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Constructing Productive ICT Capital Stock Series for Belgium

T. Pamukçu
W. Van Zandweghe

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In this paper, a methodology is proposed for the construction of ICT investment and capital stocks in Belgium. The series are obtained in nominal and in real terms and at macroeconomic as well as sector level. The ICT assets distinguished are IT equipment and communications equipment, leaving software out of the analysis. After calculation of investment expenditure on both assets, the expenditure is transformed into quality-adjusted volume terms by means of harmonised price indices derived from appropriate U.S. indices. Productive capital stocks are calculated by means of the perpetual inventory method, and rental prices of the ICT capital services are obtained as well.

JEL Classification: C82, E22

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I Introduction

A methodology is proposed in this paper for the construction of ICT investment and capital stock series in real and in nominal terms for Belgium, as well as for the calculation of the rental price of ICT assets. Three ICT assets are distinguished: IT equipment, communications equipment and software.

The method used for the construction of investment expenditures on IT and communications equipment is identical. Therefore, the construction of nominal investment series for these two ICT assets is discussed simultaneously in Section 2. The construction of investment expenditures on software, on the other hand, cannot be based on the same data source and requires other methods. Some suggestions are made in Section 3 but investment and capital stock series for software are not constructed in this report.

Once investment expenditures are obtained, proper price indices are needed to transform ICT investment into base-year efficiency units. The importance of the use of constant-quality price indices for ICT asset has been widely recognised.[1] Ideally, hedonic indices should be used for this purpose; however, as such data are not available for Belgium, harmonised price indices will be used instead. This is the subject of Section 4.

To transform subsequently the real investment series obtained for each ICT asset into a capital stock, the perpetual inventory method is used. The calculation of the productive capital stock is based on the best practice advocated by the OECD (2001). The assumptions involved in the calculations are discussed in Section 5.

Section 6 looks at the issues related to the calculation of the capital stock of each ICT asset at the sector level. ICT investment and capital stock series at the sector level are presented for the period 1990-2000 in the appendix at the end of this report.

In the last section of this report, we examine the evolution of the share of ICT investment and capital in total nominal investment and capital stock, respectively, in Belgium. The discussion pertains to the six major sectors over the period 1990-2000. Cross country data is used in order to proceed to an international comparison at the macro and the sector level.

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1. See, for instance, Jorgenson and Stiroh (2000), Jorgenson (2001) and Schreyer (2001).

II IT equipment and communications equipment investment

A. Data construction and assumptions

For each ICT asset (i = IT equipment or communications equipment), the macroeconomic investment series are obtained indirectly, starting from the condition that domestic supply equals domestic use:

$$Q_{it} + M_{it} - X_{it} + W_{it} + (T_{it} - S_{it}) = CJ_{it} + C_{it} + I_{it} + DS_{it}. \tag{1}$$

On the left hand side of this equation, Q_{it}, M_{it} and X_{it} respectively stand for domestic production, imports and exports of the asset, and the difference between total supply and exports $(Q_{it} + M_{it} - X_{it})$ denotes domestic supply. The remaining terms are margins (W_{it}) and net taxes $(T_{it} - S_{it})$, accounting for the fact that total supply is measured at basic prices whereas use is measured at acquisition prices. Domestic use is described on the right hand side: CJ_{it} denotes intermediate consumption, C_{it} is final consumption, I_{it} is investment and DS_{it} gives the change in stocks.

Unlike data on investment, detailed data on the import and export of goods are readily available for the period 1978-2000. These data are further discussed in Subsection C. Detailed production data are available for the period 1994-2000 (from the National Bank of Belgium) and the growth rate of imports of each asset is used to backcast production for each ICT asset.[1] Thus, time series of domestic supply at basic prices are obtained for each ICT asset covering 1978-2000.

Investment in IT and communications equipment is at present only available for the year 1995 (from the detailed input-output investment table). Therefore, estimates of IT and communications equipment investment are calculated by adjusting domestic supply by the amount of investment per euro of domestic supply in 1995:

$$I_{it} = \frac{I_{i,95}}{Q_{i,95} + M_{i,95} - X_{i,95}} (Q_{it} + M_{it} - X_{it}) \qquad t = 1978\ldots2000 \tag{2}$$

This adjustment sets the level of ICT investment expenditure in 1995 equal to the ICT expenditure level of the input output investment table. The 1995 ratio of investment to domestic supply amounts to 1.1 for IT equipment and 0.7 for communications equipment. The large size of these ratios is explained by the fact

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1. For IT equipment, the ratio of domestic production over imports equals 0.24 on average for 1994-2000. For communications equipment this ratio is larger, namely 0.81. The ratios of both assets declined, however, over the given period.

that supply is measured at basic prices whereas investment is measured at acquisition prices.[1]

B. Foreign trade data

The foreign trade data used to approximate ICT investment is taken from the OECD International Trade in Commodities Statistics (ITCS).[2] These statistics are classified according to the Standard International Trade Classification (SITC). For 1990-1998, the trade data are available in its third revision (SITC rev. 3), which corresponds to ISIC rev. 3 and hence to NACE-BEL. Historical series for 1961-1990 are only available in SITC rev. 2, which does not correspond to the third revision. However, by comparing headings and values of entries at the most detailed level for the year 1990, in which data are available in both SITC rev. 2 and rev. 3, almost the entire ICT definition could be derived in terms of SITC rev. 3 from the data in SITC rev. 2 for the period 1961-90.

TABLE 1 - ICT definition in NACE-BEL

NACE class	Description
	IT equipment
3000	Office, accounting and computing machinery
3210	Electronic valves and tubes and other electronic components
3320	Instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial pro-cess control equipment
3330	Industrial process control equipment
	Communications equipment
3130	Insulated wires and cable
3220	Television and radio transmitters and apparatus for line telephony and line telegraphy
3230	Television and radio receivers, sound and video recording or reproducing apparatus and associated goods

Table 1 gives the definition of ICT manufacturing as proposed by the OECD (1998), with the description of each NACE-BEL class, and with the distinction between IT equipment and communications equipment added. This definition is adopted here, resulting in a definition comprising investment in ICT manufactured goods and disregarding investment in ICT services for lack of data.

Table 2 gives the ICT definition in terms of the NACE-BEL and the corresponding SITC rev. 3 classification. The basic heading 76381 (video recording or reproducing apparatus) corresponds to both NACE-BEL class 3220 and 3230. However, since it cannot be broken down further, it is assigned entirely to NACE-BEL 3230, as both class 3220 and 3230 belong to the definition of communications equipment.

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1. That the share of investment in domestic supply is lower for communications equipment than for IT equipment, is mainly attributable to the fact that domestic production of communications equipment relative to investment is much larger than in the case of IT equipment. Moreover, for communications equipment, intermediate consumption per euro of investment is much larger, and margins per euro of investment are much lower than in the case of IT equipment.
2. Use of this data source is proposed in Pamukçu (2001).

TABLE 2 - Correspondence of NACE-BEL and SITC Rev. 3

NACE-BEL	3000	3130	3210	3220	3230	3320	3330
SITC Rev. 3	726.55	773	772.2	763.81	761	764.83	874.69
	75		772.3	764.1	762	871.3	
			776	764.3	763	873	
			778.6	764.82	764.2	874[a]	
				764.91			

a. Except the basic heading 874.69

Table 3 gives the derived correspondence between the second and third revision of the SITC, together with import and export values of 1990 (in 1,000 U.S. dollar), the only year for which data are available in both revisions. Almost all the SITC revision 3 entries in the first column of the table have a counterpart in revision 2 in the second column of the table. For most codes the headings as well as the values correspond between revision 2 and 3, as is the case for division 75, groups 761, 762, 763 and 776, subgroups 764.3, 772.2, 772.3, 773.1 and basic headings 764.81, 764.82, 764.83, 764.91, 764.92 and 764.99. In a few cases, the headings do not correspond but the values of different codes are identical, enabling to match these codes: subgroups 778.6 and 871.3 in revision 3 correspond respectively to headings 778.84 and 871.03 in revision 2.

Certain headings in Table 3 do not correspond between revisions 2 and 3, but nevertheless allow to compose the groups that make up the ICT assets. First, the sum of the values of SITC groups 873 and 874 is the same for 1990 in revision 2 and 3, although taken separately the value of both groups differs between both revisions. However, since groups 873 and 874 both correspond to NACE-BEL class 3320, this does not impede retrieving class 3320. Second, basic heading 874.69 is not separable of group 874 in revision 2, although it constitutes a separate NACE-BEL class (3330). Therefore, the goods of NACE-BEL 3330 and NACE-BEL 3320 cannot be isolated before 1990. However, since both NACE-BEL classes belong to the same ICT product, viz. IT equipment, separation of both NACE classes is not necessary. Third, group 764 corresponds in SITC revision 2 and 3, but its subgroups, 764.1 and 764.2, do not. Again this does not influence the data series between the two revisions, since both subgroups belong to communications equipment.

TABLE 3 -   Correspondence between SITC **REV. 3 and** REV. 2

	(a) SITC *Revision 3*	Import	Export
72655	Offset printing machinery, sheet fed, office type	205.7	1,633.0
75	Office machines and auto. data processing machines	2,531,084.1	1,235,221.8
761	Television receivers, whether or not combined	361,293.9	724,015.7
762	Radio-broadcast receivers, whether or not combined	241,314.6	154,172.3
763	Sound recorders or reproducers; television recorders	207,906.2	238,371.0
7641	Electrical apparatus for line telephony or teleg.	258,444.6	119,913.5
7642	Microphones; loudspeakers; headphones; amplifiers	111,406.2	135,796.8
7643	Transmission apparatus for radio-broadcasting, etc.	48,541.4	26,809.2
76481	Reception appar. for radio-teleph., -telegr., n.e.s.	9,765.9	16,609.1
76482	Television cameras	99,668.1	27,991.3
76483	Radar, radio-navigat. aid, -remote control apparatus	32,763.3	42,353.3
76491	Parts & accessories for apparatus of heading 7641	105,427.8	358,690.9
76492	Parts & accessories for apparatus of heading 7642	18,377.2	2,189.7
76499	Parts & accessories for apparatus of group 763	26,746.4	102,564.1
7722	Printed circuits	58,453.7	99,313.3
7723	Electrical resistors, other than heating resistors	20,543.4	56,132.8
7731	Insulated wire, cable & other insulated conductors	323,514.4	350,629.8
776	Cathode valves & tubes; diodes; integrated circuits	490,625.5	146,749.4
7786	Electric capacitors, fixed, variables or adjustable	58,137.8	82,615.3
8713	Microscopes (non-optical) ; diffract. apparat., n.e.s.	3,488.8	667.6
873	Meters & counters, n.e.s.	74,446.2	22,947.6
874	Measuring, analysing & controlling apparatus, n.e.s.	768,575.3	423,922.2
87469	Parts & accessories for instruments of 8746	11,141.0	1,558.6
	(b) SITC *Revision 2*		
75	Office machines & auto. data processing equipment	2,531,084.1	1,235,221.8
761	Television receivers	361,293.9	724,015.7
762	Radio-broadcast receivers	241,314.6	154,172.3
763	Gramophones, dictating, sound recorders etc	207,906.2	238,371.0
7641	Elect.line telephonic & telegraphic apparatus	263,559.5	121,668.1
7642	Microphones, loudspeakers, amplifiers	106,291.3	134,042.2
7643	Radiotelegraphic & radiotelephonic transmitters	48,541.4	26,809.2
76481	Radiotelephonic or radiotelegraphic receivers	9,765.9	16,609.1
76482	Television cameras	99,668.1	27,991.3
76483	Radio navigational aid apparatus, radar apparatus	32,763.3	42,353.3
76491	Parts of apparatus of 764.1-	105,427.8	358,690.9
76492	Parts of apparatus of 764.2-	18,377.2	2,189.7
76499	Parts of apparatus of 763--	26,746.4	102,564.1
7722	Printed circuits and parts thereof	58,453.7	99,313.3
7723	Resistors, fixed or variable and parts	20,543.4	56,132.8
7731	Insulated, elect.wire, cable, bars, strip and the like	323,514.4	350,629.8
776	Thermionic, cold & photo-cathode valves, tubes, parts	490,625.5	146,749.4
77884	Elect.capacitors, condensers, fixed or variable	58,137.8	82,615.3
87103	Microscopes & diffraction apparatus	3,488.8	667.6
873	Meters and counters, n.e.s.	60,202.5	18,142.8
874	Measuring, checking, analysing instruments	782,819.0	428,727.0
8749	*8749 Parts, n.e.s. acc. for 873--, 8743-, 87454, 8748*	173,354.4	126,509.9

One difference between these two revisions remains: the basic heading 726.55 in SITC revision 3 has no counterpart in revision 2. However, it concerns a value small enough to be safely ignored, since it amounts to an underestimation of the revision 2 data by 0.02 percent (919,350 U.S. dollar) on average for imports and exports in 1990.

In short, the ICT trade time series going back before 1990 are obtained with the qualification that a negligible error remains between revision 2 and 3, due to basic heading 726.55. Disregarding this minor deviation, trade series are obtained for the period 1960-1998. However, before 1978 - the year until which SITC rev. 1 has been in use - a number of assets have missing values, causing a break in the series. Therefore, the series used in the calculations concern only the period 1978-1998. The trade data for the years 1999-2000 are obtained using the growth rates of the Prodcom foreign trade data for the corresponding assets, obtained from the NBB and available for 1994-2000.

III Software investment

Data on software investment in Belgium is available from NBB (2002) for the period 1995-2000, at the macro level as well as at the six sector level. This data distinguishes between purchased and own-account software.

To calculate a software capital stock, the software investment series needs to be retropolated at least over the period 1984-1994. To this end, one option could be the calibration method suggested by Cette et al. (2000, p. 145).[1] They start from the observation that the average ratio of software investment to IT equipment investment has a similar value (around 1.4) in France and the U.S. during 1990-1997. This observation leads them to apply the U.S. value of that ratio in France in the first year of the sample (1960) and the last year before French software investment is available (1989). Subsequently, they apply the average annual growth rate between 1960 and 1989 of the U.S. ratio to infer growth of software investment in France. However, since this ratio equals, on average, 1.5 in the U.S. versus only 0.4 in Belgium over the period 1995-2000, their method has not been used for the construction of software investment and capital stock series for Belgium.

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1. The calculation of software investment via trade data is not possible, since no such data are available for this asset.

IV Harmonised price data

The hedonic method is a statistical tool for developing standardised per unit prices for goods - such as ICT assets - whose quality and characteristics change rapidly over time. According to the hedonic method, heterogenous goods can be redefined as aggregations of their characteristics, so that changed models or new models of a good can be represented as a new combination of characteristics. In practice, this approach analyses the relationship between price and quality by regressing prices on explanatory variables that represent important product characteristics.

Since no hedonic price indices are available for ICT assets in Belgium, a solution consists of using a so-called "harmonised deflator" (Schreyer, 2001) for each ICT capital good in order to obtain quality-adjusted price indices. At least two different methods are available, and both take the U.S. hedonic indices as a benchmark.

The assumption retained by the first method is that the change of the relative price of an ICT asset should be the same across countries. The relative price is expressed as the price level of the ICT good divided by the price level of non-ICT goods. Let the rate of change of the price index of good i in country j be expressed as $\dot{q}_i^j$ and let N denote non-ICT goods. Then the rate of change of the harmonised price index of Belgium is given by:

$$\dot{q1}_{ICT}^{B} = \dot{q}_{N}^{B} + \dot{q}_{ICT}^{US} - \dot{q}_{N}^{US} \tag{3}$$

The drawback of this method is that $\dot{q}_N^j$ is not available and must be approximated by a price deflator of business investment that combines price indices of both ICT and non-ICT investment goods. However, this is unlikely to cause serious bias to the results, since expenditure on ICT investment is still a relatively small portion of total investment expenditure.

Alternatively, changes in the Belgian ICT price index can be approximated by the combined change in the U.S. hedonic ICT price index and in the euro/dollar exchange rate, assuming that the law of one price holds for the ICT capital goods. If $\dot{e}$ is the rate of change of the euro/dollar exchange rate, the harmonised price index becomes:

$$\dot{q2}_{ICT}^{B} = \dot{q}_{ICT}^{US} + \dot{e} \tag{4}$$

To the extent that changes in exchange rates are not fully passed on to consumers, the price changes calculated in domestic currency would be biased. Moreover, adjusting by the current exchange rate may imply an exaggeration of the pass-through from U.S. prices into Belgian prices. Although both methods are used in

the literature, the method based on relative prices is preferred here to the one based on the exchange rate, since it is not sensitive to exchange rate volatility.

FIGURE 1 - Harmonised IT equipment prices (log scale, 1995=1)
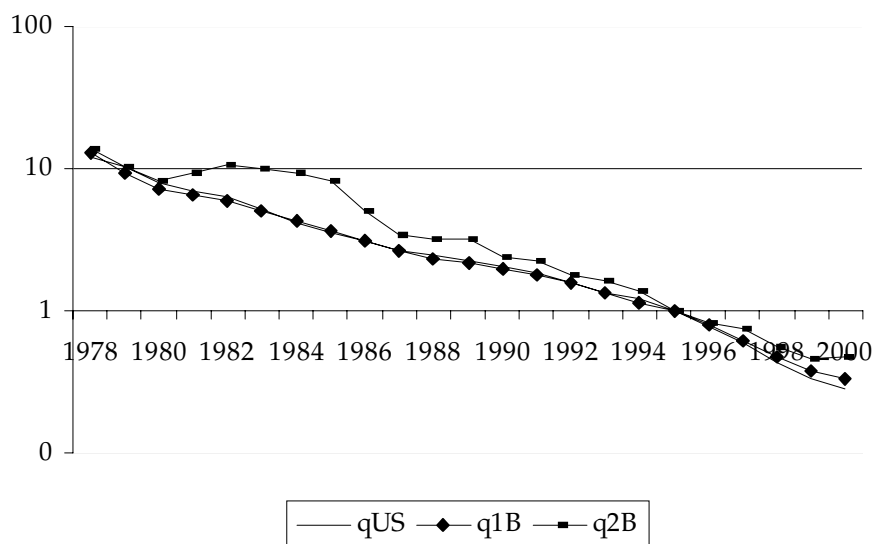
Figure 1 compares both harmonised price indices of IT equipment for Belgium to the corresponding U.S. hedonic price index. The Belgian IT equipment price index is calculated by correcting the U.S. hedonic price index (qUS) either for the inflation differential of Belgian and U.S. non-ICT investment prices (q1B), or for the euro/dollar exchange rate (q2B). As the figure shows, the harmonised price index based on the exchange rate is characterised by an upward trend in the early 1980s, that would show up throughout the rest of the calculations. Therefore, the series based on the assumption of a similar evolution of the relative prices of ICT and non-ICT investment goods in both countries will be used in the remainder.

V Perpetual inventory method

The productive capital stock of asset type i in period t is:

$$K_{i,t} = \sum_{\tau=0}^{T} h_{i,\tau} F_{i,\tau} \frac{I_{i,t-1-\tau}}{q_{i,t-1-\tau}} \tag{5}$$

where $I_{i,t-1}/q_{i,t-1}$ is constant-quality volume investment in asset i in year t-1, which becomes part of the capital stock at the beginning of year t. Furthermore, T is the maximum service life, $h_{i,\tau}$ is an age-efficiency profile, and $F_{i,\tau}$ is a retirement function that gives the proportion of assets of age τ still in service at time t. For the construction of capital stocks over the period 1970-2000, INR (2002, p. 20) uses a bell-shaped (lognormal) retirement function. However, to save observations we make the simplifying assumption that the assets' mortality is characterised by simultaneous exit (deterministic mortality):

$$\tilde{F}_{i,\tau} = \begin{array}{l} 1 \quad i = 1 \ldots L \\ 0 \quad \text{otherwise} \end{array}$$

where L denotes the average service life, assumed equal to 5 years for IT equipment and 11 years for communications equipment.[1] If $F_{i,\tau} = \tilde{F}_{i,\tau}$ the capital stock becomes:

$$K_{i,t} = \sum_{\tau=0}^{L} h_{i,\tau} \frac{I_{i,t-1-\tau}}{q_{i,t-1-\tau}} \tag{6}$$

Because the age-efficiency pattern attributes a smaller weight to the assets of a particular vintage as they live longer, the capital stock will be overestimated if assets overall are assumed to live shorter than they do in reality. Hence, the assumption that the survival function equals $F_{i,\tau} = \tilde{F}_{i,\tau}$ implies overestimation of the capital stock, relative to a more realistic bell-shaped mortality pattern with survival function $F_{i,\tau} = F_{i,\tau}^{N}$. Indeed, with simultaneous exit at the average service life L all the assets of a particular vintage survive before L, is reached, after which none survives. If $F_{i,\tau} = F_{i,\tau}^{N}$, however, some assets break down before L is reached and a number of assets survive thereafter.

Regarding the choice of the *age-efficiency profile*, two common profiles are the hyperbolic and the geometric age-efficiency profile. Although the geometric pattern is appealing because it simplifies the calculations, the hyperbolic profile is often regarded as more realistic.[2] Assets with a hyperbolic age-efficiency profile

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1. The length of the average service lives of IT and communications equipment follows the assumptions of the US Bureau of Economic Analysis.

lose relatively more of their productive value towards the end of their service life, whereas assets with a geometric deterioration lose relatively more productive value in the beginning of their service life. In the calculations presented here, a hyperbolic age-efficiency profile is used, specified by:

$$h_{i,t} = \frac{T-t}{T-\beta t}. \tag{7}$$

Here β is set to 0.8 and the maximum service life $T = 1.5L$, as in Colecchia and Schreyer (2001). ICN (2002: 19) assumes that $T = 2L$ for its calculation of the stock of non-ICT assets, but judging from the low resulting depreciation rates (cf. infra) this seems too long for ICT equipment. Several other relations between average and maximum service life are found in the literature. For instance, van der Wiel (2001) takes $T = L$ in the above formula, Meinem et al. (1998) assume that $T = L\beta^2/[\beta + (1-\beta)\log(1-\beta)]$ and Mohr and Gilbert (1996) take the expected value of the hyperbolic function for all possible service lives between 0.5L and 1.5L. It must be remarked that the results are sensitive to the choice of T. Variations in the value of β, on the other hand, have a negligible impact on the results.

The *user cost* of each ICT capital asset is needed to obtain the share of the asset in total income. It is given by:

$$\mu_{i,t} = (r + \delta_{i,t} + \dot{q}_{i,t})q_{i,t} \tag{8}$$

and depends on the internal rate of return r, the asset's depreciation rate $\delta_{i,t}$ and the percent change in market value of the asset $\dot{q}_{i,t}$. The latter is obtained as a 3-year moving average of the harmonised price indices.

The rate of *depreciation* is calculated as follows. Once the functional form of the age-efficiency profile has been decided on, the age-price profile can directly be derived from it, using the result that the value of an asset depends on the expected stream of revenue provided over its service life. The age-price profile is used to calculate the net capital stock, in the same way as the age-efficiency profile is applied to calculate the productive stock. Since the change in the net stock consists of investment minus depreciation, the amount of depreciation is readily derived, and the depreciation rate is calculated as the ratio of the level of depreciation and the net stock.[1] More details can be found in OECD (2001a). As suggested there, the real discount rate needed for the calculation of the age-price profile has been set to 0.04.

The nominal or internal *rate of return* can be calculated as the ex-post rate that exhausts all non-labour income in the production account. That requires solving the following equation for r_t .:

$$P_t Q_t - w_t L_t = \sum_i \mu_{i,t} K_{i,t} = r_t \sum_i q_{i,t} K_{i,t} + \sum_i [d_{i,t} - \dot{q}_{i,t}]q_{i,t}K_{i,t}. \tag{9}$$

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2. Several official institutions prefer a hyperbolic profile over a geometric profile (e.g. US Bureau of Labor Statistics and Australian Bureau of Statistics, as reported in OECD, 2001a). Moreover, the hyperbolic pattern is applied to construct capital stocks of ICT assets in a number of studies (e.g. Colecchia and Schreyer, 2001).

1. The net capital stock is calculated from investment at constant prices, so that depreciation is also measured at constant prices. Hence it only measures the effects of ageing and not of revaluation.

VI Calculations at the sector level

The only year for which data on ICT investment are available on a sectoral basis is 1995. The method used in this report for the construction of productive capital stock series at the sector level over the period 1990-2000 is explained below.

Using data from the 1995 input-output table of the Belgian economy, we first calculated the share of each sector in total ICT investment in 1995 and then multiplied these shares with the ICT investment expenditures calculated at the macro level in Section 2. These calculations provide us with nominal investment series in IT and communications equipment from 1978 to 2000.

We then used the harmonised investment deflators discussed in Section 4 in order to calculate ICT investment in real terms over the period 1978-2000. Applying the perpetual inventory method presented in Section 5, we obtained productive capital stock series at the 31 sector level from 1990 to 2000. Data on investment and capital stock series for ICT assets are presented in the appendix at the end of this report.

VII Discussion of the investment and capital stock data

We present in Table 7 data on the share of ICT investment in total investment - in current prices - for six major sectors of the Belgian economy. These sectors are: (I) Agriculture, (II) Industry (manufacturing sector, gas and electric utilities), (III) Construction, (IV) Transport, Communication and Trade, (V) Finance, Insurance, and Real Estate, and (VI) Services n.c.e.[1] Economy-wide figures show that the share of ICT investment declined from 11% to 10% from 1990 to 1995, and increased steadily afterwards, reaching 15% in 2000. Note that investment expenditures on IT equipment are more important than those made on communications in all sectors except sector IV (transport, communications, trade) where these two ICT items have similar shares in total investment. Sector IV is also the one that invests most intensively in ICT equipment, with its share in total investment reaching 28% in 2000. Sector II (Industry) is also an important user of ICT with the share of these capital goods in total investment reaching 18% in 2000 while these shares are equal to 13% and 10% for sectors V and VI, respectively.

The share of ICT capital in the total nominal capital stock is presented in Table 8 for the period 1990-2000. This share is lower than the share of ICT investment at the macro as well as at the sector level - see Table 7 - reflecting low values of the ICT investment carried out before 1990. The evolution of the share of ICT capital over the period 1990-2000 is different from the evolution of the ICT investment share, as well. At the economy-wide level, this share goes from 3.0% in 1990 to 3.5% in 2000. In sector IV, it rises from 14.8 in 1990 to 16.1% in 1994 and reaches 13.9% at the end of the period. In sectors II and V, the share of ICT capital in total capital dimishes from 1990 to 1998 and increases afterwards. Note that sector IV invests more heavily in communications equipment than in IT equipment over the period 1991-2000, an evolution also observed at the economy-wide level from 1997 on.

In Table 9, we present data on the share of ICT investment in value added for the period 1990-2000. The evolution of this variable during 1990-2000 is similar to the evolution of the share of ICT in total investment reported in Table 7.

An international comparison at the macro level can be carried out on the basis of the data presented in tables 4, 5 and 6. Table 4 contains data on the share of ICT investment in total investment for several OECD countries and for the year 1990, 1995, 2000 based on the work of Colecchia and Schreyer (2001). Belgium stands at the third place after the U.S. and Finland in terms of ICT intensity over this period. We observe that (i) ICT intensity diminishes by 1.2 points in Belgium from 1990 to

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1. See INR (2002), pp. 22-23 for more details on sectoral classification.

1995 whereas the average change observed for the other countries equals 2.0 points (the only other country where a decline in ICT intensity is observed over this period is Germany, with this variable diminishing by 1.5 points) and that (ii) from 1995 to 2000, ICT intensity increases by 2.7 points in Belgium and by 1.4 points on average in other countries.

In Table 5, data on the share of ICT capital in the total nominal capital stock in 1996 are presented for eight OECD countries. Capital stock figures for countries other than Belgium are from Schreyer (2000). When comparing the results for Belgium to those of the other countries, it must be born in mind that divergences in the results can arise partly from differences in the definition of ICT or differences in the assumptions underlying the capital stock. ICT capital stock represents 3.0% of the total capital stock in Belgium, a figure slightly below the average (4.0%).

Finally, in Table 6, we present data on ICT intensity for the manufacturing and services sectors in France and Belgium for the years 1990, 1995 and 1999.[1] We observe that ICT intensity is higher in Belgium than in France in both sectors during the period 1990-2000, although a relative convergence is observed for ICT intensity in the services towards the end of the period. As for the manufacturing sector, differences observed in 1990 remain at the end of the period.[2]

TABLE 4 - **Share of ICT investment in total non-residential investment (%)** - *current prices*

	1990	1995	2000
Belgium	12.9	11.7	14.4
USA	14.5	16.0	16.3
France	6.7	7.4	8.3
Germany	10.3	8.8	10.4
Italy	9.9	10.2	11.4
UK	8.0	12.2	12.0
Finland	7.5	13.3	18.2
Canada	8.3	9.7	12.1
Australia	9.3	13.1	12.8
Japan	7.8	9.9	12.1

Source: own calculations for Belgium and Colecchia and Schreyer (2001) for other countries.

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1. Services include only commercial activities.
2. These differences concern both the levels and the evolution of this variable from 1990 to 1999.

TABLE 5 -   Share of ICT capital in total nominal capital stock in 1996 (%)

Belgium	3.0
USA	7.4
UK	5.2
Italy	2.1
Germany	3.0
France	3.2
Canada	5.0
Japan	2.3

Source: own calculations for Belgium; Schreyer (2000) for other countries.

TABLE 6 -   Share of ICT investment in equipment investment (%) - *current prices*

	1990	1995	1999
Manufacturing			
Belgium	14.2	13.2	18.7
France	5.0	3.9	4.8
Services			
Belgium	37.6	30.1	37.0
France	19.1	20.3	30.5

Source: own calculations for Belgium; Cette et al. (2000) for France.

TABLE 7 -   ɪᴄᴛ **investment expenditure at current prices - share in total investment (%)**

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Agriculture											
IT	1.69	2.26	1.69	2.87	2.04	2.13	2.45	2.80	3.32	3.50	4.89
Comm.	0.06	0.07	0.06	0.11	0.12	0.12	0.11	0.12	0.17	0.17	0.15
Total	1.75	2.33	1.75	2.98	2.16	2.25	2.56	2.92	3.49	3.67	5.05
Industry											
IT	8.93	9.35	8.22	11.19	7.88	7.42	8.29	8.71	9.41	11.24	15.33
Comm.	1.41	1.48	1.44	2.05	2.20	2.03	1.81	1.75	2.28	2.69	2.34
Total	10.34	10.83	9.66	13.24	10.07	9.45	10.10	10.46	11.69	13.93	17.67
Construction											
IT	5.17	5.65	5.65	7.27	4.70	4.18	5.07	5.53	5.62	5.35	7.29
Comm.	0.23	0.25	0.27	0.37	0.36	0.32	0.31	0.31	0.38	0.36	0.31
Total	5.39	5.90	5.93	7.64	5.06	4.50	5.38	5.84	6.00	5.70	7.60
Transport, Communication and Trade											
IT	16.04	16.11	14.33	15.89	11.17	10.60	11.65	13.12	12.79	13.90	17.24
Comm.	10.15	10.20	10.01	11.65	12.45	11.61	10.19	10.54	12.41	13.31	10.50
Total	26.20	26.30	24.34	27.54	23.62	22.20	21.85	23.66	25.20	27.21	27.74
Finance, Insurance and Real Estate											
IT	8.11	8.55	7.40	8.47	5.43	5.16	6.02	6.69	6.87	6.98	9.29
Comm.	0.20	0.21	0.20	0.24	0.23	0.22	0.20	0.21	0.26	0.26	0.22
Total	8.30	8.76	7.60	8.70	5.66	5.37	6.22	6.90	7.13	7.24	9.51
Services n.e.c											
IT	9.02	8.83	7.36	7.89	5.11	5.24	6.91	7.60	8.42	7.84	10.34
Comm.	2.14	2.09	1.93	2.17	2.13	2.15	2.26	2.29	3.06	2.81	2.36
Total	11.15	10.93	9.28	10.06	7.24	7.38	9.17	9.89	11.48	10.65	12.70
Total economy											
IT	8.08	8.02	8.01	5.99	6.53	6.71	7.10	7.77	8.63	9.12	11.96
Comm.	2.57	2.84	2.97	3.42	3.24	3.22	3.45	3.69	3.65	3.98	3.10
Total	10.65	10.86	10.98	9.41	9.78	9.93	10.55	11.46	12.28	13.10	15.07

TABLE 8 - ICT **capital stock at current prices - share in total capital stock (%)**

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Agriculture											
IT	0.71	0.76	0.78	0.80	0.80	0.75	0.65	0.58	0.59	0.62	0.70
Comm.	0.04	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.08	0.09	0.10
Total	0.75	0.80	0.83	0.85	0.86	0.81	0.72	0.66	0.67	0.71	0.80
Industry											
IT	3.40	3.38	3.29	3.15	3.10	2.72	2.25	1.87	1.82	1.83	1.89
Comm.	0.83	0.89	0.94	1.00	1.08	1.17	1.21	1.17	1.20	1.25	1.30
Total	4.23	4.27	4.23	4.15	4.19	3.89	3.46	3.04	3.03	3.08	3.19
Construction											
IT	2.85	2.79	2.74	2.65	2.62	2.29	1.90	1.58	1.53	1.50	1.53
Comm.	0.19	0.20	0.22	0.23	0.25	0.27	0.28	0.28	0.28	0.28	0.29
Total	3.04	3.00	2.95	2.89	2.87	2.56	2.18	1.86	1.81	1.78	1.82
Transport, Communication and Trade											
IT	7.52	7.49	7.28	6.89	6.71	5.85	4.81	3.97	3.79	3.75	3.72
Comm.	7.32	7.91	8.36	8.76	9.35	10.04	10.35	9.98	10.00	10.21	10.17
Total	14.84	15.40	15.64	15.64	16.06	15.89	15.16	13.95	13.80	13.97	13.89
Finance, Insurance and Real Estate											
IT	1.78	1.82	1.78	1.69	1.64	1.44	1.18	0.98	0.96	0.97	1.00
Comm.	0.07	0.07	0.08	0.08	0.09	0.09	0.10	0.09	0.10	0.10	0.11
Total	1.84	1.89	1.85	1.78	1.73	1.53	1.27	1.08	1.06	1.07	1.11
Services n.e.c											
IT	1.14	1.20	1.20	1.17	1.15	1.03	0.88	0.76	0.76	0.78	0.82
Comm.	0.41	0.47	0.51	0.56	0.60	0.66	0.71	0.71	0.75	0.80	0.84
Total	1.55	1.67	1.71	1.72	1.75	1.70	1.59	1.47	1.51	1.59	1.66
Total economy											
IT	2.00	2.07	1.96	1.89	1.69	1.62	1.45	1.29	1.26	1.34	1.54
Comm.	0.95	1.06	1.13	1.20	1.27	1.42	1.54	1.63	1.73	1.80	1.93
Total	2.94	3.13	3.09	3.09	2.96	3.04	2.99	2.92	2.99	3.14	3.47

TABLE 9 - ɪᴄᴛ **investment expenditure at current prices - share in value added (%)**

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Agriculture											
IT	0.55	0.56	0.51	0.61	0.41	0.46	0.53	0.60	0.68	0.84	1.08
Comm.	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.04	0.03
Total	0.57	0.58	0.53	0.64	0.44	0.49	0.55	0.62	0.71	0.88	1.11
Industry											
IT	2.11	2.21	1.95	2.32	1.52	1.44	1.69	1.91	2.05	2.26	3.06
Comm.	0.33	0.35	0.34	0.43	0.42	0.40	0.37	0.38	0.50	0.54	0.47
Total	2.45	2.55	2.30	2.75	1.94	1.84	2.07	2.30	2.55	2.80	3.52
Construction											
IT	0.78	0.77	0.64	0.77	0.52	0.50	0.62	0.70	0.75	0.78	1.03
Comm.	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.04
Total	0.82	0.81	0.67	0.81	0.56	0.54	0.66	0.74	0.80	0.83	1.07
Transport, Communication and Trade											
IT	3.51	3.29	2.83	3.30	2.21	2.20	2.62	2.98	3.11	3.33	4.44
Comm.	2.22	2.08	1.98	2.42	2.46	2.41	2.29	2.39	3.02	3.19	2.71
Total	5.73	5.37	4.81	5.72	4.67	4.61	4.91	5.37	6.14	6.51	7.15
Finance, Insurance and Real Estate											
IT	3.09	2.89	2.39	2.69	1.73	1.67	1.87	2.11	2.15	2.30	3.03
Comm.	0.08	0.07	0.06	0.08	0.07	0.07	0.06	0.07	0.08	0.08	0.07
Total	3.17	2.96	2.46	2.76	1.81	1.74	1.93	2.18	2.23	2.38	3.10
Services n.e.c											
IT	1.17	1.11	0.96	1.06	0.69	0.67	0.79	0.90	0.95	1.01	1.36
Comm.	0.28	0.26	0.25	0.29	0.29	0.28	0.26	0.27	0.35	0.36	0.31
Total	1.44	1.37	1.21	1.35	0.98	0.95	1.04	1.17	1.29	1.38	1.67
Total economy											
IT	1.81	1.68	1.66	1.20	1.27	1.33	1.41	1.58	1.78	1.90	2.53
Comm.	0.58	0.60	0.61	0.68	0.63	0.64	0.64	0.75	0.75	0.83	0.66
Total	2.39	2.28	2.27	1.88	1.90	1.97	2.10	2.34	2.53	2.73	3.18

VIII   References

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IX Annex
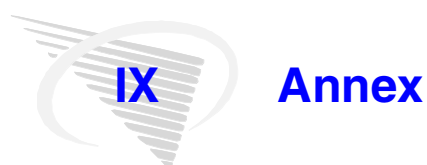
TABLE 10 - NACE 31 sectors

A	Agriculture and forestry
B	Fishing
CB	Mining
DA	Manufacture of food products and beverages
DB	Manufacture of textiles and wearing
DC	Leather products
DD	Manufacture of wood and of products of wood and cork
DE	Manufacture of paper products, publishing, printing and reproduction of recorded media
DF	Manufacture of coke, refined petroleum products and nuclear fuel
DG	Manufacture of chemicals and chemical products
DH	Manufacture of rubber and plastics products
DI	Manufacture of other non-metallic mineral products
DJ	Manufacture of basic metals and fabricated metal products
DK	Manufacture of machinery and equipment n.e.c.
DL	Manufacture of electric and electronic equipment
DM	Manufacture of motor vehicles and other transport equipment
DN	Miscellaneous manufacturing
EE	Electricity, gas and water supply
FF	Construction
GG	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
HH	Hotels and restaurants
II	Transport, storage and communications
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 service activities

TABLE 11 - ICT **investment - 1995 prices** *(1,000 euro)*

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A											
IT	9977	11310	11284	14831	11676	13982	21174	33353	46353	64242	113238
Comm.	0	0	0	0	0	0	0	0	0	0	0
Total	9977	11310	11284	14831	11676	13982	21174	33353	46353	64242	113238
B											
IT	3	3	3	4	3	4	6	10	13	19	33
Comm.	644	652	638	775	798	791	782	898	1212	1345	1234
Total	647	655	641	779	801	795	789	908	1225	1364	1267
CB											
IT	1582	1794	1789	2352	1852	2217	3358	5289	7351	10188	17958
Comm.	247	250	244	297	306	303	300	344	464	516	473
Total	1829	2044	2034	2649	2158	2521	3658	5634	7815	10704	18431
DA											
IT	30089	34111	34030	44729	35213	42169	63857	100588	139794	193743	341508
Comm.	25158	25471	24910	30271	31173	30913	30564	35075	47334	52549	48216
Total	55248	59582	58940	75000	66386	73081	94421	135662	187128	246293	389724
DB											
IT	18467	20935	20886	27453	21612	25881	39192	61736	85799	118910	209601
Comm.	7261	7352	7190	8737	8997	8922	8822	10124	13662	15167	13916
Total	25729	28287	28076	36190	30610	34803	48014	71860	99461	134078	223518
DC											
IT	590	668	667	876	690	826	1251	1971	2739	3796	6692
Comm.	146	147	144	175	180	179	177	203	274	304	279
Total	735	816	811	1052	870	1005	1428	2174	3013	4101	6971
DD											
IT	4603	5218	5206	6843	5387	6451	9769	15388	21386	29639	52245
Comm.	1211	1226	1199	1457	1500	1488	1471	1688	2278	2529	2320
Total	5814	6444	6405	8300	6887	7939	11240	17076	23664	32168	54565
DE											
IT	64316	72911	72738	95608	75267	90135	136493	215005	298808	414123	729968
Comm.	6226	6304	6165	7492	7715	7651	7564	8681	11715	13006	11933
Total	70542	79215	78903	103100	82983	97785	144058	223685	310522	427129	741901
DF											
IT	24515	27792	27726	36443	28690	34357	52027	81954	113897	157852	278244
Comm.	1781	1804	1764	2143	2207	2189	2164	2484	3352	3721	3414
Total	26297	29595	29490	38586	30897	36546	54192	84437	117249	161573	281658

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
DG											
IT	68632	77804	77620	102024	80319	96184	145653	229434	318860	441915	778956
Comm.	8028	8128	7949	9660	9947	9864	9753	11192	15104	16768	15385
Total	76660	85932	85568	111683	90266	106048	155406	240626	333964	458683	794342
DH											
IT	8686	9847	9824	12913	10165	12173	18434	29038	40356	55931	98588
Comm.	5637	5707	5581	6782	6984	6926	6848	7858	10605	11773	10802
Total	14323	15554	15405	19695	17150	19099	25282	36896	50961	67704	109390
DI											
IT	10914	12373	12344	16225	12773	15296	23163	36486	50708	70277	123876
Comm.	5757	5829	5700	6927	7134	7074	6994	8026	10832	12025	11034
Total	16672	18202	18044	23152	19907	22370	30157	44513	61539	82302	134909
DJ											
IT	41066	46554	46443	61046	48058	57551	87151	137281	190789	264419	466086
Comm.	6556	6638	6492	7889	8124	8056	7965	9141	12336	13695	12565
Total	47622	53192	52935	68935	56182	65607	95116	146422	203125	278113	478652
DK											
IT	19568	22184	22131	29089	22901	27424	41529	65417	90914	126000	222098
Comm.	706	715	699	850	875	868	858	985	1329	1475	1354
Total	20275	22899	22830	29939	23776	28292	42387	66401	92243	127475	223451
DL											
IT	96408	96772	126421	96831	112410	157938	238091	344872	489819	857186	0
Comm.	2961	2929	3563	3660	3589	3394	3841	5336	6009	5427	0
Total	99368	99701	129984	100491	116000	161332	241932	350208	495828	862613	0
DN											
IT	8042	9116	9095	11954	9411	11270	17066	26883	37361	51780	91272
Comm.	2823	2858	2795	3397	3498	3469	3429	3935	5311	5896	5410
Total	10865	11974	11890	15351	12909	14739	20496	30819	42672	57676	96682
E											
IT	55168	62541	62393	82010	64562	77315	117080	184425	256308	355223	626146
Comm.	66509	67336	65853	80026	82410	81722	80800	92724	125132	138921	127464
Total	121677	129877	128246	162035	146972	159037	197880	277149	381440	494144	753609
F											
IT	35010	39689	39595	52044	40972	49065	74300	117037	162655	225427	397356
Comm.	3032	3069	3002	3648	3756	3725	3683	4226	5704	6332	5810
Total	38042	42758	42596	55691	44728	52790	77983	121264	168359	231759	403166

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
G											
IT	358119	405979	405018	532359	419102	501885	760016	1197181	1663809	2305905	4064581
Comm.	58937	59670	58356	70915	73028	72418	71602	82168	110886	123105	112953
Total	417057	465649	463374	603274	492129	574303	831618	1279349	1774695	2429010	4177533
H											
IT	32544	36893	36806	48378	38085	45608	69066	108793	151197	209547	369365
Comm.	23328	23618	23098	28069	28905	28664	28341	32523	43890	48726	44708
Total	55872	60511	59904	76447	66991	74272	97406	141316	195087	258273	414073
I											
IT	222987	252787	252189	331479	260958	312504	473233	745439	1035990	1435798	2530858
Comm.	684430	692941	677678	823531	848064	840982	831500	954201	1287708	1429605	1311703
Total	907417	945728	929867	1155010	1109022	1153486	1304733	1699640	2323697	2865403	3842561
J											
IT	175927	199438	198966	261523	205885	246552	373360	588118	817350	1132781	1996735
Comm.	2426	2456	2402	2919	3006	2981	2947	3382	4564	5067	4649
Total	178353	201894	201368	264442	208891	249533	376307	591500	821914	1137848	2001384
K											
IT	408231	462788	461692	606853	477747	572114	866366	1364704	1896627	2628572	4633342
Comm.	25630	25949	25377	30839	31757	31492	31137	35732	48221	53534	49119
Total	433861	488736	487069	637691	509504	603606	897503	1400436	1944848	2682107	4682461
L											
IT	59871	67872	67711	89000	70066	83905	127060	200145	278157	385503	679519
Comm.	11776	11923	11660	14169	14591	14470	14307	16418	22156	24597	22569
Total	71647	79794	79371	103169	84657	98375	141366	216563	300312	410100	702088
M											
IT	4732	5365	5352	7035	5538	6632	10044	15821	21987	30472	53713
Comm.	1036	1049	1025	1246	1283	1273	1258	1444	1948	2163	1985
Total	5768	6413	6378	8281	6822	7905	11302	17264	23935	32635	55698
N											
IT	82202	93188	92967	122197	96200	115202	174453	274800	381909	529295	932980
Comm.	31894	32290	31579	38376	39519	39189	38747	44465	60006	66618	61124
Total	114096	125478	124547	160573	135719	154391	213200	319265	441915	595913	994104
O											
IT	71681	81260	81068	106557	83887	100457	152124	239627	333027	461548	813563
Comm.	57572	58288	57004	69273	71337	70741	69943	80265	108318	120254	110336
Total	129253	139548	138072	175829	155224	171198	222067	319891	441345	581802	923900
Total economy											
IT	1480219	1610695	1918044	1648184	2159488	2696373	3660066	5603239	8549095	11698870	19199334
Comm	924887	994662	1081700	1251482	1251820	1292710	1444467	1685209	1790030	2078343	1718544
Total	2405106	2605357	2999744	2899666	3411308	3989083	5104533	7288448	10339125	13777213	20917878

TABLE 12 - ICT **Capital Stock - 1995 prices** *(1,000 euro)*

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A											
IT	32490	38236	44110	49100	57362	61041	65424	75973	97363	130883	178706
Comm.	0	0	0	0	0	0	0	0	0	0	0
Total	32490	38236	44110	49100	57362	61041	65424	75973	97363	130883	178706
B											
IT	9	11	13	14	17	18	19	22	28	38	52
Comm.	3228	3677	4095	4451	4901	5407	5949	6402	6916	7787	8747
Total	3237	3688	4108	4465	4918	5425	5968	6424	6944	7825	8799
CB											
IT	5153	6064	6995	7787	9097	9680	10376	12048	15441	20757	28341
Comm.	1237	1409	1569	1706	1878	2073	2280	2454	2651	2984	3352
Total	6390	7473	8565	9493	10975	11753	12656	14502	18091	23741	31693
DA											
IT	97985	115314	133029	148080	172996	184091	197310	229123	293633	394726	538953
Comm.	126089	143636	159965	173882	191465	211248	232409	250112	270173	304199	341706
Total	224074	258949	292994	321962	364460	395339	429719	479235	563806	698925	880659
DB											
IT	60138	70774	81647	90884	106176	112986	121100	140625	180218	242264	330783
Comm.	36393	41457	46171	50187	55262	60972	67080	72190	77980	87801	98626
Total	96531	112231	127817	141072	161439	173958	188180	212814	258198	330064	429410
DC											
IT	1920	2260	2607	2902	3390	3607	3866	4490	5754	7735	10561
Comm.	730	831	926	1006	1108	1222	1345	1447	1563	1760	1977
Total	2650	3091	3532	3908	4498	4830	5211	5937	7317	9495	12538
DD											
IT	14990	17641	20351	22654	26465	28163	30185	35052	44921	60386	82451
Comm.	6068	6912	7698	8368	9214	10166	11184	12036	13001	14639	16444
Total	21058	24553	28049	31021	35679	38329	41369	47088	57922	75025	98894
DE											
IT	209441	246481	284347	316519	369775	393491	421748	489746	627636	843720	1152002
Comm.	31206	35549	39590	43034	47386	52282	57519	61901	66866	75287	84570
Total	240647	282030	323937	359553	417161	445773	479267	551647	694502	919007	1236572
DF											
IT	79833	93952	108385	120648	140948	149988	160758	186678	239237	321603	439111
Comm.	8928	10171	11327	12312	13557	14958	16457	17710	19131	21540	24196
Total	88761	104123	119712	132961	154505	164946	177215	204388	258368	343143	463307

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
DG											
IT	223497	263023	303429	337760	394591	419898	450051	522613	669756	900341	1229313
Comm.	40235	45834	51045	55485	61096	67409	74161	79810	86212	97069	109038
Total	263731	308856	354474	393245	455687	487307	524212	602423	755968	997411	1338350
DH											
IT	28287	33289	38403	42748	49941	53144	56960	66144	84767	113951	155587
Comm.	28250	32181	35839	38957	42897	47329	52070	56036	60531	68154	76558
Total	56536	65470	74243	81706	92838	100473	109030	122180	145298	182105	232145
DI											
IT	35542	41828	48254	53713	62751	66776	71571	83110	106510	143180	195495
Comm.	28854	32869	36606	39791	43814	48341	53184	57235	61826	69612	78195
Total	64396	74697	84860	93504	106565	115117	124755	140345	168336	212792	273691
DJ											
IT	133729	157379	181556	202098	236102	251245	269287	312704	400747	538717	735556
Comm.	32860	37433	41688	45315	49897	55053	60568	65181	70409	79277	89052
Total	166588	194812	223244	247413	286000	306298	329854	377885	471156	617994	824608
DK											
IT	63724	74994	86514	96303	112506	119722	128319	149008	190962	256707	350504
Comm.	3540	4033	4492	4882	5376	5931	6526	7023	7586	8541	9594
Total	67264	79027	91006	101185	117882	125654	134845	156031	198548	265249	360099
DL											
IT	308419	362963	418723	466099	544523	579446	621057	721190	924243	1242444	1696415
Comm.	14570	16598	18485	20093	22125	24411	26856	28902	31220	35152	39486
Total	322989	379561	437208	486192	566648	603857	647913	750091	955463	1277596	1735900
DN											
IT	26188	30819	35553	39576	46235	49200	52733	61235	78477	105495	144041
Comm.	14148	16116	17949	19510	21483	23703	26077	28063	30314	34132	38341
Total	40335	46935	53502	59086	67718	72903	78810	89299	108791	139627	182381
E											
IT	179653	211425	243905	271501	317182	337525	361763	420090	538368	723718	988154
Comm.	333331	379718	422888	459678	506160	558459	614401	661200	714234	804186	903341
Total	512983	591142	666792	731178	823342	895984	976163	1081290	1252602	1527904	1891496
F											
IT	114009	134171	154783	172296	201286	214196	229577	266592	341652	459276	627089
Comm.	15194	17308	19276	20953	23071	25455	28005	30138	32556	36656	41175
Total	129202	151479	174059	193249	224357	239651	257582	296730	374207	495932	668264

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
G											
IT	1166202	1372448	1583289	1762427	2058968	2191020	2348358	2726986	3494778	4697967	6414535
Comm.	295383	336489	374744	407346	448536	494881	544454	585926	632923	712633	800501
Total	1461585	1708936	1958033	2169773	2507504	2685902	2892813	3312912	4127701	5410601	7215036
H											
IT	105978	124720	143880	160159	187107	199107	213405	247812	317585	426923	582915
Comm.	116916	133186	148328	161232	177535	195879	215501	231916	250518	282068	316847
Total	222893	257906	292208	321391	364642	394986	428906	479728	568102	708991	899762
I											
IT	726149	854570	985853	1097396	1282040	1364264	1462232	1697989	2176064	2925243	3994084
Comm.	3430237	3907598	4351851	4730448	5208786	5746986	6322671	6804276	7350040	8275709	9296102
Total	4156386	4762168	5337704	5827844	6490826	7111250	7784903	8502265	9526104	11200952	13290186
J											
IT	572899	674218	777794	865796	1011473	1076344	1153636	1339638	1716818	2307887	3151155
Comm.	12159	13851	15425	16767	18463	20370	22411	24118	26052	29333	32950
Total	585058	688069	793220	882564	1029935	1096714	1176047	1363756	1742870	2337221	3184105
K											
IT	1329390	1564496	1804840	2009046	2347081	2497612	2676967	3108576	3983806	5355359	7312128
Comm.	128452	146328	162964	177141	195054	215208	236765	254800	275237	309901	348112
Total	1457842	1710824	1967804	2186187	2542135	2712820	2913732	3363376	4259043	5665260	7660239
L											
IT	194966	229447	264695	294644	344219	366296	392600	455899	584259	785409	1072386
Comm.	59020	67233	74876	81390	89621	98881	108786	117072	126462	142389	159946
Total	253986	296679	339572	376034	433840	465177	501386	572971	710721	927798	1232331
M											
IT	15411	18137	20923	23290	27209	28954	31033	36037	46183	62083	84767
Comm.	5190	5913	6585	7158	7882	8696	9567	10296	11122	12522	14066
Total	20602	24049	27508	30448	35091	37650	40600	46333	57305	74605	98833
N											
IT	267689	315030	363427	404546	472614	502925	539040	625950	802188	1078367	1472386
Comm.	159846	182090	202792	220434	242724	267804	294630	317072	342504	385639	433189
Total	427534	497120	566218	624980	715338	770728	833670	943022	1144692	1464006	1905575
O											
IT	233426	274708	316910	352766	412121	438553	470046	545831	699512	940342	1283928
Comm.	288541	328695	366064	397911	438147	483419	531844	572355	618263	696127	781960
Total	521967	603403	682974	750677	850269	921972	1001889	1118186	1317775	1636469	2065888
Total economy											
IT	4589368	5495440	6367020	7393748	8080131	9085448	10388563	12455007	16284624	22711148	32182809
Comm.	4281739	4931845	5592613	6268380	7079063	7950439	8920579	9931113	11104837	12426258	13959298
Total	8871107	10427284	11959633	13662128	15159195	17035886	19309142	22386121	27389461	35137406	46142107