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CONTENTS

THE MEASUREMENT OF PRODUCTIVITY: CONTRIBUTIONS TO THE ANALYSIS FROM I-O ECONOMICS

ROSSELLA BARDAZZI[23]

Abstract

This paper is devoted to the study of labour productivity at the sectoral level. I-O concepts and tools may prove to be very important when outsourcing and vertical integration take place but, generally, statistics at sectoral level largely disregard this information and neoclassical growth models usually ignore intermediate goods and analyse economic growth entirely in terms of value added. Assumptions implied in conventional indicators to measure productivity, as well as the concept of real value added are discussed. An empirical application is provided to compare between productivity indexes rooted in growth accounting methodology and measures computed by the I-O approach and underline the shortcomings of the most popular indicators at the industry level. According to the I-O method, labour requirements used to compute factor productivity indexes take into account the direct and indirect labour used in the production of final output by sector and offer a perspective of studying trends in productivity, which is missing in traditional methods considering indirect effects. Results show that these effects are relevant in some economic sectors where either the share of intermediates is large or outsourcing is taking place.

JEL Classification: O47, C67

Keywords: Labour productivity, input-output

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1. INTRODUCTION

This paper is devoted to the study of labour productivity at the sectoral level by comparing two different methods which may be used to measure the content of labour per unit of output. This topic is part of the broader issue of understanding the drivers of economic growth, therefore an extensive literature on productivity measurement has been produced and statistical institutes and international organisations have published large manuals to explain how to compute meaningful productivity indices and statistics. [24]

The aim of this work is to emphasise the assumptions of using some specific variables to measure productivity which are not novel but are usually disregarded in empirical work. A simple example with a comparison between the index produced by statistical offices will be provided and a measure of labour requirements based upon the I-O approach will be computed to underline the shortcomings of the most popular indicators at the sectoral level.

1. PRODUCTIVITY INDICATORS: SOME PROBLEMATIC ISSUES

Productivity measurement poses a problem of valuation both in the framework of consistent KLEMS calculations and in the value added based measures as "productivity is commonly defined as a ratio of a *volume* measure of output to a *volume* measure of input use" (OECD, 2001, italics ours).

The first approach is theory-based as it dates back to the seminal article by Jorgenson and Griliches (1967), then extended by other studies later on. This approach assumes the existence of a production function where gross output by industry is a function of capital, labour, intermediate inputs and technology. Under the assumptions of competitive factor markets, constant returns to scale and full utilisation of inputs, the growth of industry output is expressed as the cost-share

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24 For example, the OECD (2001) Productivity Manual is widely considered an authoritative collection of the problems and practical solutions in the field of productivity measurement. Therefore, this manual is often referred to throughout this paper.

weighted growth of inputs and technological change. This implies the computation of multifactor productivity measures as shown in the figure below:

Type of output measure	Type of input measure			
	Labour	Capital	Capital and labour	Capital, labour and intermediate inputs (energy, materials, services)
Gross output	Labour productivity (based on gross output)	Capital productivity (based on gross output)	Capital-labour MFP (based on gross output)	KLEMS multifactor productivity
Value added	Labour productivity (based on value added)	Capital productivity (based on value added)	Capital-labour MFP (based on value added)	-
	Single factor productivity measures		Multifactor productivity (MFP) measures	

Source: OECD Productivity Manual (OECD, 2001).

Figure 1: Overview of the main productivity measures

Other productivity indicators refer to single production input, among these labour related to a measure of output is the most frequently computed productivity index.

At the more aggregate level, the value added measures of labour productivity are to be preferred over indicators based on gross output because they are less sensitive to outsourcing intensity and to the degree of vertical integration[25]. In this case, when labour is replaced by the use of intermediate inputs, this in itself would raise labour productivity but, at the same time, value added will fall and this change will partially or completely offset the rise in productivity. On the contrary, gross output-based labour productivity changes when the ratio of intermediates to labour varies for reasons – such as outsourcing – unrelated either to technology shifts or to efficiency gains.

25 The opposite is true if one considers the multi-factor productivity measures: in this case, if outsourcing and vertical integration are taking place, value-added based measures rise faster than gross-output based MFP, because the use of primary factors is substituted by intermediate inputs.

At the industry or firm level, gross output single factor productivity measures should be preferred. In this case, from the producers' perspective the production decisions for primary and intermediate inputs are taken at the same time, then substitution can occur and this makes them non-separable. However, even at the industry level, the most generally used concept of output is value added although, to give an interpretation to the productivity measures based on value added, the existence of industry value-added functions is required. This assumption is very strict and will be discussed further. In summary, real value added is the most widely used concept by national statistical institutes and other international statistical agencies to determine both the relative growth of different industries and the industry single factor productivity measures[26].

The basic difference between output measured as value added or as gross output is the treatment of intermediate goods. GDP is a value added measure and it excludes intermediate inputs whereas a gross output measure includes the value of goods and services used in the production process. This difference is not very relevant at the national level where the two measures differ only as far as intermediate inputs are part of international trade. However, changes in intermediate usage can affect productivity: a substitution between labour and intermediates can occur as a result of outsourcing and off shoring. Gains in efficiency due to some practices can reduce the use of intermediates as well as working hours thus increasing productivity. As argued by Diewert and Nakamura (2007), gross output directly takes into account intermediate goods as a source of growth while value added reflects the effect of intermediates on productivity indirectly as "real value added per unit of primary input rises when unit requirements for intermediate inputs are reduced" (p.4550).

Moreover, beside the definition of the measure of output, there is a problem concerning valuation as the volume of output is needed in computing a productivity index. The deflation of gross output is more straightforward as it requires only price indices on gross output, while the deflation of value added suffers from several theoretical and practical drawbacks since it involves double deflation. As simply stated

26 For a comprehensive survey of the history of value-added concept both in the practice of statistical organizations and in the literature see Meade (2007).

by Schreyer (2001) "value-added is not an immediately plausible measure of output: contrary to gross output, there is no physical quantity that corresponds to a volume measure of value-added" (p.41).

Therefore, the choice between value added and gross output depends on the level of analysis – disaggregate or aggregate level – and on data availability as value added series are often longer and more accessible than gross output and intermediate inputs series.

2. STANDARD APPROACH TO LABOUR PRODUCTIVITY ANALYSIS

EU KLEMS is a project aimed at building a comparable dataset for empirical and theoretical research in the field of productivity growth for European countries[27]. As stated by O'Mahony and Timmer (2009) the 'organising principle' behind the database is the growth accounting methodology. However, it is claimed that much of the variables of the EU KLEMS growth and productivity accounts are independent of this method such as the 'basic' series which contain all the data necessary to construct productivity measures at the industry and aggregate level across Europe. Distinguishing features of this database are the harmonised industry detail, the differences in the composition of each input such as levels of worker skills or types of capital goods and the breakdown of intermediate inputs into energy, materials and services. Timmer et al. (2007) assert that "the main building block of a KLEMS account is a series of input-output tables in which inter-industry flows are recorded in a consistent way" (p.19). Indeed, from supply and use tables industry output, intermediate inputs and value added can be obtained. Then additional statistical information is taken from National Accounts. These statistics represent the 'basic' productivity variables of the database followed by a group of growth accounting variables which are of analytical nature as they are obtained in a framework rooted in production functions requiring additional assumptions such as those mentioned in the previous paragraph (competitive factor markets, full inputs utilisation and constant returns to scale). However, it is important to underline that in this first group of basic variables one can

27 This research was founded by the European Commission under the Sixth Framework Programme. The project was carried out by a consortium of 24 research institutes and national statistical institutes (www.euklems.net).

find the price and volume indices of gross value added which require specific theoretical assumptions. In the methodology report accompanying the dataset it is explained that "in this database it was chosen to report industry-level value added volume indices for each country based on the national accounts methodology of that particular country. This methodology differs across countries (...). This choice is driven by the fact that for many countries value added volume series are often longer and have more industry detail than the gross output and intermediate inputs series." (Timmer et al. 2007, p. 21). These words confirm the motivation of 'data availability' behind the choice of relying more on value added than on gross output to measure productivity at the industry level, albeit the caveats stated above and the implicit assumptions that will be described in the following. In fact, to produce the volume measure of value added (real value added) firstly it is necessary to assume the existence of industry-level value added function as a function of only capital, labour and time as:

$$VA_J = V^j\left(L_j, K_j, t\right).$$

This function links technological change exclusively to real value added and primary inputs, therefore implying that it is a sub function of an industry-level production function which is value-added separable:

$$Y_j = F\left(V^j\left(L_j, K_j, t\right), M_j\right)$$

where Yj is the maximum quantity of gross output of industry j that can be produced by all inputs: intermediate inputs (Mj), labour (Lj), and capital (Kj). In order to define this sub function it is assumed that intermediate inputs are separable from primary inputs, so that intermediate inputs' prices do not matter when the producer makes his choices for all its production inputs simultaneously. It must be stressed that the volume and price indices of value added can be computed even if the separability assumption is violated although this index would be meaningless.

When the production function is assumed separable in intermediate inputs and value added, the quantity of value added can be derived as a

Tornqvist index for gross output then rewritten in terms of value added as:

$$\Delta \log VA_{jt} = \frac{1}{s_{VA}}(\Delta log Y_{jt} - s_M \Delta \log M_{jt})$$

where s_{VA} is the share of value added in gross output and s_M is the share of intermediate inputs in gross output defined as (1-s_{VA}) [28]. Therefore, the volume change of value added is defined as an average of the volume change of output Yj and the volume change of intermediate inputs weighted by their share in gross output. The expression is multiplied by the inverted share of value added on gross output.

Because the volume change for value added involves the volume change for output and intermediate inputs, it implies a process of double deflation. This may be empirically approximated by using fixed-weight Laspeyres quantity indices where constant-price value added is a difference between the constant price index of gross output and the constant price index of intermediate inputs with weights expressed in prices of the base period. Otherwise the Tornqvist version of double-deflation can be applied with geometric weights expressed in current prices and averaged across periods.

One clear advantage of this productivity measure based on value added is that the aggregate overall productivity level is obtained by the weighted aggregation of industry-level productivity where weights are simply each industry's current price share in total value added.

When all hypotheses are met, the nominal measure of value added is defined as:

$$P_j^V VA_j = P_j^Y Y_j - P_j^M M_j$$

where P_V is the price index of value added.

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28 In this equation the separability holds if the share s_{VA} does not depend on the intermediate inputs M.

To sum up, the measurement of factor productivity at industry level requires a volume measure of output. Albeit gross output is regarded as the preferred concept to measure single factor productivity, value added is generally used. In order to obtain a quantity measure of value added the existence of industry value added functions is required: to define this function a separability condition must hold otherwise the volume and price index of value added would be meaningless. This condition is generally violated as shown by Jorgenson, Gallop and Fraumeni (1987)[29]. Moreover, as stressed by Meade (2007) and Almon (2009) the double deflated value added which is obtained by this procedure is a purely fabricated quantity with no economic meaning: it represents the value added that would have resulted in industry j if prices had remained constant after the base year. As stated by Almon (2006) "it is, in fact, what would have been left over for paying primary factors, had producers, contrary to economic theory, gone right on producing with the previous period's inputs after prices have changed. That is certainly no measure of "real value added," for it is not, in all probability, what producers did." (p.4).

The volume of value added computed with double deflation is problematic particularly when sectors experience (a) large relative price changes, (b) large changes in factor shares or (c) large changes in the value of inputs relative to output. In case (a) intermediate input substitution occurs, in case (b) substitution occurs between primary production factors, in case (c) if the price development of intermediates is very different from the price development of output – and intermediates are a large share of production – then unrealistic results for the quantity of value added are likely to be obtained.

3. THE ALTERNATIVE I-O APPROACH: MEASURING HOW EFFICIENT IS THE ECONOMY IN PRODUCING VARIOUS FINAL PRODUCTS

All the reasons above suggest not using the volume measure of value added at the industry level to study sectoral factor productivity. An alternative method to the conventional approach may be derived within

29 In their well-known study the authors find that separability does not hold in 40 out of 45 industries (see Jorgenson Gallop and Fraumeni (1987), p. 242).

the input-output framework. This method is not particularly novel or mathematically sophisticated and has been applied within the I-O community for several studies[30]. It is based upon I-O tables and the computation of Leontief inverse matrix. Through this system the so-called factor requirements or factor intensity coefficients, both direct and indirect, may be computed and they give an important contribution to the analysis of productivity. Although the derivation of these coefficients is rather straightforward for I-O practitioners, here follows a brief description of their computation based on Almon (2009).

Let's assume that A_t is defined as the input-output coefficient matrix of year t, and similarly v_t is defined as the vector of real input – such as labour – per unit of output q in the same year, where each element is

$$v_j = y_j / q_j$$

and y_j is the payment to that primary factor by industry j. Finally p_t is the vector of prices in year t; in the base year, all prices are 1.0. Then as the column j of the Leontief inverse, $(I - A)^{-1}$, shows the outputs necessary, directly and indirectly, to produce one unit of final demand of product j, by premultiplying the matrix with the transpose of vector v_t one obtains x_t the vector of inputs per unit of final demand in year t:

$$x_t = v_t' \, (I - A_t)^{-1}.$$

The unit of final demand is expressed in current prices, then to convert the x vector to a constant unit, it must be multiplied element-by-element by the price index vector, p_t. Therefore vector z_t is given by

$$z_t = x_t * p_t$$

30 Pasinetti (1973) defines the concept of vertically integrated sector (VIS) as a section of industries able to produce all the inputs necessary to come up with the final good. In this context total labour productivity is computed including not only workers directly employed in the production of final goods, but also those employed in the firms producing the inputs, the inputs of the inputs, and so forth. An application of this index for Spain is in De Juan and Febrero (2000).

and it represents the real inputs needed to produce a (constant-sized) unit of final demand. If the primary factor considered is labour, z_t measures the labour direct and indirect requirements to produce a unit of final product. Therefore, the reciprocal of these labour requirements are labour productivity indexes as they show the use of labour in the inter-industry relationships encapsulated in the Leontief inverse besides the labour intensity of sector j. The resulted employment required in the production of the sector's final output may be different from the labour intensity of the sector itself: labour productivity depends on efficiency in labour use throughout the whole production process.

One may wonder why this simple relationship is not used to analyse productivity, especially at the sectoral level, while input-output tables are used only as a coherent accounting framework to collect sectoral data to be used for studying productivity. Indeed, input-output calculations may offer a perspective of studying trends in productivity which is missing in traditional methods not taking into account indirect effects.

4. AN EMPIRICAL APPLICATION TO ITALY

In order to compare the standard approach to measure labour productivity at the sectoral level with the I-O relationships the Italian economy is considered.

Two sets of sectoral data have been used. The first one refers to the EUKLEMS database already mentioned in Section 2. Then Supply and Use Tables and National Accounts for the Italian economy produced by the National Statistical Office (ISTAT) have been considered. In the first database, sectoral detail is based upon a common classification and harmonised data is available in the same format for all European countries. The second source of statistical data allows more detail and longer time series although in slightly different sectoral classification which has been reconciled with EU KLEMS in order to compare the results.

EUKLEMS database allows producing an index of labour productivity based upon real value added according to the theoretical assumptions described in Section 2. In general industry-level value added volume indices for each country are derived using double deflation but every country may have used a different methodology.

National data for Italy has been used to apply the I-O method described in Section 3. Sectoral labour productivity indexes have been obtained as the reciprocal of the labour requirements by industry. In this application imports are assumed to be produced with the same input patterns as domestic products and moreover the adjustment of employment for quality is not considered. These assumptions should be removed in a further development of this work.

In the series of graphs here below (Figures 2, 3, 4) these indexes – represented by the lines with plus signs – are compared with the index of labour productivity – the lines with squares – usually computed as the volume of labour per unit of the volume of value-added based upon the EUKLEMS data sets.

To compare the different set of labour productivity indicators a common classification of selected sectors between the national Italian classification and the EUKLEMS database has been built. Here results for these sectors are presented to give some insights of the main findings.

First of all, one can observe that there are some sectors where the two indexes show only minor differences: this is the case of Construction, Trade, Financial intermediation, Education, Health and Social work.

In other industries labour productivity implied by taking into account the I-O structure of the whole economy is performing better than what is shown by the sectoral value added productivity index: these are Food, beverages and tobacco, Textiles and wearing apparel, Wood and paper, Machinery and equipment, Electric and electronic equipment, Chemicals, Real estates and business activities. In this case the standard labour productivity index underestimates the reduction of labour per unit of output produced by those sectors. The economy as a whole has been progressively more efficient in producing the output than what is measured looking only at the labour factor used in that industry.

Finally, for some industries the trend in labour productivity is worse when one looks at how efficiently – in terms of the use of labour – the whole economy is producing a unit of final demand by that sector than looking at the value added per unit of labour of that specific sector. These industries are Agriculture, forestry, and Hunting, Electrical energy, gas and water, Transports, Mining and quarrying. In this case the sector is using progressively less labour per unit of output in the decade considered but – as the reciprocal of labour requirements may suggest – the economy as a whole is not saving as much in producing that output: that industry may have externalised some of its producing process to other industries, therefore the reduction of labour used is only apparent as only the direct and not the indirect labour content has been reduced.

A possible explanation of these results may be found if the structure of intermediate consumption of the economy is observed. In Table 1 the sectoral shares of intermediate inputs over gross output for selected sectors are shown. In Table 2 the difference of output and intermediate price growth rates by industry is presented.

The first group of industries where there are minor differences between the two labour productivity indicators generally present shares of intermediates over output below average (which is 55.5) and stable across the time period: this is the case of Financial intermediation, Education, Health and Social work. Therefore, even if the price development of intermediates may be different from the price development of production this may not be very problematic in the computation of the volume of value added as intermediates are not a large share of production. Likewise the eventual indirect labour content in their production is not expected to be significant. On the other hand for Trade and Construction while the intermediate share is higher the price dynamics of inputs and output is rather similar.

For the other industries where results diverge, a very large share of intermediates over output is observed – for Food and beverages, Basic metals and machinery – and in some cases increasing over time – such as for Agriculture, Chemicals, Electricity, Mining --. This evidence may have created changes in the labour requirements along the production chain which are not allocated in the industry itself. These indirect effects are captured by the I-O methodology and therefore the results may differ from the standard index of labour productivity. Moreover, in certain cases large differences in intermediate and output price growth may be observed – for instance in Agriculture and Electricity, Gas, Water – which make problematic to compute real value added by double deflation.

5. CONCLUSIONS

In this paper the theoretical and empirical characteristics of two alternative methods for computing labour productivity indicators at the industry level have been analysed. The empirical application shows that there are cases where the two procedures produce different results. This finding may be explained by the fact that in case of the I-O method the labour requirements used to compute a factor productivity index take into account the direct and indirect labour used in the production of final output by sector. According to this method it can be evaluated how efficient is the whole economy in producing a unit of final good. It can be concluded that this procedure avoids the theoretical assumptions which must be assumed by the traditional approach based upon double deflated value added and is more comprehensive in measuring the factor used in the industry production process. This approach may be further investigated by removing some working assumptions of this application, such as those concerning imports, the quality of labour, and by applying this procedure not only to study labour productivity but also the capital requirements of production which pose more difficulties in finding the appropriate variables for this methodology.

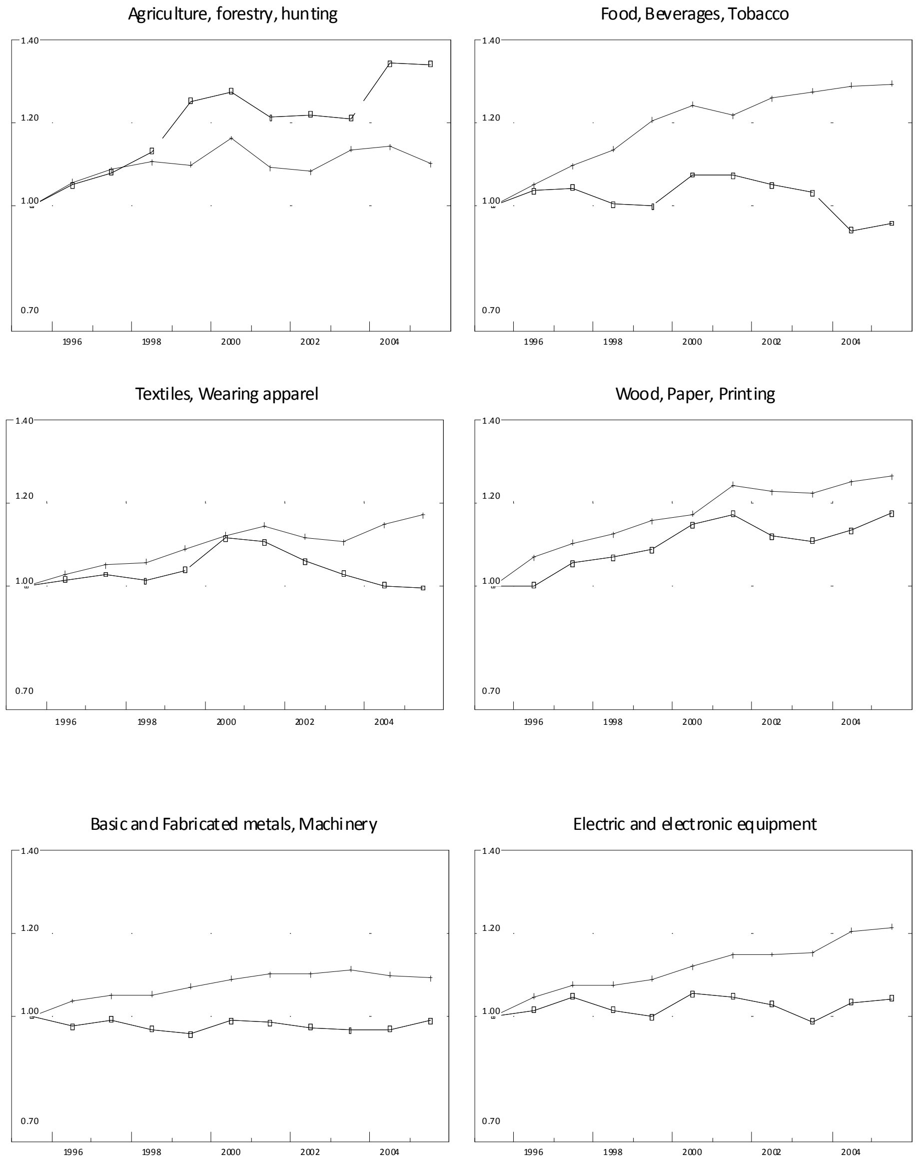

Figure 2: Labour productivity indexes (1995=1)

Notes: lines with plus signs, I-O indexes; lines with squares, EUKLEMS indexes.

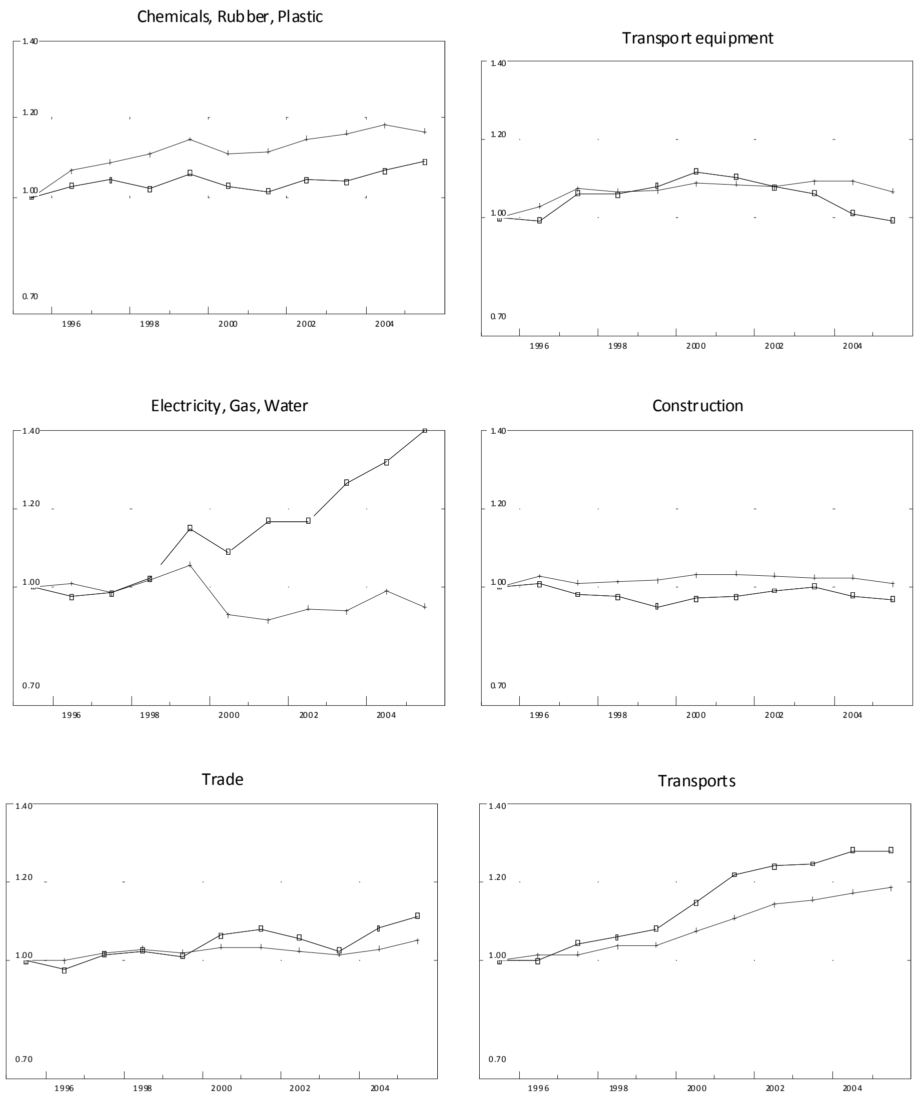

Figure 3: Labour productivity indexes (1995=1)

Notes: lines with plus signs, I-O indexes; lines with squares, EUKLEMS indexes.

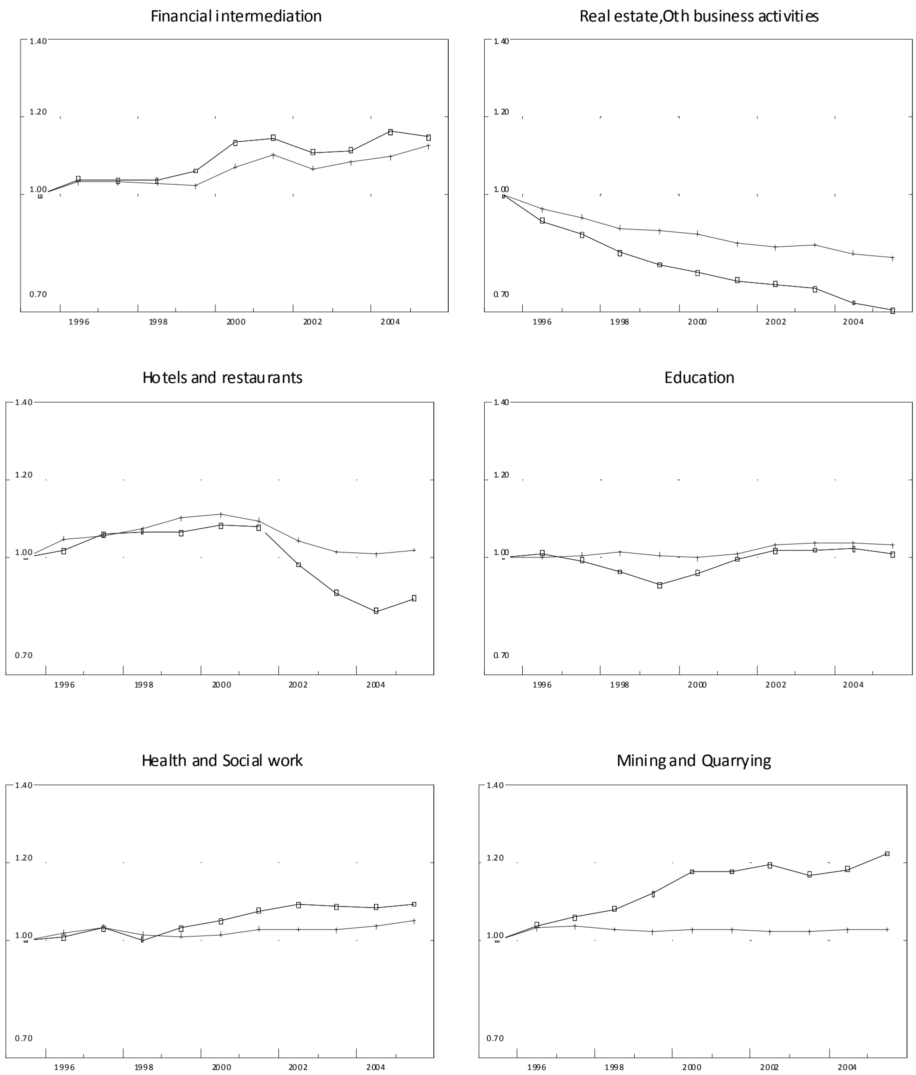

Figure 4: Labour productivity indexes (1995=1)

Notes: lines with plus signs, I-O indexes; lines with squares, EUKLEMS indexes.

Table 1: Sectoral shares of intermediate inputs over gross output

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	growth rates
AGRICULTURE, HUNTING, FORESTRY AND FISHING	36.8	36.1	35.5	35.4	35.8	37.3	38.2	38.3	38.1	38.6	40.6	10%
FOOD , BEVERAGES AND TOBACCO	77.1	76.3	76.1	75.9	76.2	76.6	77.0	76.0	76.8	76.6	77.6	1%
TEXTILES, LEATHER AND FOOTWEAR	68.6	68.1	69.0	69.7	70.5	71.2	70.9	71.3	71.4	71.4	72.6	6%
WOOD, PAPER AND PRINTING	63.2	62.6	64.0	64.9	66.1	66.6	63.5	64.6	67.0	67.0	67.7	7%
BASIC AND FABRICATED METALS, MACHINERY	67.9	65.4	66.7	66.8	66.6	68.0	68.0	68.2	68.1	69.8	70.3	3%
ELECTRICAL AND OPTICAL EQUIPMENT	66.6	65.7	66.2	66.7	67.4	67.6	67.6	67.2	66.7	66.2	66.9	0%
CHEMICAL, RUBBER, PLASTICS	71.9	72.0	72.9	71.8	73.8	76.6	76.7	76.9	77.3	78.2	79.4	10%
TRANSPORT EQUIPMENT	75.7	75.7	74.3	74.6	76.0	77.4	78.6	79.8	79.8	79.4	81.0	7%
ELECTRICITY, GAS AND WATER SUPPLY	51.0	51.1	53.5	51.3	52.9	61.7	62.0	59.9	61.7	61.0	64.2	26%
CONSTRUCTION	60.5	59.9	60.5	61.2	61.7	61.7	60.1	59.8	58.6	58.0	57.7	-5%
WHOLESALE AND RETAIL TRADE	50.3	50.8	52.1	53.1	54.7	56.0	56.2	57.1	57.6	58.1	59.2	18%
TRANSPORT AND STORAGE	56.3	56.2	57.1	56.9	58.8	60.3	60.3	58.5	59.5	59.2	60.8	8%
FINANCING INTERMEDIATION	28.4	29.1	30.5	31.3	32.1	32.2	33.5	33.6	32.8	33.4	33.5	18%
REAL ESTATE, RENTING AND BUSINESS ACTIVITIES	27.0	27.2	27.4	28.2	29.2	29.2	31.0	31.0	30.3	30.7	30.4	13%
HOTELS AND RESTAURANTS	51.0	49.8	50.8	51.3	50.8	51.3	50.8	51.9	52.9	52.6	53.2	4%
EDUCATION	15.5	15.2	14.9	15.7	15.7	16.5	16.2	15.4	15.3	16.1	15.5	0%
HEALTH AND SOCIAL WORK	33.0	32.5	31.2	32.7	32.9	32.2	32.7	33.5	34.2	34.4	35.1	6%
MINING AND QUARRYING	31.9	32.8	33.2	37.6	37.9	39.7	41.2	40.4	43.0	44.0	42.9	34%

Table 2: Difference of output and intermediate price growth rates by industry

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
AGRICULTURE, HUNTING, FORESTRY AND FISHING	-0.42	0.81	-0.25	-1.49	-4.47	-2.36	-1.17	1.12	3.10	-7.02	-3.17
FOOD , BEVERAGES AND TOBACCO	-0.96	1.24	1.05	1.06	0.57	-0.58	0.51	1.42	-0.49	2.11	-0.54
TEXTILES, LEATHER AND FOOTWEAR	-1.57	1.08	0.19	0.95	0.03	-0.96	1.36	0.20	0.32	0.74	-0.75
WOOD, PAPER AND PRINTING	-1.14	1.14	-1.16	-0.17	-1.04	-0.83	3.63	-0.62	-1.94	-0.44	-0.41
BASIC AND FABRICATED METALS, MACHINERY	-1.45	2.41	-0.82	0.30	1.10	-1.91	0.11	-0.08	0.39	-2.08	-1.37
ELECTRICAL AND OPTICAL EQUIPMENT	-1.17	1.41	0.23	0.81	0.05	-0.43	0.68	1.03	0.60	0.47	-0.84
CHEMICAL, RUBBER, PLASTICS	-0.49	1.13	-0.03	2.60	-2.70	-3.16	0.23	-0.16	0.17	0.00	-0.02
TRANSPORT EQUIPMENT	-0.03	0.55	2.28	0.88	0.26	-0.84	-0.37	-0.31	0.45	1.39	-1.21
ELECTRICITY, GAS AND WATER SUPPLY	-4.86	1.51	-1.09	6.22	-4.25	-13.50	-1.51	3.19	-2.05	-0.17	-6.61
CONSTRUCTION	-1.02	1.22	-0.09	-0.05	0.43	0.24	0.50	0.31	1.38	1.42	0.48
WHOLESALE AND RETAIL TRADE	-2.38	0.88	-0.98	-0.16	-0.91	-1.50	0.69	0.11	0.85	-1.14	-1.63
TRANSPORT AND STORAGE	-3.05	0.68	-0.65	1.34	-2.25	-1.38	1.36	2.08	-0.04	-0.70	-0.81
FINANCING INTERMEDIATION	0.30	0.40	-0.96	-0.32	0.03	1.85	0.24	1.52	3.10	0.47	0.30
REAL ESTATE, RENTING AND BUSINESS ACTIVITIES	0.67	2.45	2.03	-0.11	0.60	2.31	-1.28	2.91	2.92	0.23	0.54
HOTELS AND RESTAURANTS	0.29	3.59	-0.57	0.29	2.10	-0.50	1.59	-0.11	-0.03	1.45	-0.29
EDUCATION	-4.32	-0.08	-0.35	-4.64	-2.11	-5.16	3.02	1.91	0.25	-12.35	-0.56
HEALTH AND SOCIAL WORK	3.28	0.89	3.29	-3.47	-1.97	-0.08	-1.06	-1.22	0.01	0.89	-0.03
MINING AND QUARRYING	-2.45	-1.42	0.89	-6.09	3.04	-5.60	1.62	-0.80	-2.48	-0.23	-0.08

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