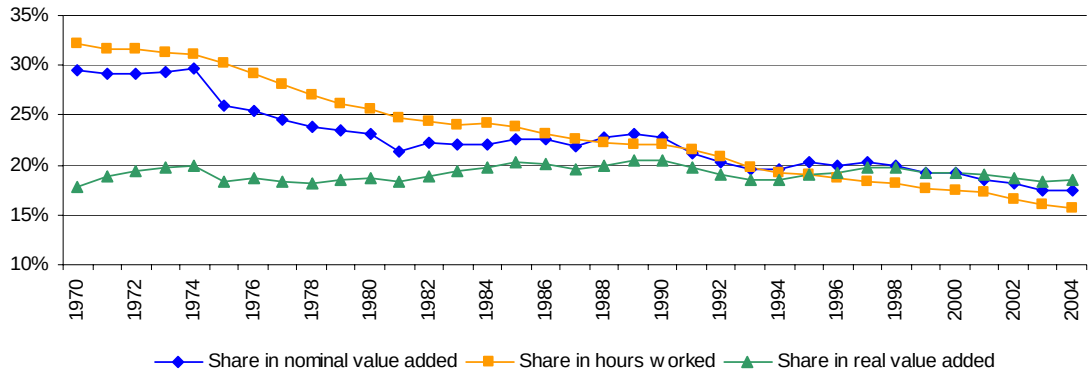



**Figure 29 Real value added average annual growth rate**
*in percent*

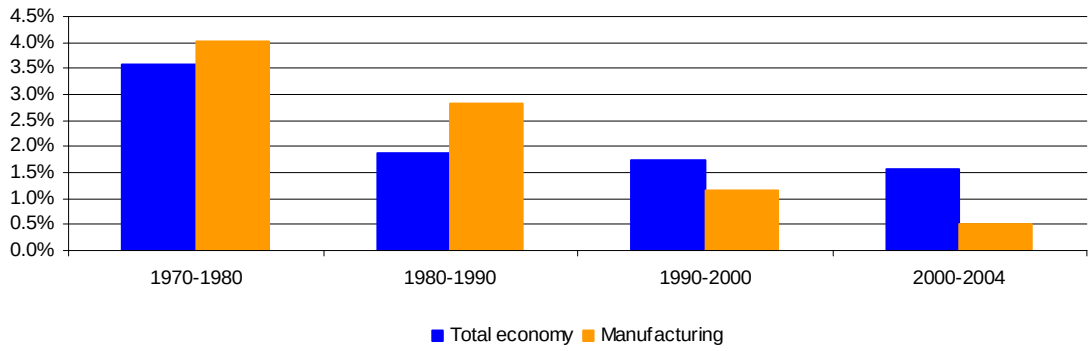
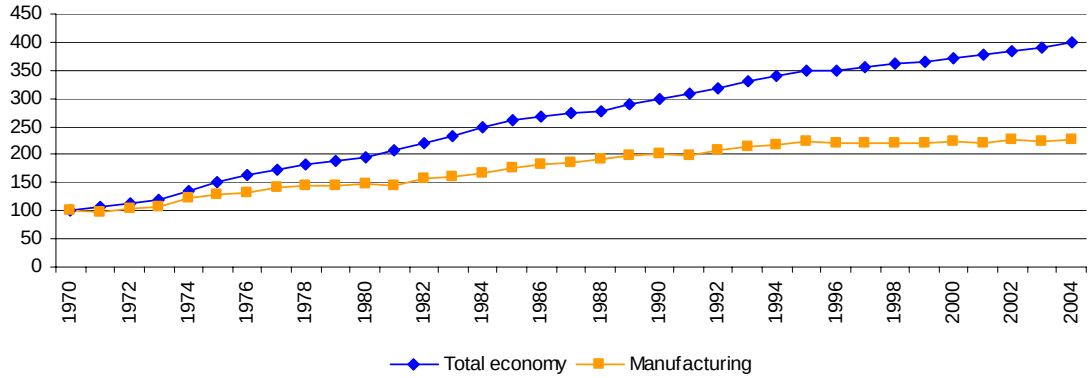



**Figure 30 Value added deflators**
*indices: 1970 = 100*



### *2.2 Value added growth decomposition*

The overall picture given by the average contribution calculated by decade shows that labour contribution has always been negative in manufacturing as opposed to what has been observed for the total economy since the beginning of the nineties. This negative labour contribution in manufacturing was even slightly more pronounced during the most recent period, 2000-2004, than during the previous decades.

As already mentioned, this evolution depends on the share of the two production factors in value added as these shares are used as a weight in contribution estimates. Labour share in manufacturing value added was higher than labour share in total economy value added from the mid-seventies until the end of the nineties although both shares recorded the same fluctuations: a large increase in the seventies followed by a large decrease in the eighties and limited increases and decreases in the nineties. Since 1998, labour shares in manufacturing and in total economy have been very close and their fluctuations have been more limited.

As opposed to labour, capital and MFP have always contributed positively to real value added growth in manufacturing.

The positive contribution of capital has fluctuated across periods, being particularly high during the eighties and the nineties. During these two decades, capital contribution was higher for manufacturing than for the total economy. When this contribution for manufacturing is divided into ICT capital contribution and non-ICT capital contribution, ICT capital contribution was higher than non-ICT capital contribution only during the seventies. In the most recent period, 2000-2004, the contributions of both kinds of capital were particularly weak and smaller than for the total economy.

The positive MFP contribution was on a declining trend until the beginning of the nineties before increasing until 1995 and stabilising thereafter at around 1% per year. This evolution contrasts with what has been observed for the whole economy, where the stabilisation of the MFP trend occurred at around 0%.

Figure 31 Contribution to real value added growth

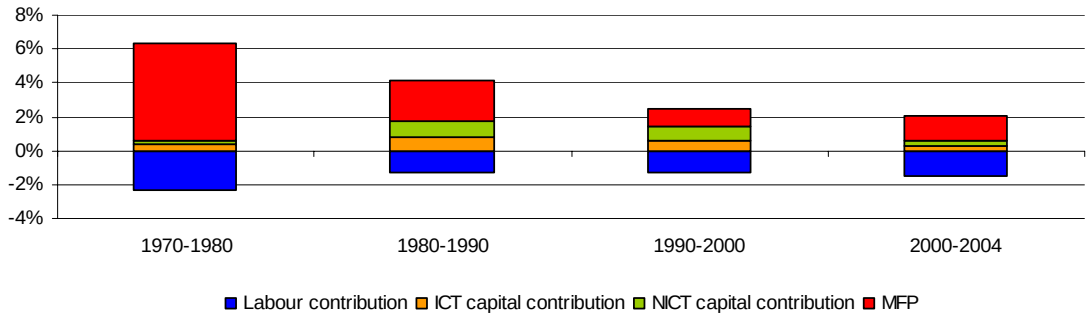



**Figure 32 Share of labour compensation in value added**

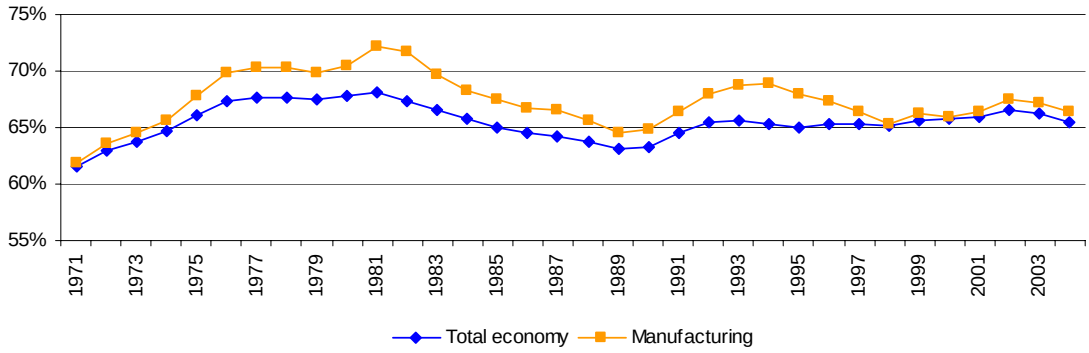
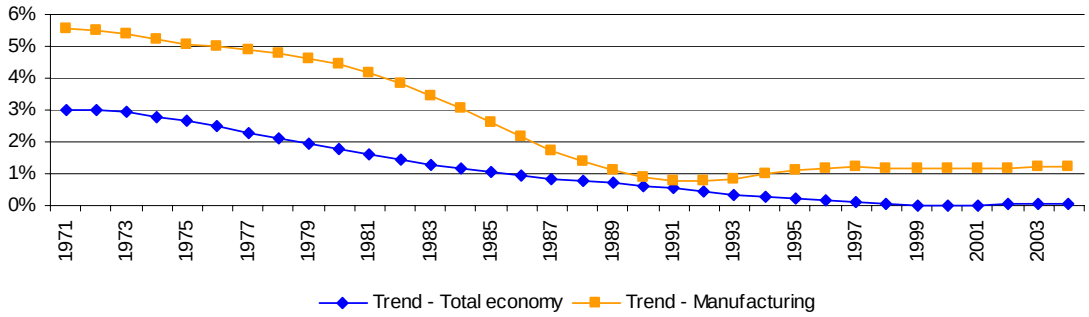



**Figure 33 Evolution of MFP**
*average annual growth rate in percent*



### *2.3 Decomposition of labour productivity growth*

As expected from respective movements in real value added and in hours worked, the annual average growth rate of labour productivity in manufacturing was always higher than for the whole economy over the period 1970-2004. However, from the beginning of nineties, the difference between the two growth rates decreased and in the most recent period, the difference between the two growth rates was only 1.5%.

Until the end of the nineties, the slowdown of manufacturing labour productivity growth was mainly explained by the declining contribution of MFP although this contribution was higher than MFP contribution for the total economy, with manufacturing remaining a privileged transmission channel of technical progress. During the most recent period, 2000-2004, MFP contribution was stronger and helped to sustain manufacturing labour productivity growth.

Since 1980, capital deepening has been more pronounced in manufacturing than in the total economy but it was particularly high in manufacturing from the mid-eighties to the mid-nineties. This decade corresponds to a rapid restructuring of Belgian manufacturing, leading businesses to replace labour with capital given the evolution of their relative prices. Since the mid-eighties, these relative prices have increased much faster in manufacturing than in the total economy. In the most recent period, capital deepening in manufacturing was particularly weak compared to previous decades. This is due to a deceleration of both ICT and non-ICT capital deepening.

**Figure 34 Growth of labour productivity**
*average annual growth rate in percent*

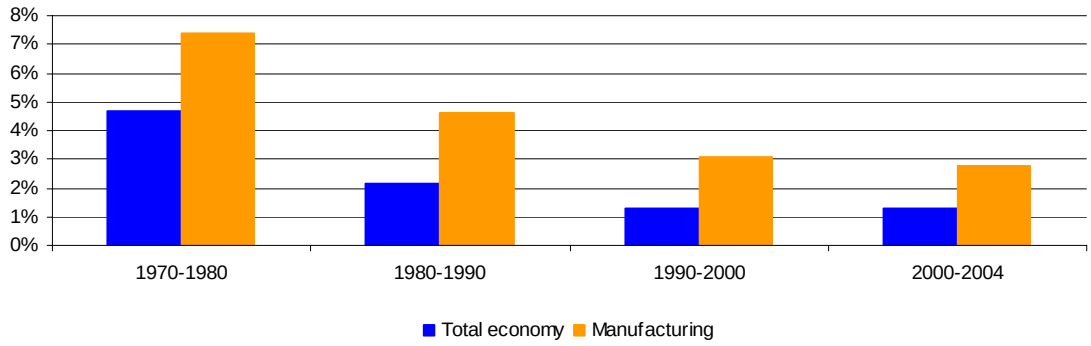



**Figure 35 Contribution to labour productivity growth**

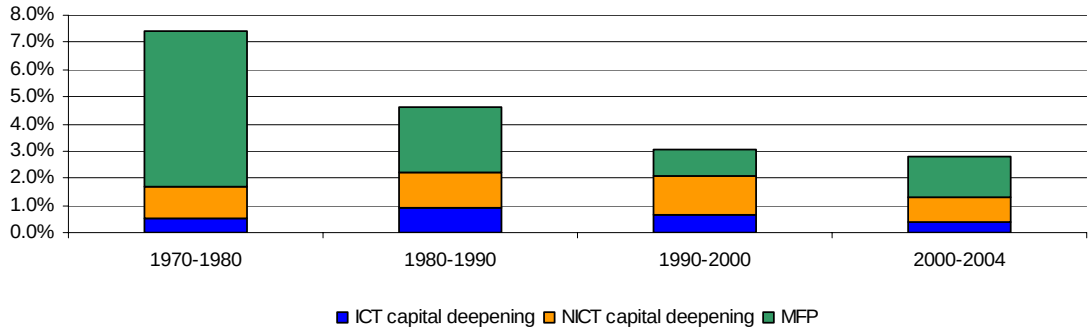
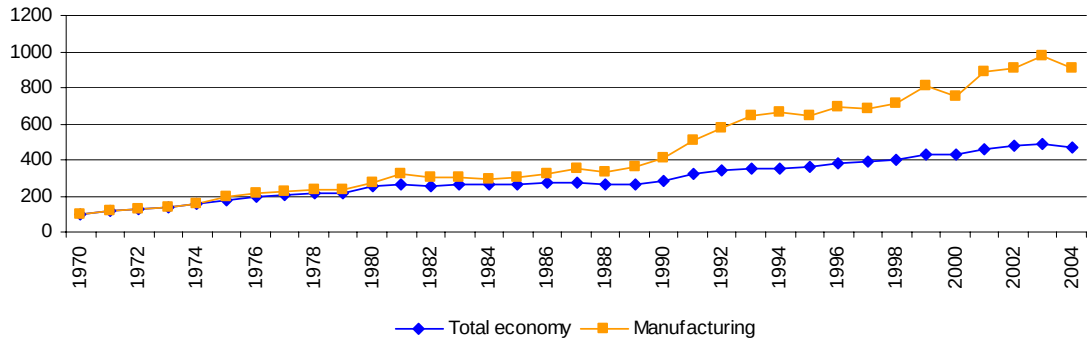



**Figure 36 Evolution of relative factor prices**
*labour prices on capital prices indices: 1970 = 100*



### *2.4 Capital productivity and ICT capital*

As opposed to what was observed for the total economy, capital productivity growth in manufacturing was positive during the seventies. From the mid-eighties to the mid-nineties, capital productivity in manufacturing declined at a much higher annual average rate than in the total economy. This evolution is explained by a greater capital deepening in manufacturing than in the total economy during this period.

The share of manufacturing in the total real capital stock of the economy, stable at the beginning of the seventies, started to decrease after the first oil shock until 1983 before increasing until 1992. Since then, this share has been relatively stable at around 10.5%.

Between 1970 and 2004, industries accumulating the biggest share of the real productive capital stock among manufacturing changed. In 1970, Basic metals and fabricated metal products accounted for almost a quarter of the real capital stock in manufacturing. In 2004, this share was at only 14%. In 2004, the first rank was occupied by Chemicals, chemical products and man-made fibres, which owned 18.2% of manufacturing real capital stock, coming from 6.4% in 1970. Pulp, paper and paper products, printing and publishing, Electrical and optical equipment, Transport equipment and Rubber and plastic products also increased their relative importance in terms of real capital stock. By contrast, the other industries recorded decreases in their relative importance in the real capital stock.

Among the different categories of capital, ICT investment goods are particularly important for the economy as they are considered as a powerful channel for increasing the overall efficiency of the production process. In manufacturing, the share of ICT capital services in total capital services increased from 5.3% in 1970 to 15.1% in 1992 before decreasing to 11.6% in 2004. From 1981 to 1999, this share was higher in manufacturing than in the total economy.

In 2004, the most ICT intensive industries within manufacturing, measured by the share of ICT capital services in total capital services of the industry, were Electrical and optical equipment (31.4%), Pulp, paper and paper products, printing and publishing (22.5%), Leather and leather products (17.4%), Transport equipment (13.8%) and Chemicals, chemical products and man-made fibres (12.2%).

Figure 37 Evolution of capital productivity
*average annual growth rate in percent*

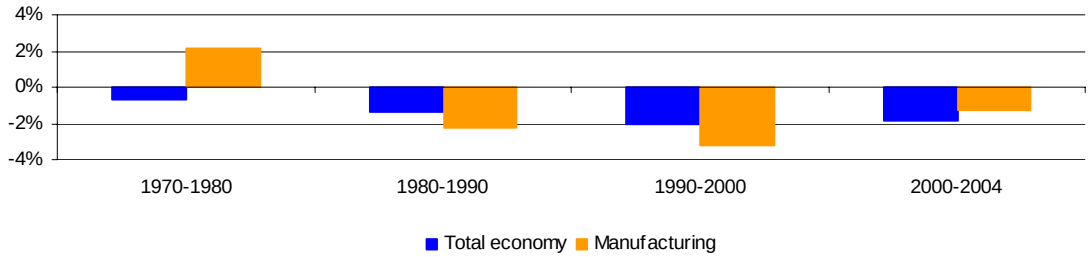



**Figure 38 Share of manufacturing in total real productive capital stock**

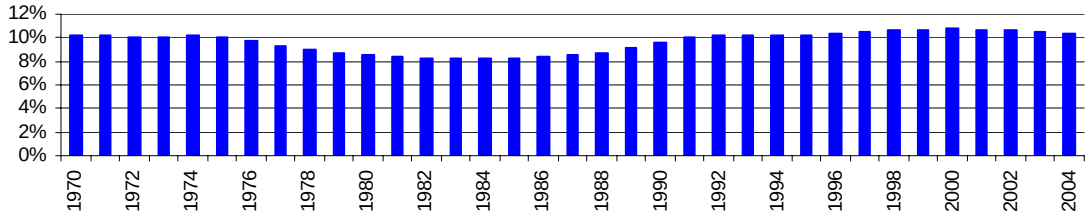



**Figure 39 Relative importance of ICT nominal capital services**

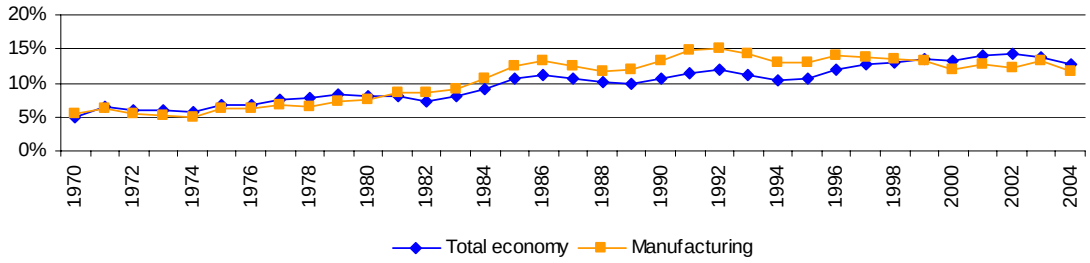



**Table 6 Share in manufacturing real capital stock**
*in percent*

| | 1970 | 2004 |
|---|---|---|
| Basic metals and fabricated metal products | 24.2 | 14.0 |
| Food, beverages and tobacco | 14.9 | 14.7 |
| Textiles and textile products | 11.0 | 5.4 |
| Other non-metallic mineral products | 7.1 | 6.8 |
| Manufacturing n.e.c. | 6.7 | 4.2 |
| Chemicals, chemical products and man-made fibres | 6.4 | 18.2 |
| Machinery and equipment n.e.c. | 5.3 | 3.6 |
| Pulp, paper and paper products, printing and publishing | 5.2 | 8.5 |
| Electrical and optical equipment | 4.9 | 6.2 |
| Transport equipment | 4.7 | 8.2 |
| Wood and wood products | 3.6 | 2.6 |
| Coke, refined petroleum products and nuclear fuel | 3.4 | 2.5 |
| Rubber and plastic products | 2.1 | 4.9 |
| Leather and leather products | 0.5 | 0.2 |
| Total manufacturing | 100 | 100 |

### *2.5 Structural changes in manufacturing*

Within manufacturing, strong changes in the nature of activities took place from the seventies. In terms of real value added, some activities saw their relative importance declining over the last few decades. This is particularly true for Textiles and textile products and for Leather and leather products and to a lesser extent for Basic metals and fabricated metal products, for Food, beverage and tobacco and for Pulp, paper and paper products, printing and publishing. Leather and leather products is the only industry with a negative average annual growth rate of its real value added over the whole period. By contrast, other activities recorded an increase in their relative importance within manufacturing. This is clearly the case for Chemicals, chemical products and man-made fibres but also for Transport equipment, for Rubber and plastic products and for Wood and wood products.

Comparable trends are also observable in terms of hours worked in some industries although the magnitude of these changes is generally smaller than in terms of real value added. However, based on value added the relative importance of some activities declined while it increased based on hours worked. This is the case for Food, beverages and tobacco, for Pulp, paper and paper products, printing and publishing, and for Machinery and equipment. The decrease in hours worked in these activities was smaller than in the rest of manufacturing.

**Table 7** **Share in manufacturing real value added and value added average annual growth rate**
*in percent*

| | 1970 | 2004 | 1970-2004 |
|---|---|---|---|
| Basic metals and fabricated metal products | 19.5 | 15.2 | 1.7 |
| Food, beverages and tobacco | 17.1 | 13.4 | 1.7 |
| Pulp, paper and paper products; printing and publishing | 9.9 | 8.0 | 1.8 |
| Textiles and textile products | 9.1 | 4.4 | 0.3 |
| Machinery and equipment n.e.c. | 8.5 | 6.2 | 1.5 |
| Electrical and optical equipment | 7.3 | 7.4 | 2.5 |
| Other non-metallic mineral products | 7.2 | 5.1 | 1.4 |
| Manufacturing n.e.c. | 5.5 | 2.9 | 0.5 |
| Transport equipment | 5.3 | 8.7 | 3.9 |
| Chemicals, chemical products and man-made fibres | 3.6 | 19.5 | 7.4 |
| Leather and leather products | 3.2 | 0.2 | -5.9 |
| Coke, refined petroleum and nuclear fuel | 2.4 | 2.8 | 2.8 |
| Rubber and plastic products | 0.7 | 4.4 | 7.7 |
| Wood and wood products | 0.6 | 1.9 | 5.5 |
| Total manufacturing | 100 | 100 | 2.4 |

**Table 8** **Share in manufacturing hours worked and hours worked average annual growth rate**
*in percent*

| | 1970 | 2004 | 1970-2004 |
|---|---|---|---|
| Basic metals and fabricated metal products | 19.1 | 16.9 | -2.7 |
| Food, beverages and tobacco | 11.8 | 14.7 | -1.7 |
| Pulp, paper and paper products; printing and publishing | 6.4 | 7.7 | -1.8 |
| Textiles and textile products | 16.3 | 6.4 | -5.1 |
| Machinery and equipment n.e.c. | 6.2 | 6.8 | -2.1 |
| Electrical and optical equipment | 8.8 | 7.8 | -2.7 |
| Other non-metallic mineral products | 6.6 | 5.3 | -3.0 |
| Manufacturing n.e.c. | 6.3 | 4.6 | -3.3 |
| Transport equipment | 5.2 | 9.7 | -0.5 |
| Chemicals, chemical products and man-made fibres | 7.2 | 12.1 | -0.8 |
| Leather and leather products | 1.4 | 0.3 | -6.9 |
| Coke, refined petroleum and nuclear fuel | 0.7 | 1.1 | -1.2 |
| Rubber and plastic products | 2.2 | 4.3 | -0.4 |
| Wood and wood products | 1.8 | 2.4 | -1.6 |
| Total manufacturing | 100 | 100 | -2.3 |

### *2.6 Industry contribution to value added growth in manufacturing*

The leading role of manufacturing has been reduced in the last thirty years and this is generally referred to as deindustrialisation. An interesting question is whether this slowdown of value added growth has occurred across all manufacturing industries or whether it was concentrated in particular industries. Table 9 shows that the industry Chemicals and chemical products industry was the main driver of manufacturing growth throughout the whole period. The share of Chemicals in total manufacturing value added increased over the same period from 3.6% to 19.5%. However the contribution of chemical industry to value added growth in manufacturing experienced a sharp decline in the most recent period.

It stands out from Table 9 that the contributions of Food products and beverages together with Basic metals and fabricated metal products increased substantially during the last period. Although the value added share of both sectors decreased over the whole period except for the nineties, they can be considered as important drivers of value added growth between 1970 and 2004. Moreover, in the second half of the whole period considered, some manufacturing branches had a reduced or even negative impact on aggregate value added growth in manufacturing. The negative contribution to value added growth was particularly strong for Cokes, refined petroleum and nuclear fuel, Textiles and textile products and Electrical and optical equipment. The negative contribution of the former industry contrasts with its leading role in total value added creation during the seventies. The negative impact on total value added growth of Electrical and optical equipment is only a recent phenomenon.

### *2.7 Industry contribution to labour input growth in manufacturing*

As opposed to value added growth, almost all manufacturing industries have experienced negative labour input growth since 1970. This explains why all contributions shown in Table 10 are negative. The persistent negative trend was mainly driven by Textiles and textile products, Basic metals and fabricated metals and Electrical and optical equipment. Those manufacturing branches account together for at least 50 per cent of the fall in manufacturing labour input during the period 1970-2004. Since the nineties Transport equipment has also had a considerable negative impact on total hours worked within manufacturing.

**Table 9 Industry contribution to value added growth in manufacturing (1970-2004)**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Food, beverages and tobacco | 0.5 | 0.3 | 0.0 | 0.3 |
| Textiles and textile products | -0.1 | 0.1 | 0.1 | -0.2 |
| Leather and leather products | -0.1 | 0.0 | 0.0 | 0.0 |
| Wood and wood products | 0.1 | 0.1 | 0.0 | 0.1 |
| Pulp, paper and paper products; publishing and printing | 0.1 | 0.3 | 0.1 | 0.0 |
| Coke, refined petroleum products and nuclear fuel | 0.9 | -0.1 | -0.3 | 0.0 |
| Chemicals and chemical products fibres | 0.6 | 0.9 | 0.8 | 0.2 |
| Rubber and plastic products | 0.1 | 0.2 | 0.1 | 0.2 |
| Other non-metallic mineral products | 0.1 | 0.1 | 0.0 | 0.0 |
| Basic metals and fabricated metal products | 0.4 | 0.4 | 0.0 | 0.3 |
| Machinery and equipment n.e.c. | 0.3 | 0.1 | 0.0 | -0.1 |
| Electrical and optical equipment | 0.4 | 0.1 | 0.3 | -0.3 |
| Transport equipment | 0.5 | 0.4 | 0.1 | 0.0 |
| Manufacturing n.e.c. | 0.2 | 0.0 | 0.0 | 0.0 |
| Total manufacturing | 4.0 | 2.8 | 1.2 | 0.5 |

Remarks: the industries' contributions to annual average aggregate value added growth have been calculated at the A31 industry level. The weights reflect the average of the share of each industry in total value added at the beginning and at the end of the period covered.

**Table 10 Industry contribution to labour input growth in manufacturing (1970-2004)**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Food, beverages and tobacco | -0.4 | -0.2 | -0.1 | -0.1 |
| Textiles and textile products | -0.9 | -0.3 | -0.5 | -0.4 |
| Leather and leather products | -0.1 | 0.0 | 0.0 | 0.0 |
| Wood and wood products | -0.1 | 0.0 | 0.0 | 0.0 |
| Pulp, paper and paper products; publishing and printing | -0.2 | 0.0 | -0.1 | -0.2 |
| Coke, refined petroleum products and nuclear fuel | 0.0 | 0.0 | 0.0 | 0.0 |
| Chemicals and chemical products fibres | -0.1 | 0.0 | -0.1 | -0.2 |
| Rubber and plastic products | 0.0 | 0.0 | 0.0 | 0.0 |
| Other non-metallic mineral products | -0.3 | -0.2 | -0.1 | -0.1 |
| Basic metals and fabricated metal products | -0.7 | -0.5 | -0.4 | -0.2 |
| Machinery and equipment n.e.c. | -0.2 | -0.1 | -0.1 | -0.1 |
| Electrical and optical equipment | -0.2 | -0.3 | -0.2 | -0.4 |
| Transport equipment | 0.1 | 0.0 | -0.1 | -0.3 |
| Manufacturing n.e.c. | -0.3 | -0.1 | -0.1 | -0.1 |
| Total manufacturing | -3.4 | -1.8 | -1.9 | -2.3 |

Remarks: the industries' contributions to annual average aggregate labour input growth have been calculated at the A31 industry level. The weights reflect the average of the share of each industry in total labour input at the beginning and at the end of the period covered.

### *2.8 Industry contribution to labour productivity growth in manufacturing*

As we have seen before, labour productivity growth in manufacturing, as well as in the other industries, fell considerably during the period 1970-2004. Labour productivity growth in manufacturing is mainly due to a limited number of industries. Table 11 illustrates that Chemicals and chemical products has been the main driver of labour productivity growth since the seventies followed by Basic metals and fabricated metal products. Together these industries account for at least one third of manufacturing labour productivity growth between 1970 and 2000. Both industries also represent a considerable share in total manufacturing value added.

Food and beverages and Transport equipment can be identified as industries with an increasing contribution to labour productivity growth in the most recent period, although those two industries, as well as almost all of the other manufacturing industries, also experienced a substantial fall in absolute labour productivity growth over the period considered. Coke, refined petroleum and nuclear fuel even had on average a negative growth rate in the last fifteen years, leading to a negative contribution to aggregate labour productivity growth. This negative impact contrasts with the leading role of this industry during the seventies.

**Table 11 Industry contribution to productivity growth in manufacturing (1970-2004)**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Food, beverages and tobacco | 0.7 | 0.4 | 0.1 | 0.4 |
| Textiles and textile products | 0.5 | 0.4 | 0.4 | 0.2 |
| Leather and leather products | 0.1 | 0.0 | 0.0 | 0.0 |
| Wood and wood products | 0.2 | 0.1 | 0.0 | 0.1 |
| Pulp, paper and paper products, publishing and printing | 0.3 | 0.3 | 0.1 | 0.2 |
| Coke, refined petroleum products and nuclear fuel | 0.4 | 0.0 | -0.2 | -0.1 |
| Chemicals and chemical products fibres | 1.5 | 1.3 | 0.9 | 0.5 |
| Rubber and plastic products | 0.2 | 0.2 | 0.1 | 0.2 |
| Other non-metallic mineral products | 0.4 | 0.2 | 0.1 | 0.1 |
| Basic metals and fabricated metal products | 1.2 | 0.9 | 0.4 | 0.5 |
| Machinery and equipment n.e.c. | 0.5 | 0.2 | 0.1 | 0.1 |
| Electrical and optical equipment | 0.7 | 0.3 | 0.6 | 0.2 |
| Transport equipment | 0.5 | 0.4 | 0.2 | 0.3 |
| Manufacturing n.e.c. | 0.3 | 0.1 | 0.1 | 0.1 |
| Total manufacturing | 7.4 | 4.6 | 3.1 | 2.8 |

Remarks: the industries' contributions to the annual average labour productivity growth have been calculated at the A31 industry level. This contribution can be negative as it is the difference between weighted value added growth and weighted labour input growth. Thus a labour intensive low growth industry may have a negative effect on aggregate labour productivity growth.

## 3. Market services

**Table 12 Summary of main findings**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| **Value added** | 3.2 | 2.3 | 2.1 | 2.3 |
| - Labour contribution | -0.1 | 0.4 | 0.9 | 0.5 |
| - ICT capital contribution | 1.1 | 1.1 | 1.0 | 0.9 |
| - NICT capital contribution | 1.3 | 0.5 | 0.9 | 1.0 |
| - MFP | 0.9 | 0.3 | -0.7 | -0.1 |
| **Value added per hour worked** | 3.3 | 1.6 | 0.5 | 1.5 |
| - ICT capital deepening | 1.1 | 1.1 | 0.9 | 0.9 |
| - NICT capital deepening | 1.4 | 0.2 | 0.3 | 0.7 |
| **Value added** | 3.2 | 2.3 | 2.1 | 2.3 |
| Wholesale and retail trade contribution | 0.9 | -0.1 | -0.2 | 1.0 |
| Hotels and restaurants contribution | 0.1 | 0.1 | 0.0 | 0.0 |
| Transport, storage and communication contribution | 0.4 | 0.5 | 0.5 | 0.3 |
| Financial activities contribution | -0.2 | 0.4 | 0.3 | 0.1 |
| Real estate, renting and business activities contribution | 1.9 | 1.4 | 1.5 | 0.9 |
| **Hours worked** | -0.1 | 0.7 | 1.6 | 0.9 |
| Wholesale and retail trade contribution | -0.5 | -0.1 | -0.2 | 0.2 |
| Hotels and restaurants contribution | -0.0 | 0.1 | 0.0 | 0.1 |
| Transport, storage and communication contribution | 0.1 | -0.2 | 0.1 | -0.1 |
| Financial activities contribution | 0.1 | 0.1 | -0.1 | -0.2 |
| Real estate, renting and business activities contribution | 0.1 | 0.9 | 1.6 | 1.0 |
| **Value added per hour worked** | 3.3 | 1.6 | 0.5 | 1.5 |
| Wholesale and retail trade contribution | 1.2 | -0.1 | -0.1 | 0.9 |
| Hotels and restaurants contribution | 0.1 | 0.0 | 0.0 | 0.0 |
| Transport, storage and communication contribution | 0.5 | 0.8 | 0.4 | 0.4 |
| Financial activities contribution | -0.5 | 0.4 | 0.4 | 0.4 |
| Real estate, renting and business activities contribution | 1.8 | 0.4 | -0.2 | -0.1 |

### *3.1 Relative importance of market services*

The share of market services in total real value added remained constant, at around 46%, during the seventies and most of the eighties. From 1989, this share increased, first rapidly during the first half of the nineties, and then at a slower pace. Since 2002, the share of market services in total real value added has been higher than 50%.

From 1980, the annual average growth rate of real value added in market services was systematically higher than the rate for the total economy, reversing the trend observed in the seventies.

In terms of nominal value added, the share of market services in the total economy increased rapidly from 34.8% in 1974 to 47.6% in 1993, then remained stable until 1997 and grew faster again thereafter to reach 50.9% in 2004.

The share of hours worked in market services in total hours worked constantly increased over the whole period, from 31.6% in 1970 to 44.1% in 2004. Between 1970 and 2004, hours worked in market services increased by 28.5%.

As opposed to what is observed in manufacturing, the value added deflator increased much faster for market services than for the total economy over the whole period. However, since 1995, the increase in the spread between the two deflators has slowed down, due to an inflection point in the growth of the market services deflator.

Data information: market services are defined as all industries included in the NACE classification from G to K. Definitions of variables are the same as for the total economy.

Figure 40 Relative importance of market services in total economy

***in percent of total economy***

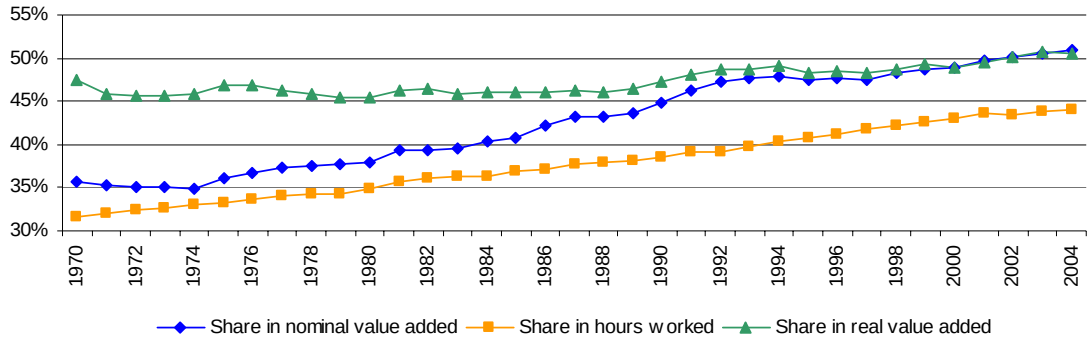



**Figure 41 Real value added average annual growth rate**

*in percent*

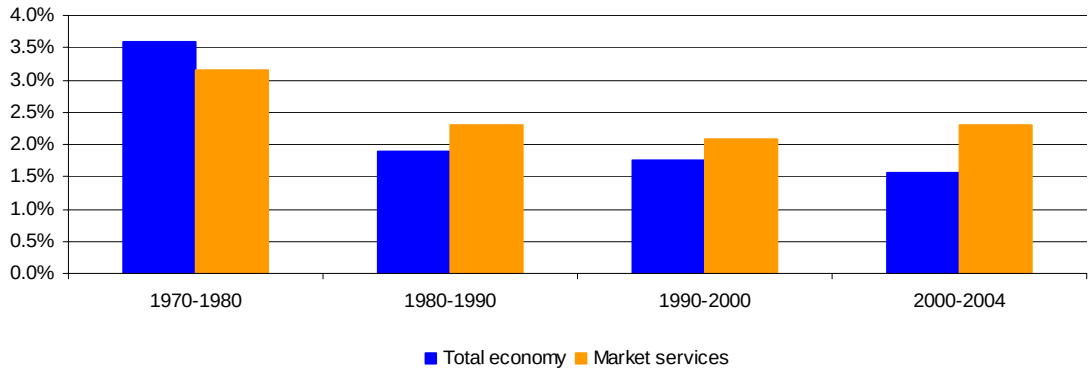
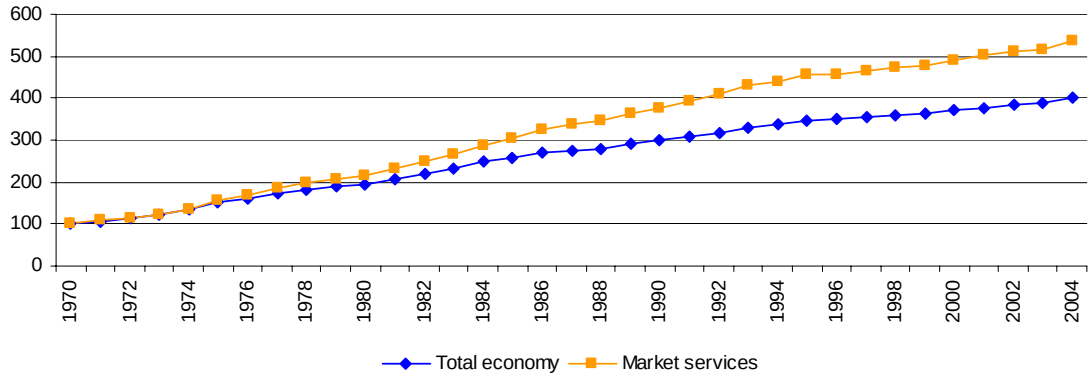



**Figure 42 Value added deflators**

*indices: 1970 = 100*



### *3.2 Value added growth decomposition*

Since 1980, labour contribution to value added growth in market services has always been positive and was particularly strong during the nineties. This contribution is influenced by the evolution of the share of value added attributed to labour. The fluctuations of labour share are very similar for market services and for the total economy due to the weight of market services in the total economy. However, the levels are different and labour share in market services has always been at least 10% lower than labour share in the total economy. In the absence of labour market rigidities, this difference has to reflect mainly differences in qualifications level of the labour force.

Capital contribution has been strong in market services over the whole period and especially during the seventies. Since 1990, capital contribution in market services has been stable at 1.9% which is higher than the percentage recorded by the total economy. This contribution is more or less equally distributed between ICT and non-ICT capital.

After providing a positive but limited contribution, MFP has negatively influenced value added growth in market services since the beginning of the nineties. When the cyclical effect is taken out through a Hodrick-Prescott filter, the following trends become apparent: MFP growth was first on a downward trend until 1982 and then rose slightly until 1988 before declining again until 1998. Since then, there has been an upward trend but MFP growth still remains negative for the period 2000-2004.

Figure 43 Contribution to real value added growth

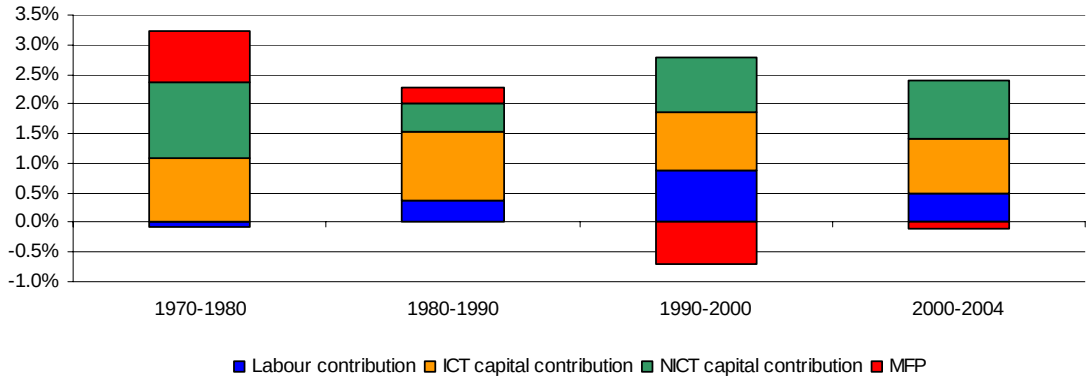



**Figure 44 Share of labour compensation in value added**

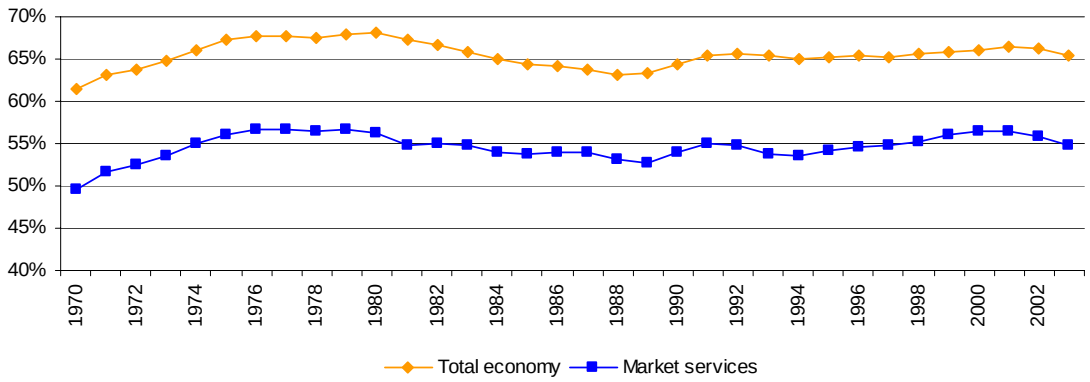
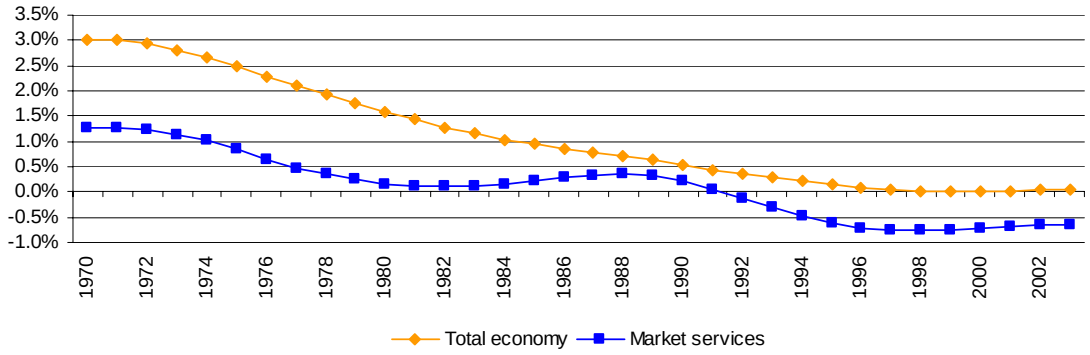



**Figure 45 Evolution of MFP**
*average annual growth in percent*



### *3.3 Decomposition of labour productivity growth*

Labour productivity growth in market services was weaker than in the total economy except during the most recent period, 2000-2004.

In the long term, the evolution of labour productivity in market services was mainly driven by the contribution of capital deepening. Since the end of the seventies, ICT capital deepening was always stronger than non-ICT capital deepening. However, as non-ICT capital deepening increased over the period 1980-2004, the difference between contributions of these two kinds of capital deepening decreased and was only 0.2% in 2000-2004.

Capital deepening in market services, driven by ICT, has always been higher than in the total economy, even if, since the beginning of the nineties, relative factor prices in market services have increased at a slower pace than in the total economy.

As mentioned earlier, MFP contribution after being positive in the seventies and the eighties became strongly negative in the nineties before coming back to zero in 2000-2004.

**Figure 46 Growth of labour productivity**
*annual average growth rate in percent*

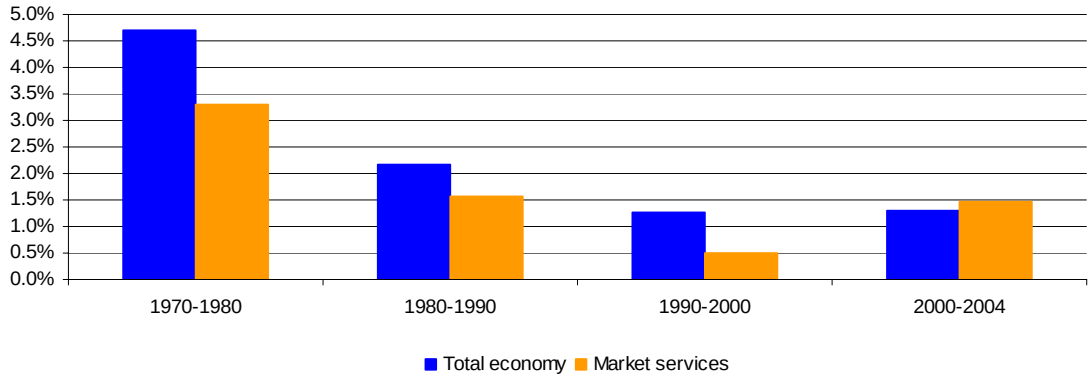



**Figure 47 Contribution to labour productivity growth**

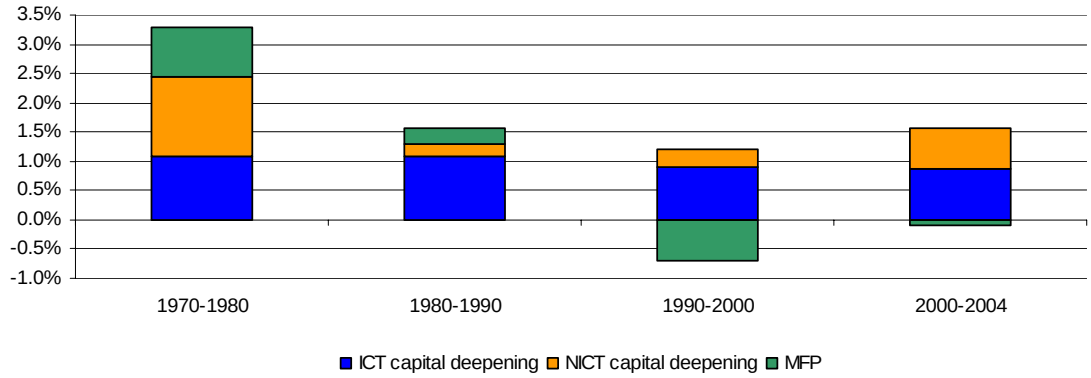
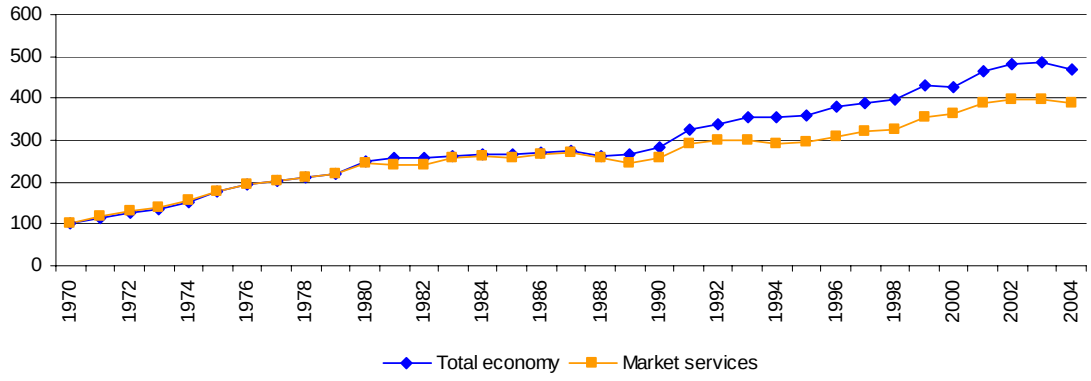



**Figure 48 Evolution of relative factor prices**
*labour price on capital price indices: 1970 = 100*



### *3.4 Capital productivity and ICT capital*

Capital productivity in market services was negative during the whole period. The negative annual average growth rate of capital productivity in market services was higher than in the total economy except for the years between 1985 and 1995 when the evolution in the total economy was mainly influenced by manufacturing.

Between 1970 and 2004, the relative importance of market services in total real capital stock rose from 68.3% to 72.6%. This increase occurred mainly in the second half of the seventies and between 1992 and 2004, and was faster during the most recent period. This evolution was mainly due to capital accumulation in Real estate, renting and business services which accounted for 71% of the real capital stock in market services in 2004. Wholesale and retail trade and Hotels and restaurants also recorded an increase in their relative importance in the capital stock in market services. By contrast, Transport, storage and communication and Financial activities were characterised by a decrease in the relative importance of their capital stock between 1970 and 2004.

The share of ICT capital services in total capital services has always been slightly higher for market services than for the total economy but the evolution has been similar due to the weight of market services in the capital services of the whole economy. The relative importance of ICT capital services was higher in manufacturing than in market services only from 1989 to 1996.

Among market services, in 2004, the most ICT-intensive industries, measured by the share of ICT capital services in total capital services of the industry, were Transport, storage and communication (25.4%), Financial activities (23.6%) and Wholesale and retail trade (13.7%).

**Figure 49 Evolution of capital productivity**
*average annual growth rate in percent*

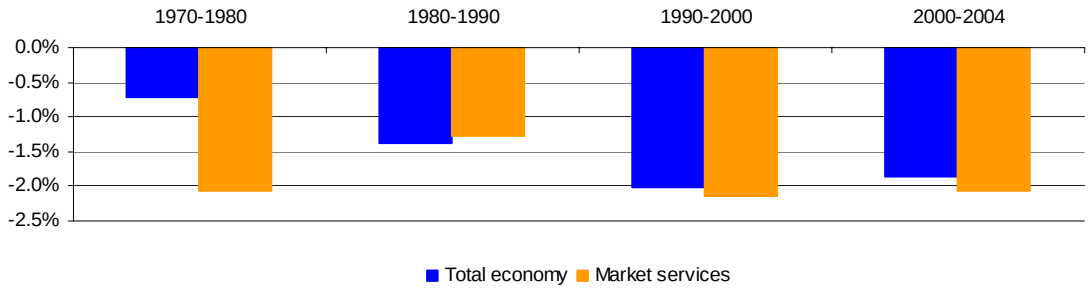



**Figure 50 Share of market services in total real productive capital stock**

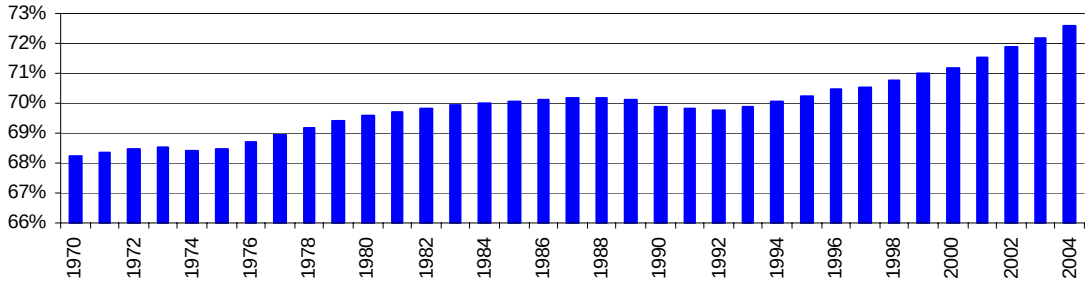



**Figure 51 Relative importance of ICT nominal capital services**

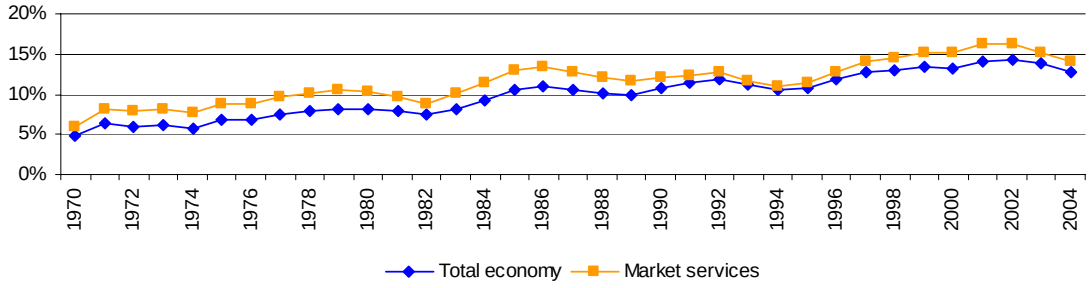



**Table 13 Share in market services real productive capital stock**
*in percent*

| | 1970 | 2004 |
|---|---|---|
| Real estate, renting and business services | 69.6 | 71.3 |
| Transport, storage and communication | 18.3 | 16.0 |
| Wholesale and retail trade | 5.7 | 7.2 |
| Financial activities | 5.3 | 4.0 |
| Hotels and restaurants | 1.0 | 1.5 |
| Total market services | 100 | 100 |

### *3.5 Structural changes in market services*

Between 1970 and 2004, two industries largely increased their relative importance in market services in terms of real value added: Real estate, renting and business services, and Transport, storage and communication. This evolution can be explained by an increase in out-sourcing of business services in various industrial sector, by the strong development of interim offices included in Real estate, renting and business services, by the single European market favouring the development of transport activities and by new technologies causing rapid growth of communication activities. By contrast, Wholesale and retail trade recorded a large fall in its relative importance. The same was observed for Financial activities and Hotels and restaurants but to a lesser extent.

The increase in relative importance of Real estate, renting and business services in terms of real value added went hand in hand with a large upsurge in the share of this industry in total hours worked in market services. The same evolution is not observed for Transport, storage and communication, for which the share in hours worked decreased between 1970 and 2004. This could be explained by enhanced competitive pressures in this industry leading to productivity gains. The only market services industry to record a negative average annual growth rate of hours worked during 1970 and 2004 is Wholesale and retail trade.

**Table 14** **Share in market services real value added and value added average annual growth rate**
*in percent*

| | 1970 | 2004 | 1970-2004 |
|---|---|---|---|
| Real estate, renting and business services | 21.5 | 43.9 | 4.6 |
| Wholesale and retail trade | 45.3 | 25.2 | 0.8 |
| Transport, storage and communication | 12.8 | 16.0 | 3.1 |
| Financial activities | 16.2 | 11.8 | 1.6 |
| Hotels and restaurants | 4.3 | 3.1 | 1.6 |
| Total market services | 100 | 100 | 2.5 |

**Table 15** **Share in market services hours worked and hours worked average annual growth rate**
*in percent*

| | 1970 | 2004 | 1970-2004 |
|---|---|---|---|
| Real estate, renting and business services | 12.2 | 35.2 | 3.9 |
| Wholesale and retail trade | 48.5 | 32.6 | -0.4 |
| Transport, storage and communication | 22.6 | 17.5 | 0.0 |
| Financial activities | 9.0 | 7.8 | 0.3 |
| Hotels and restaurants | 7.7 | 6.9 | 0.4 |
| Total market services | 100 | 100 | 0.7 |

### *3.6 Industry contribution to value added growth in market services*

During the whole period 1970-2000, the increasing share of market services in aggregate value added growth was driven for almost 40% by Real estate, renting and business activities. In the most recent period, value added growth market services was mainly led by Wholesale and retail trade. This contrasts with the shrinking share in total value added of Wholesale and retail trade in the previous period. Transport, storage and communication was the second most important driver of value added growth in market services during the eighties and nineties. From the eighties, Financial intermediation services also made a positive contribution to value added growth in market services. However Table 16 indicates that the relative impact of both Transport, storage and communication and Financial activities decreased in the most recent sub-periods.

### *3.7 Industry contribution to labour input growth in market services*

The labour input evolution in market services during the seventies was mainly driven by a large fall of total hours worked in Wholesale and retail trade and Hotels and restaurants. Those two branches constituted about 60% of the evolution in total hours worked in market services during this early period. From the eighties onwards, Real estate, renting and business activities grew fast. As a consequence, this industry has clearly become the main positive contributor to labour input growth in market services. Its contribution peaked in the second half of the nineties. Similarly to its impact on value added growth, the impact of Wholesale and retail trade on labour input growth has risen considerably in last sub-period. It can also be observed from Table 17 that the contributions of Financial activities and Transport, storage and communication to aggregate labour input growth became negative during this last period. This evolution contrasts with their quite large positive contribution during the seventies.

**Table 16 Industry contribution to value added growth in market services (1970-2004)**
*in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Wholesale and retail trade | 0.93 | -0.14 | -0.24 | 1.00 |
| Hotels and restaurants | 0.08 | 0.10 | 0.03 | 0.00 |
| Transport, storage and communication | 0.44 | 0.52 | 0.45 | 0.29 |
| Financial activities | -0.21 | 0.42 | 0.33 | 0.14 |
| Real estate, renting and business activities | 1.90 | 1.40 | 1.51 | 0.89 |
| Total market services | 3.15 | 2.29 | 2.09 | 2.31 |
| Total economy | 3.60 | 1.88 | 1.74 | 1.56 |

Remarks: the industries' contributions to annual average aggregate value added growth have been calculated at the A31 industry level. The weights reflect the average of the share of each industry in total value added at the beginning and at the end of the period covered.

**Table 17 Industry contribution to labour input growth in market services (1970-2004)**
*in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Wholesale and retail trade | -0.52 | -0.07 | -0.16 | 0.17 |
| Hotels and restaurants | -0.02 | 0.06 | 0.04 | 0.05 |
| Transport, storage and communication | 0.12 | -0.23 | 0.13 | -0.12 |
| Financial activities | 0.14 | 0.10 | -0.05 | -0.19 |
| Real estate, renting and business activities | 0.13 | 0.87 | 1.62 | 0.95 |
| Total market services | -0.15 | 0.73 | 1.59 | 0.86 |
| Total economy | -1.11 | -0.30 | 0.50 | 0.26 |

Remarks: the industries' contributions to the annual average aggregate market services labour input growth have been calculated at the A31 industry level. The weights reflect the average of the share of each industry in total hours worked at the beginning and at the end of the period covered.

### *3.8 Industry contribution to labour productivity growth in market services*

As already shown above, market services have become the main source of labour productivity growth in Belgium since 2000, despite its relatively low and decreasing productivity growth during the period 1970-2004. This driving role of market services in the most recent period is mainly due to Wholesale and retail trade. By contrast, the labour productivity growth of Real estate, renting and business activities was on the decline over the period 1970-2004. On the one hand, the labour productivity growth of Real estate, renting and business activities has been negative since the eighties. On the other hand, the contribution of this industry has shrunk and even become negative in the nineties.

While the contribution of Transport, storage and communication services still accounts for a considerable share of labour productivity growth in market services, the positive impact of this industry peaked during the eighties and nineties. During these two decades, Financial intermediation services also made a strong positive contribution to labour productivity growth in market services.

**Table 18 Industry contribution to labour productivity growth in market services (1970-2004)**
*in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Wholesale and retail trade | 1.2 | -0.1 | -0.1 | 0.9 |
| Hotels and restaurants | 0.1 | 0.0 | 0.0 | 0.0 |
| Transport, storage and communication | 0.5 | 0.8 | 0.4 | 0.4 |
| Financial activities | -0.5 | 0.4 | 0.4 | 0.4 |
| Real estate, renting and business activities | 1.8 | 0.4 | -0.2 | -0.1 |
| Total market services | 3.3 | 1.6 | 0.5 | 1.5 |
| Total economy | 4.71 | 2.18 | 1.27 | 1.29 |

Remarks: the industries' contributions to annual average labour productivity growth have been calculated at the A31 industry level. This contribution can be negative as it is the difference between weighted value added growth and weighted labour input growth. Thus a labour intensive low growth industry may have a negative effect on aggregate labour productivity growth.

## 4. Non-market services

### *4.1 Relative importance of non-market services*

During the seventies, the share of non-market services in total real and nominal value added increased rapidly before decreasing during the second half of the eighties. Since then, the evolution of these two measures of non-market services' relative importance has diverged: the share in nominal value added rose slightly to 23.5% in 2004, while the share in real value added fell slightly to 22.4% in 2004, the annual average growth rate of real value added being smaller in non-market services than in the total economy.

However, since 1970, the share of non-market services in total hours worked has continued to increase even though the pace has slowed down since the beginning of the nineties. The share of non-market services in total hours worked grew from 20% in 1970 to 31% in 2004. Over the whole period, hours worked in non-market services increased by 41.7%.

The value added deflator in non-market services has increased much more rapidly than in the total economy and the difference between the growth rates of the two price indexes has increased over the last few years.

Data information: non-market services are defined as all industries included in the NACE classification from L to P. This classification does not fully respect the definition of non-market activities which only takes into account activities for which the sale price covers less than 50% of production costs. Some activities included in these NACE classes are indeed market activities. The different indicators have to be interpreted with caution due to accounting conventions on value added measurement for non-market activities. Value added of non-market services is estimated based on value added components and not on the difference between production and intermediate inputs as for market industries. Definitions of variables are the same as for the total economy.

**Figure 52 Relative importance of non-market services in the total economy**
*in percent of total economy*

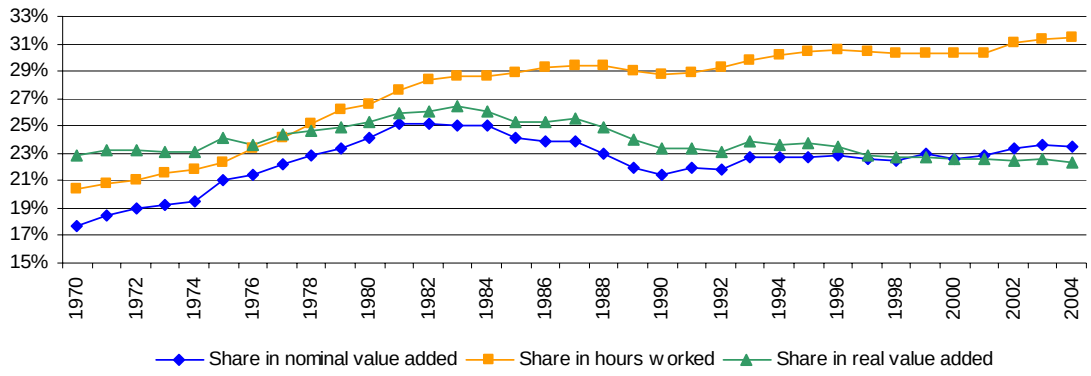



**Figure 53 Real value added average annual growth rate**
*in percent*

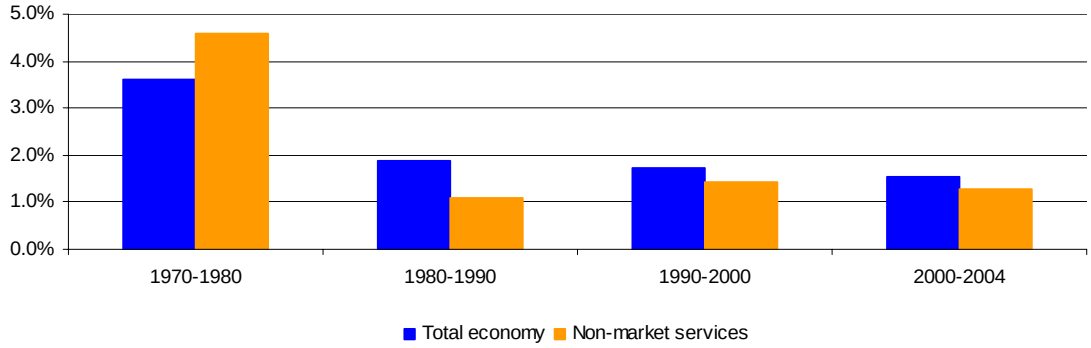
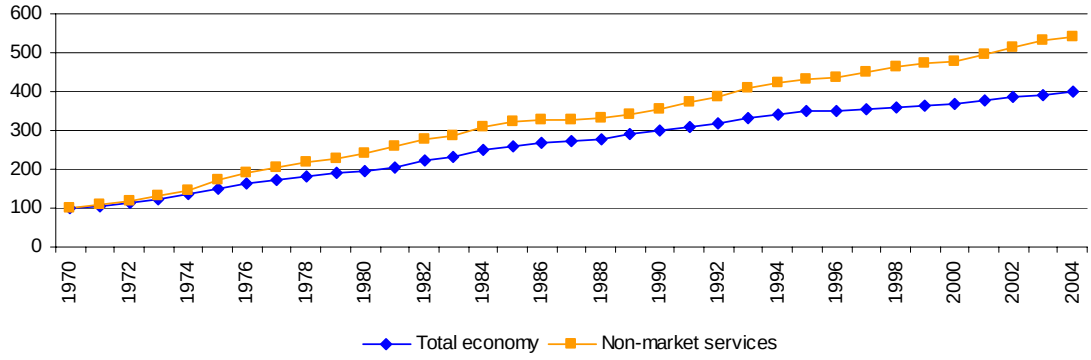



**Figure 54 Value added deflators**
*indices: 1970 = 100*



### *4.2 Structural changes in non-market services*

The structural changes in non-market services have been influenced by ageing population. The shares of Education in real value added and in hours worked declined between 1970 and 2004 while the shares of Health and social work rapidly increased. Even though its shares have decreased over the period, Public administration remains, with Health and social work, one of the main non-market service industries both in terms of value added and of hours worked.

Although its share is still limited, Other community, social and personal services recorded an increase in their relative importance partly explained by the development of leisure activities.

The only non-market services industry with a negative average annual growth rate of real value added and hours worked is Private households with employed persons. It has to be noted that the studied period ended before the introduction of the "Titre-Service/Dienstencheque" incentive mechanism.

**Table 19 Share in non-market services real value added and value added average annual growth rate**
*in percent*

| | 1970 | 2004 | 1970-2004 |
|---|---|---|---|
| Public administration | 41.0 | 31.2 | 1.4 |
| Health and social work | 18.5 | 29.9 | 3.7 |
| Education | 31.0 | 27.7 | 1.9 |
| Other community, social and personal services | 6.0 | 9.8 | 3.7 |
| Private households with employed persons | 3.5 | 1.4 | -0.4 |
| Total non-market services | 100 | 100 | 2.2 |

**Table 20 Share in non-market services hours worked and hours worked average annual growth rate**
*in percent*

| | 1970 | 2004 | 1970-2004 |
|---|---|---|---|
| Public administration | 37.8 | 31.0 | 0.4 |
| Health and social work | 13.9 | 31.9 | 3.5 |
| Education | 26.0 | 21.4 | 0.4 |
| Other community, social and personal services | 10.5 | 11.3 | 1.2 |
| Private households with employed persons | 11.8 | 4.4 | -1.9 |
| Total non-market services | 100 | 100 | 1.0 |

### *4.3 Capital accumulation*

The share of non-market services in the total real capital stock increased until 1983 when it reached 12.5% before progressively declining to 10% in 2004.

Between 1970 and 2004, Education lost its first place in terms of relative importance in capital stock of non-market services in favour of Public administration. Due to changes in society, Health and social work and Other community, social and personal services recorded an increase in their relative importance in real capital stock of non-market services.

The accumulation of ICT capital in non-market services was lower than in the total economy. However, the share of ICT capital services in total capital services, which was particularly low during the eighties, progressively rose to levels observed for the total economy. Among non-market services, Other community, social and personal services owned the largest share of capital services in ICT services. In 2004, this share was 17.7%. Health and social work and Public administration had a similar percentage of capital services under the form of ICT: 14.2%. As it is more problematic in terms of training young people the share of ICT capital services in the total capital services of Education was very low at 6.2%.

**Figure 55 Share of non-market services in total real productive capital stock**

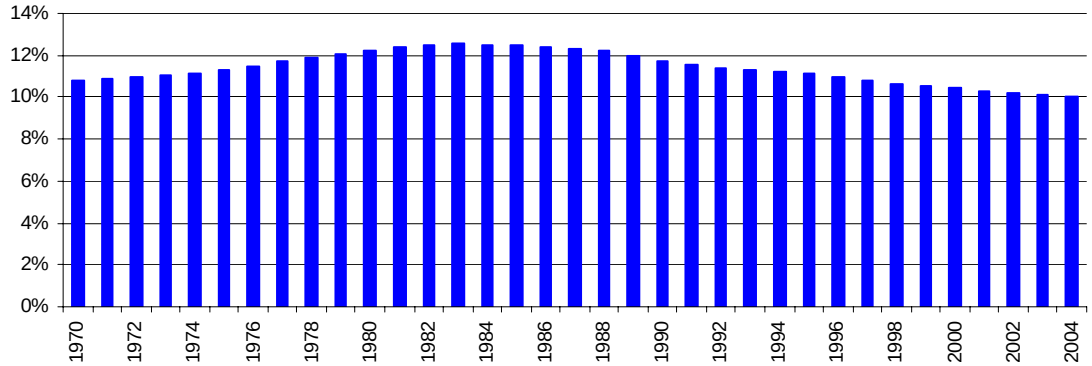
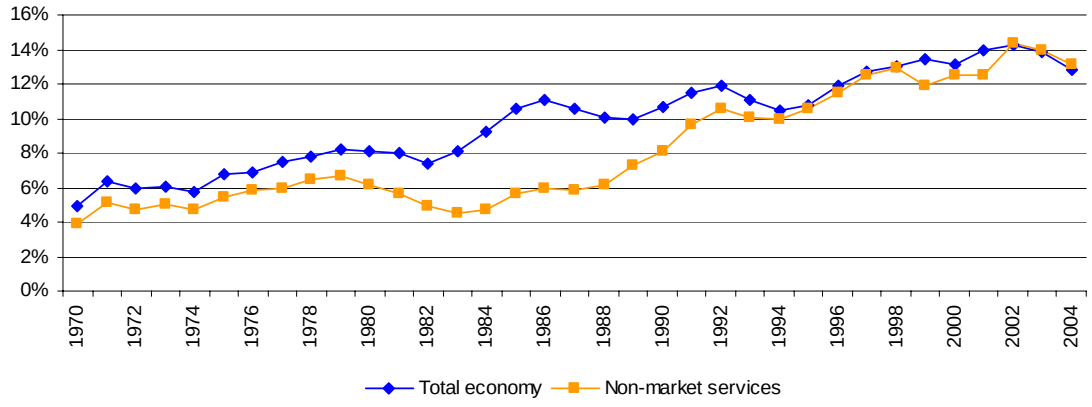



**Table 21 Share in non-market services real productive capital stock**
*in percent*

| | 1970 | 2004 |
|---|---|---|
| Public administration | 24.4 | 35.3 |
| Education | 48.3 | 30.5 |
| Health and social work | 15.5 | 19.3 |
| Other community, social and personal services | 11.9 | 15.0 |
| Total non-market services | 100 | 100 |

**Figure 56 Relative importance of ICT nominal capital services**



## 5. Other industries

### *5.1 Relative importance of other industries*

Other industries constitute a heterogeneous group including industries not elsewhere classified, i.e. Agriculture, Fishing, Extractive activities, Energy, Water and Construction. It is therefore useful to analyse them separately rather than as a group by distinguishing three categories: Primary industries (Agriculture, Fishing and Extractive industries), Electricity, gas and water supply and Construction.

As expected, Primary industries saw a sharp decline in their relative importance measured both in terms of value added and of hours worked. This decrease was higher in nominal than in real terms: the share of primary activities in total nominal value added shrank from 7.3% in 1970 to 1.2% in 2004 while their share in total real value added declined from 3.4% in 1970 to 1.4% in 2004. The relative importance of these activities for the total economy remains slightly higher when measured in hours worked. In 2004, hours worked in Primary industries accounted for 2.3% of total hours worked.

Until the end of the seventies, the share of Electricity, gas and water supply in value added, both real and nominal, increased. Since then, the share in nominal value added has been eroded while the share in real value added remained constant before growing again during the second half of the nineties. The share of Electricity, gas and water supply in total hours worked remained almost constant until the mid-eighties before starting to slowly decrease.

The relative importance of construction activities whether in terms of value added or of hours worked, follows its own pattern mainly influenced by the business cycle and mortgage interest rates. After being more or less constant during the seventies, the relative importance of these activities sharply declined during the first half of the eighties before recording a limited rebound during the second half of the eighties and at the beginning of the nineties and stabilising thereafter.

Data information: other industries are defined as all industries included in the NACE classification A, B, C, E and F. Definitions of variables are the same as for the total economy

**Figure 57 Relative importance of Primary industries in total economy**
*in percent of total economy*

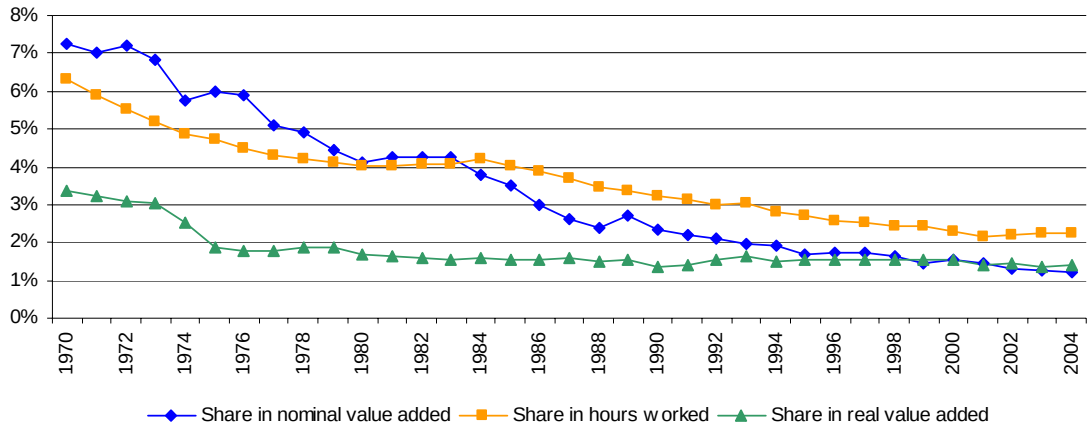



**Figure 58 Relative importance of Electricity, gas and water supply in total economy**
*in percent of total economy*

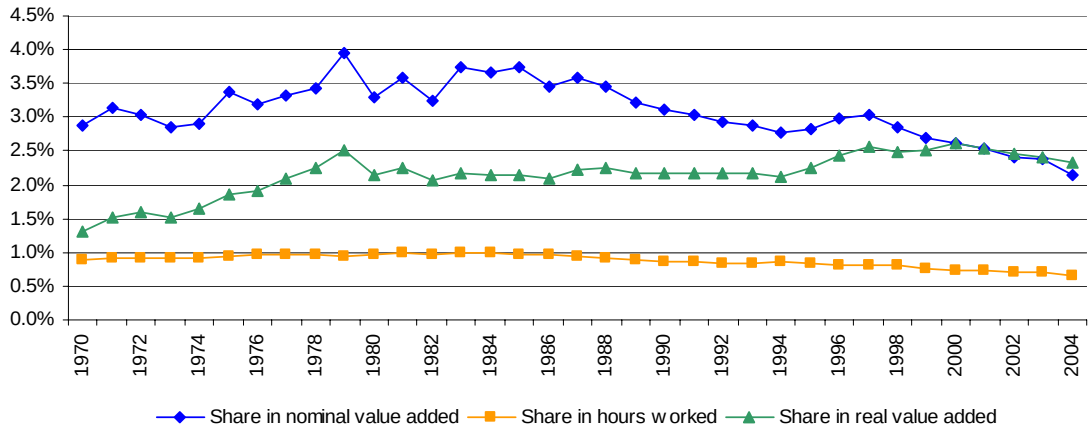
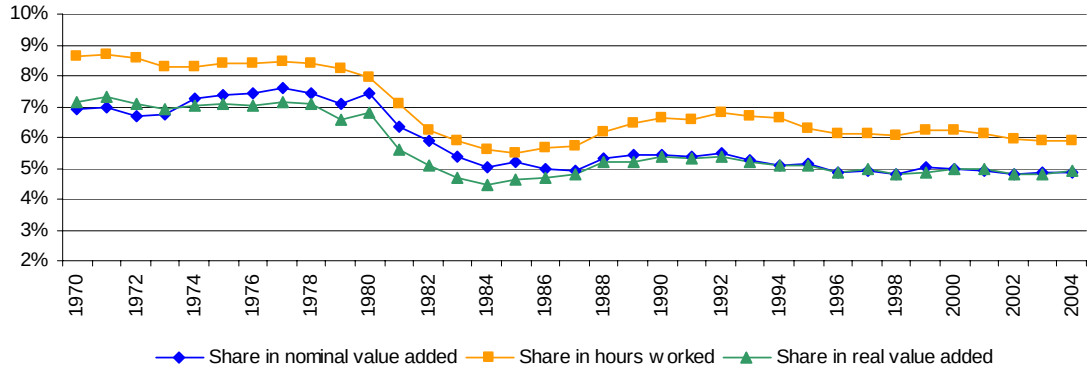



**Figure 59 Relative importance of Construction in total economy**
*in percent of total economy*



### *5.2 Main evolutions in Electricity, gas and water supply*

Real value growth in Electricity, gas and water supply was particularly dynamic during the seventies and to a lesser extent also during the nineties. However, the most recent period, 2000-2004, was marked by a strong decrease in value added of these activities.

Over the whole period, 1970-2004, labour contribution to value added growth was negative and this negative contribution was highest between 2000 and 2004, reaching almost -1%. By contrast, capital contribution to value added growth was always positive. However, when this contribution is split between ICT and non-ICT capital, only ICT capital contribution maintained a positive sign over the whole period, with non-ICT capital contribution being negative between 2000 and 2004. MFP contribution to value added growth was particularly strong in Electricity, gas and water supply relative to that observed in the total economy. It was only during the most recent period that MFP contribution turned negative. The relatively bad performance in terms of the main growth components during the last few years has to be analysed in regard to structural changes in the production process of these activities. It takes some time for those structural changes to produce positive impacts on growth.

Labour productivity growth has always been high in Electricity, gas and water supply except for the most recent period when the average annual rate of labour productivity growth fell below 1%. Capital deepening, both ICT and non ICT , has always contributed positively to productivity growth. During 2000-2004, this contribution was able to compensate for the strong decline in MFP such that growth of labour productivity was nonetheless positive.

Productivity gains contributed to the slower pace of increase in the value added deflator of Electricity, gas and water supply than in that of the total economy. The labour cost evolution was close to that observed for the total economy except during the eighties when wage growth was higher in Electricity, gas and water supply than in the rest of the economy.

**Table 22 Main indicators**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Value added | 8.5 | 2.1 | 3.6 | -1.5 |
| - Labour contribution | -0.1 | -0.5 | -0.4 | -0.9 |
| - ICT capital contribution | 0.6 | 0.5 | 0.6 | 0.7 |
| - Non-ICT capital contribution | 2.6 | 0.4 | 0.7 | -0.3 |
| - MFP | 5.4 | 1.7 | 2.7 | -1.0 |
| Hourly labour productivity | 8.8 | 3.5 | 4.7 | 0.8 |
| - ICT capital deepening | 0.6 | 0.5 | 0.7 | 0.8 |
| - Non-ICT capital deepening | 2.8 | 1.3 | 1.4 | 1.0 |
| Relative prices | -3.6 | -0.8 | -3.5 | -1.9 |
| Relative labour costs | 0.0 | 0.4 | 0.1 | 0.0 |

### *5.3 Main evolutions in Construction*

Real value added growth in Construction increased rapidly during the seventies before declining during the eighties and renewing with a progressively increasing growth from 1990.

The labour contribution to this evolution of value added was always negative over the period but with its magnitude varied. The most recent period, 2000-2004, was marked by a stronger negative labour contribution than during the nineties. Capital contribution, both ICT and non-ICT, was always positive during 1970-2004, reaching 0.9% from the beginning of the eighties. The main part of this positive contribution came from non-ICT capital. MFP contribution to value added growth in Construction was quite different from MFP contribution for the total economy. After being strong during the seventies, MFP contribution in Construction was particularly weak during the eighties and the nineties but accelerated to reach an average annual growth rate of 1.3% in the most recent period.

Labour productivity growth was influenced by and followed the same pattern as MFP: initially, strong during the seventies, then weaker during the eighties and the nineties and accelerating during 2000-2004. Capital deepening, both ICT and non-ICT, positively contributed to labour productivity growth, fluctuating across the decades at around 1%. ICT capital deepening contributed less than non-ICT capital deepening to labour productivity growth.

From the beginning of the eighties, the value added deflator of Construction increased at a slower pace than the deflator of the whole economy. After fast growth during the seventies and a slower increase during the eighties, labour costs in Construction followed the same trend as labour costs in the total economy.

**Table 23 Main indicators**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| Value added | 3.1 | -0.4 | 1.0 | 1.4 |
| - Labour contribution | -1.4 | -1.7 | -0.1 | -0.9 |
| - ICT capital contribution | 0.2 | 0.3 | 0.2 | 0.2 |
| - Non-ICT capital contribution | 0.2 | 0.6 | 0.7 | 0.7 |
| - MFP | 4.1 | 0.4 | 0.2 | 1.3 |
| Hourly labour productivity | 5.0 | 1.6 | 1.1 | 2.6 |
| - ICT capital deepening | 0.2 | 0.3 | 0.2 | 0.2 |
| - Non-ICT capital deepening | 0.7 | 1.0 | 0.8 | 1.0 |
| Relative prices | 1.3 | -0.8 | -0.2 | -0.4 |
| Relative labour costs | 1.2 | -0.8 | 0.0 | 0.1 |

## Annex

### a. The growth accounting model

The growth accounting model is based on various assumptions, among which the following are important: (i) the production function exhibits constant returns to scale and (ii) product and factor markets are characterised by perfect competition.

The growth accounting model divides the growth in value added into three different sources: increase in capital, in labour and in multi-factor productivity (MFP). Capital contribution is obtained by multiplying the increase in capital by capital's share of output ($\alpha$) and labour contribution is obtained by multiplying the increase in labour by labour's share of output ($1-\alpha$). Because MFP is not observable directly, it is measured indirectly as the change in output that cannot be explained by changes in inputs. MFP is also called the Solow residual after Robert Solow who first showed how to compute it[6]. Therefore, measure of MFP depends on the availability and quality of data concerning the other sources of growth.

In many productivity studies, the contribution of capital is measured by using stocks of assets based on accounting estimation of depreciation. However, according to the OECD Manuals "Measuring productivity" and "Measuring capital", the appropriate measure for calculating the contribution of the capital input is the flow of services produced by capital assets and not capital stocks for the following reasons:

- The other variables in the growth accounting model are flows. So the use of net or gross stocks is not suitable.
- Gross or net stocks do not reflect the productive efficiency of capital assets declining with age. Gross capital stock values all assets in use as if they were still new and net capital stock measures the market value of capital assets. The reduction in the value of fixed assets (depreciation/consumption of fixed capital) is not necessarily identical to the loss of productive efficiency.
- In calculating capital stocks, each asset in the stocks is weighted by its market value, independently of its service life.

Consequently, to have a good measure of MFP, it is important to evaluate flows of capital services, even if official data do not often exist as it is the case in Belgium.

The measurement of capital services is realised in two stages. The first stage consists in the calculation of productive capital stocks, which are equivalent to the quantity of services produced by each type of asset. The second stage is the construction of an aggregate measure of the productive contribution of the different types of capital assets (the volume index of capital services). The weights used to derive a global index are the user costs of capital or rental prices,

[6] Robert M. Solow, Technical Change and the Aggregate Production Function, *Review of Economics and Statistics* 39 (1957), 312-320.

which correspond to the price of the services. An usual and theoretically recommended index formula to construct a volume index of capital services is the Törnqvist index:

$$\ln(K_{t+1}/K_t) = \sum_i 0.5(v^i_{t+1} + v^i_t)\ln(K^i_{t+1}/K^i_t) \qquad \text{where } v^i_t \equiv \frac{uc^i_t K^i_t}{\sum_i uc^i_t K^i_t}$$

$K^i_t$ is the productive capital stock of the asset type i at time t. This productive capital stock is obtained by the perpetual inventory method with a geometric rate of depreciation. $uc^i_t$ is the user cost of the asset i at time t. The product of the user cost of the asset i and the productive capital stock gives the value of nominal capital services for asset type i: $uc^i_t K^i_t$. The overall value of capital services is obtained by aggregating all asset types: $\sum_i uc^i_t K^i_t$.

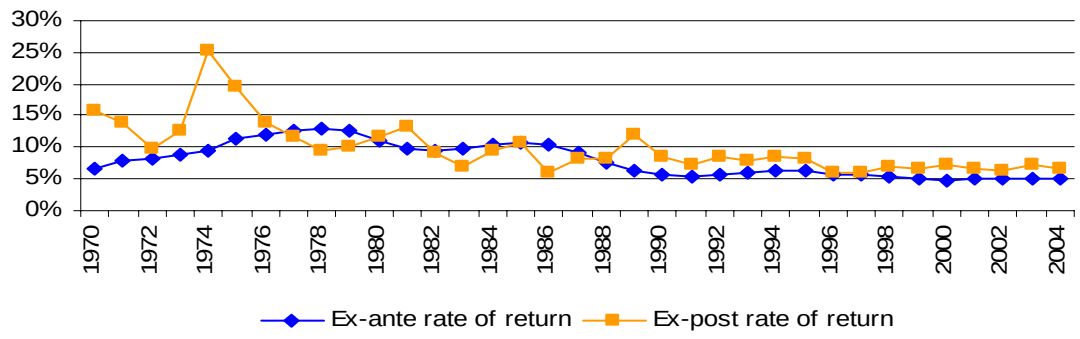
The user cost is computed as:

$$uc^i_{t,0} = q^i_{t-1,0}(r + \delta^i_t - \zeta^i_t + \delta^i_t \zeta^i_t)$$

with $q^i_{t-1,0}$ the price of new asset i at time t-1, $\delta^i_t$, the rate of depreciation of the asset i, $\zeta^i_t$, the revaluation or capital gains term defined as the expected asset price change between the beginning and the end of the period of a new asset and $r$, the nominal rate of return, which corresponds to the expected remaining remuneration for the capital owner once depreciation and asset price changes have been taken into account.

Two rates of return of capital can be computed: an ex-ante rate of return based on the average interest rates observed each year on financial markets and an ex-post rate of return calculated from the share of capital income on the nominal productive capital stock. These two rates are illustrated in the case of Belgium in the following graph.

**Figure 60 Ex-ante and ex-post capital rate of return**
*in percent*



The two rates of return of the productive capital stock have declined over the whole period, 1970-2004. However, since the nineties, this declining trend has slowed down. Since 1988, the ex-ante rate of return has been systematically below the ex-post rate of return. With 6.8% in 2004, the ex-post rate of return is 1.6% higher than the ex-ante rate of return. These calculations do not take into account the fiscal effect created by changes in tax rates on business income.

All estimates used in the report are based on data gathered for the EUKLEMS project. This project applies a geometric pattern to estimate productive capital stocks for all countries. However, this is not the only methodology available to construct capital services and these different methodologies imply differences in MFP. A sensitivity analysis of capital services is provided in the Federal Planning Bureau Working Paper 02-07.

By comparing capital contributions calculated from stocks and from services, it is possible to isolate the impact of capital improvement, usually called capital efficiency gains. Table 24 illustrates these gains for the total economy.

**Table 24 Contribution to value added growth with capital efficiency gains for total economy**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| VA | 3.6 | 1.9 | 1.7 | 1.6 |
| Labour contribution | -0.7 | -0.2 | 0.3 | 0.2 |
| Capital contribution | 1.5 | 1.1 | 1.3 | 1.2 |
| *Of which efficiency gains* | *0.5* | *0.6* | *0.5* | *0.5* |
| MFP | 2.8 | 1.0 | 0.1 | 0.2 |

## b. Description of industries and products

**Table 25 Description of the sectors**

| Code NACE Rev1 | Description |
|---|---|
| AA | Agriculture, hunting and forestry |
| BB | Fishing |
| CA | Mining and quarrying of energy producing materials |
| CB | Mining and quarrying except energy producing materials |
| DA | Food products, beverages and tobacco |
| DB | Textiles and textile products |
| DC | Leather and leather products |
| DD | Wood and wood products |
| DE | Pulp, paper and paper products, publishing and printing |
| DF | Coke, refined petroleum products and nuclear fuel |
| DG | Chemicals, chemical products and man-made fibres |
| DH | Rubber and plastic products |
| DI | Other non-metallic mineral products |
| DJ | Basic metals and fabricated metal products |
| DK | Machinery and equipment n.e.c. |
| DL | Electrical and optical equipment |
| DM | Transport equipment |
| DN | Manufacturing n.e.c. |
| EE | Electricity, gas and water supply |
| FF | Construction |
| GG | Wholesale and retail trade services; repair services of motor vehicles, motorcycles and personal and household goods |
| HH | Hotels and restaurants |
| II | Transport, storage and communication |
| JJ | Financial intermediation |
| KK | Real estate, renting and business activities |
| LL | Public administration and defence, compulsory social security |
| MM | Education |
| NN | Health and social work |
| OO | Other community, social and personal services |
| PP | Private households with employed persons |
| QQ | Extra-territorial organisations and bodies |

**Table 26 Description of the assets**

| Code | Description | CPA Reference |
|---|---|---|
| 1 | Products of Agriculture, hunting, forestry and fishing | 01+ 02+ 05 |
| | Equipment: | |
| 2 | - Metal Products and Machinery | 28 to 33 + 36, except CPA references of IT and communications equipment. |
| 3 | - Transport Materials | 34 + 35 |
| | Construction: | 45 |
| 4 | - Residential buildings | |
| 5 | - Other constructions | |
| 6 | Other products | All other assets |
| 7 | Softwares | 72 |
| 8 | IT equipment[7] | 300, 321, 332, 333 |
| 9 | Communications equipment[8] | 313,322, 323 |

[7] OECD definition of IT equipment from "Working Party on Indicators for the Information Society, Guide to measuring the Information Society, DSTI/ICCP/IIS(2005)6/FINAL, November 2005".

[8] OECD definition of Communications equipment.

## c. Value added growth decomposition at industry level

**Table 27 Value added growth decomposition**
*average annual growth rate in percent*

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| **Food products, beverages and tobacco** | | | | |
| VA | 2.9 | 2.0 | -0.1 | 2.3 |
| Labour contribution | -1.9 | -0.9 | -0.7 | -0.3 |
| ICT capital contribution | 0.3 | 0.5 | 0.3 | 0.2 |
| Non-ICT capital contribution | 0.7 | 1.0 | 1.0 | 0.3 |
| MFP | 3.8 | 1.5 | -0.8 | 2.1 |
| **Textiles and textile products** | | | | |
| VA | -1.6 | 2.5 | 1.4 | -3.4 |
| Labour contribution | -4.9 | -2.2 | -3.6 | -4.4 |
| ICT capital contribution | 0.3 | 0.7 | 0.2 | 0.0 |
| Non-ICT capital contribution | -0.3 | 0.6 | 0.4 | -0.7 |
| MFP | 3.3 | 3.5 | 4.5 | 1.7 |
| **Leather and leather products** | | | | |
| VA | -7.4 | -3.0 | -8.4 | -3.7 |
| Labour contribution | -7.4 | -4.3 | -4.3 | -4.5 |
| ICT capital contribution | 0.1 | 0.5 | 0.2 | -0.4 |
| Non-ICT capital contribution | -0.4 | 0.2 | 0.3 | -0.6 |
| MFP | 0.3 | 0.6 | -4.6 | 1.8 |
| **Wood and wood products** | | | | |
| VA | 9.1 | 5.1 | 2.4 | 5.7 |
| Labour contribution | -3.2 | -0.6 | -0.2 | -0.2 |
| ICT capital contribution | 0.4 | 0.7 | 0.3 | 0.6 |
| Non-ICT capital contribution | 0.3 | 0.5 | 0.1 | 0.3 |
| MFP | 11.6 | 4.5 | 2.1 | 5.0 |
| **Pulp, paper and paper products, publishing and printing** | | | | |
| VA | 1.3 | 3.8 | 1.0 | 0.0 |
| Labour contribution | -2.3 | -0.4 | -0.6 | -1.9 |
| ICT capital contribution | 0.7 | 1.7 | 1.4 | 0.7 |
| Non-ICT capital contribution | 0.0 | 1.4 | 1.3 | 0.6 |
| MFP | 2.9 | 1.2 | -1.1 | 0.5 |
| **Coke, refined petroleum products and nuclear fuel** | | | | |
| VA | 17.6 | -0.6 | -7.1 | -0.6 |
| Labour contribution | 0.3 | -1.9 | -1.0 | 1.2 |
| ICT capital contribution | 2.5 | 1.5 | 1.2 | 0.8 |
| Non-ICT capital contribution | 1.2 | -0.4 | 0.9 | 0.5 |
| MFP | 13.6 | 0.2 | -8.3 | -3.1 |
| **Chemicals, chemical products and man-made fibres** | | | | |
| VA | 11.5 | 8.5 | 4.6 | 1.2 |
| Labour contribution | -0.6 | 0.0 | -0.5 | -0.9 |
| ICT capital contribution | 0.4 | 0.7 | 1.0 | 0.6 |
| Non-ICT capital contribution | 1.2 | 2.1 | 2.9 | 1.0 |
| MFP | 10.5 | 5.7 | 1.3 | 0.5 |
| **Rubber and plastic products** | | | | |
| VA | 11.8 | 9.2 | 3.2 | 5.0 |
| Labour contribution | -0.4 | 0.1 | -0.4 | -0.6 |
| ICT capital contribution | 0.5 | 1.1 | 0.3 | 0.3 |
| Non-ICT capital contribution | 1.5 | 2.9 | 0.4 | 0.2 |
| MFP | 10.2 | 5.1 | 2.9 | 5.0 |

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| **Other non-metallic mineral products** | | | | |
| VA | 2.2 | 2.0 | 0.4 | 0.1 |
| Labour contribution | -2.8 | -2.0 | -1.3 | -1.0 |
| ICT capital contribution | 0.1 | 0.4 | 0.2 | 0.3 |
| Non-ICT capital contribution | 0.1 | 1.0 | 0.9 | 0.2 |
| MFP | 4.7 | 2.6 | 0.6 | 0.6 |
| **Basic metals and fabricated metal products** | | | | |
| VA | 2.3 | 2.3 | 0.4 | 1.7 |
| Labour contribution | -2.5 | -2.2 | -1.6 | -1.1 |
| ICT capital contribution | 0.2 | 0.6 | 0.4 | 0.2 |
| Non-ICT capital contribution | -0.4 | 0.2 | 0.5 | 0.2 |
| MFP | 5.0 | 3.7 | 1.2 | 2.5 |
| **Machinery and equipment n.e.c.** | | | | |
| VA | 4.2 | 1.4 | -0.1 | -1.1 |
| Labour contribution | -2.0 | -1.3 | -1.6 | -1.5 |
| ICT capital contribution | 0.5 | 1.0 | 0.2 | 0.3 |
| Non-ICT capital contribution | 0.3 | 0.4 | 0.0 | 0.1 |
| MFP | 5.2 | 1.3 | 1.3 | 0.0 |
| **Electrical and optical equipment** | | | | |
| VA | 5.0 | 1.0 | 3.9 | -3.7 |
| Labour contribution | -1.7 | -2.1 | -1.7 | -4.1 |
| ICT capital contribution | 1.2 | 2.0 | 1.2 | 0.2 |
| Non-ICT capital contribution | 0.5 | 0.4 | 0.6 | -0.2 |
| MFP | 4.9 | 0.6 | 3.8 | 0.4 |
| **Transport equipment** | | | | |
| VA | 7.4 | 4.4 | 1.2 | 0.2 |
| Labour contribution | 0.6 | -0.1 | -0.9 | -2.2 |
| ICT capital contribution | 0.1 | 0.4 | 0.3 | 0.2 |
| Non-ICT capital contribution | 0.4 | 1.7 | 1.0 | 0.2 |
| MFP | 6.3 | 2.5 | 0.8 | 2.0 |
| **Manufacturing n.e.c.** | | | | |
| VA | 2.8 | -0.6 | -0.1 | -1.1 |
| Labour contribution | -3.8 | -2.1 | -2.1 | -1.9 |
| ICT capital contribution | 0.3 | 0.6 | 0.3 | 0.4 |
| Non-ICT capital contribution | 0.2 | 0.4 | -0.1 | -0.1 |
| MFP | 6.2 | 0.5 | 1.8 | 0.6 |
| **Wholesale and retail trade services, repair services of motor vehicles, motorcycles and personal and household goods** | | | | |
| VA | 2.1 | -0.3 | -0.9 | 4.1 |
| Labour contribution | -0.7 | -0.1 | -0.3 | 0.3 |
| ICT capital contribution | 0.9 | 1.2 | 0.9 | 0.8 |
| Non-ICT capital contribution | 0.8 | 0.9 | 1.1 | 0.9 |
| MFP | 1.2 | -2.3 | -2.6 | 2.0 |
| **Hotels and restaurants** | | | | |
| VA | 1.8 | 2.6 | 0.8 | 0.0 |
| Labour contribution | -0.2 | 0.6 | 0.5 | 0.6 |
| ICT capital contribution | 0.5 | 0.6 | 0.3 | 0.3 |
| Non-ICT capital contribution | 1.2 | 0.9 | 0.6 | 0.4 |
| MFP | 0.3 | 0.6 | -0.6 | -1.3 |
| **Transport, storage and communication** | | | | |
| VA | 3.3 | 3.8 | 2.9 | 1.8 |
| Labour contribution | 0.3 | -0.7 | 0.4 | -0.4 |
| ICT capital contribution | 1.2 | 1.3 | 1.9 | 0.6 |
| Non-ICT capital contribution | 1.3 | 0.2 | 0.4 | 0.3 |
| MFP | 0.4 | 3.0 | 0.1 | 1.3 |

| | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2004 |
|---|---|---|---|---|
| **Financial intermediation** | | | | |
| VA | -1.7 | 3.7 | 2.8 | 1.2 |
| Labour contribution | 0.6 | 0.6 | -0.3 | -1.4 |
| ICT capital contribution | 1.3 | 2.5 | 1.0 | 0.8 |
| Non-ICT capital contribution | 0.9 | 0.1 | 0.0 | 0.7 |
| MFP | -4.5 | 0.5 | 2.1 | 1.0 |
| **Real estate, renting and business activities** | | | | |
| VA | 7.3 | 3.9 | 3.6 | 2.0 |
| Labour contribution | 0.3 | 1.7 | 2.4 | 1.3 |
| ICT capital contribution | 1.4 | 0.8 | 0.8 | 1.3 |
| Non-ICT capital contribution | 1.6 | 0.6 | 1.5 | 1.6 |
| MFP | 3.9 | 0.8 | -1.1 | -2.1 |

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