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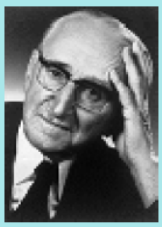



Jüri Sepp, Uku Varblane

The Decomposition of Productivity Gap between Estonia and Korea

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Abstract

The paper presents a decomposition of productivity gap between South-Korea and Estonia for the year 2006. After presenting stylised facts related to income convergence, we apply shift-share analysis to explain the patterns of structural disparities both at aggregated sectoral level and within the manufacturing sector. We propose an extension to conventional shift-share analysis with using relative productivity indicators. Decomposition shows that the overall productivity gap is mainly related to the manufacturing sector. The results show that at sectoral view, discrepancies in productivity levels of individual sectors (within-effect) play the dominant role in productivity gap formation, whereas we find some support for the structural-bonus hypothesis within the manufacturing sector. In line with the previous studies, relatively high productivity in financial intermediation and real estate sector as a feature of young market economies was confirmed.

Keywords: decomposition, productivity gap, structural change, employment

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The Decomposition of Productivity Gap between Estonia and Korea

Introduction

Estonia and the Republic of Korea (or South Korea) are both in a similar situation in terms of future economic challenges – there is a need to close the development gap between them and the world's richest. Both countries have so far been quite successful in this respect, though Korea has gained a considerable head start compared to Estonia since it began that chase more than a decade earlier[1]. Statistics reveal that over the past decade the two countries have been able to significantly reduce their backlog from the average *per capita* gross national income (GNI) of OECD countries (Figure 1). In 2002 the GNI of Estonia and Korea were 45% and 76% from OECD average respectively, whereas by the year 2011 the corresponding figures had been increased to 58% and 87% – an increase of 13 and 11 percentage points. It is noticeable that the race of catching up is taking place in somewhat different race classes as Estonia is currently trying to reach to a level where Korea was already a decade ago. However, the statistical ratios reveal that some convergence has occurred – the level of Estonian gross national income relative to Korea has risen from 59% to 67%. In absolute figures, net national income per person was 26425 USD in Korea and 17616 USD in Estonia (in PPP terms) in 2011.

However, the figure 1 shows that the process of convergence has been far from monotonous and unified nature as the global economic downturn in 2009-2010 has caused a recession only in Estonia but not in Korea. Estonia was thriving during the economic boom in 2004-2007 and reached as close to Korea as the latter is compared to the OECD average, the subsequent economic crisis, however, had in principle thrown the whole process some five years back. Moreover, the quicker growth in Estonia and the process of continuing convergence is not certain or guaranteed. Dur-

[1] In some sense, the period of centrally planned economy in Estonia can be seen as a failed attempt to find an alternative option for accelerating the economic growth. Unfortunately, undervaluation or ignorance of market signals resulted in a dead end.

ing the particular period, the average absolute increment of gross national income per capita was 881 USD in OECD, 1033 USD in Korea and only 844 USD per year in Estonia. If this tendency continues, income disparities will further increase.

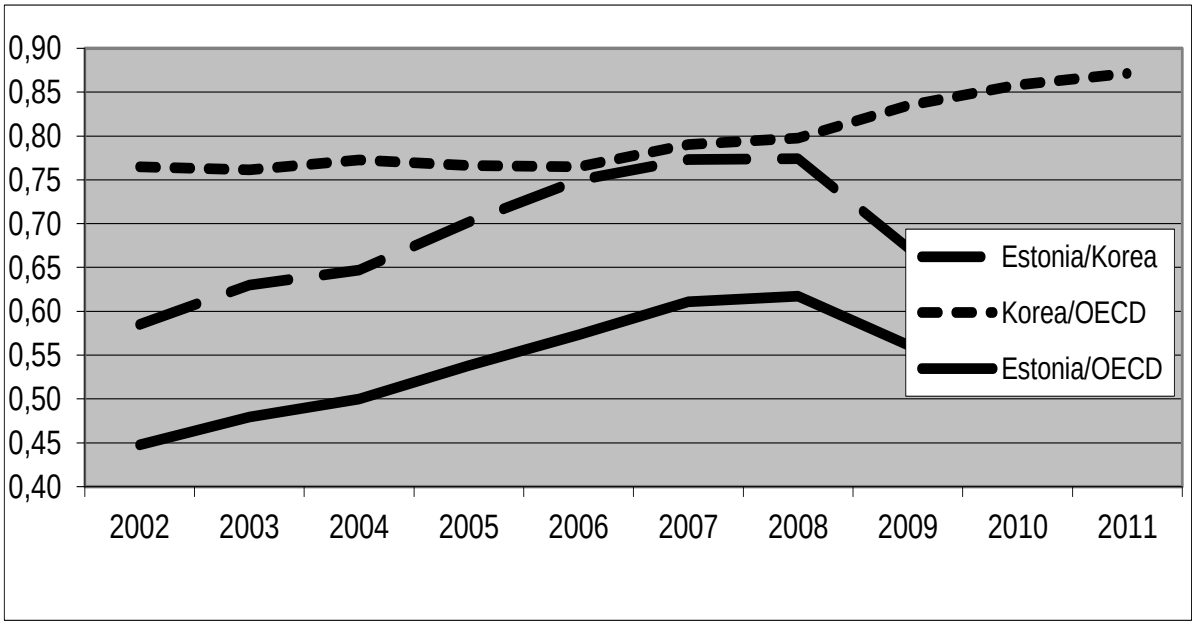

Figure 1. Income convergence in Estonia and Korea 2002 to 2011.
Source: OECD

In this paper we will focus on one specific aspect of convergence process and examine the structural determinants of the productivity gap between Korea and Estonia. In other words, the goal is to explain the patterns of structural transformation and decompose the productivity gap between Estonia and Korea both at the national level and in manufacturing sector in particular.

Productivity differences between countries can be decomposed into three separated effects. One of which is characterising the differences in allocation of labour between industries (the between-effect), the second measures the productivity growth caused by intra-branch productivity growth (within-effect) and the third component represent a cross (covariance) effect of both structural and productivity differences, that is positive when industries with growing labour productivity are increasing their market share. In addition to the aggregated components, the contribution of individual sectors is also of interest. The data used in this paper is from the OECD Database for Structural Analysis (STAN). The calculations of the analysis are based on the data

from the year 2006. The novelty in methodology lies in a spatial comparison and the application of relative productivity indicators in explaining the productivity gap.

Spatial analysis of productivity gap is not widely used in the literature. Rodrik (2012:38) is one of the few who has applied productivity decomposition analysis for explaining regional productivity differences. In his research, he comes to the conclusion that unification of employment structure of China and India with developed industrial countries would result in productivity increase of three and two times respectively. The decomposition of aggregate productivity has been also used in explaining the productivity gap between Australia and New-Zealand, whereas contributions of individual sectors were calculated (Yang, Stephenson 2011). Similar decomposition was applied in our earlier work (Sepp, Eerma 2009) where we found the components of manufacturing sector productivity gap between Estonia and Ireland or Finland, as well as between the EU-average. However, Rodrik's own fundamental interest is related to the decomposition of productivity dynamics of countries or regions. In contrast to the typical approach of focusing on the specific country[2], Rodrik raises the question of the fundamental roots of the international variation of productivity components. His motivation for this type of analysis lies in the peculiar patterns of productivity components of Asia, South-America and Africa. Havlik (2013), de Vries et al (2012) and Chansomphou, Ichihashi (2013) represent the other examples of large-scale cross-national comparisons of productivity decomposition in transition economies, however with the focus towards the BRIC countries.

The transformation patterns of sectoral structure of the economy have been studied both empirically using stylized facts, as well in the framework of growth theory.[3] In general, the economic structure is considered as a determinant of productivity and thereby the influencing factor of economic welfare. Timmer, Szirmai (2000) and several follow-up papers are talking about the structural bonus hypothesis. It should be emphasized, however, that there is definitely a two-way causality. A rather classic and generally accepted notion is that tertiarization and rising share of service sector employment in the developed countries could be largely denoted to the consequence

[2] Particularly on the structural changes in manufacturing industry the relevant research has been done by Marczewski, Szczygielski (2007) in the Polish, by O'Donnell (2007) in the Irish, by Szalavetz (2009) in the Hungarian and by Akkemik (2006) in the Turkish manufacturing experience.
[3] Fisher (1935), Clark (1940); Fourastié (1949), Kaldor (1961), Baumol (1967); Fuchs (1968), Kuznets (1971) and Madisson (1980) are the classics in this sphere.

of the increased productivity of the manufacturing sector. It enables and generates both the growth in demand for services as well as releases labour for service sector, where in many branches the “internal” productivity growth opportunities are relatively limited.

In developing countries, the released labour may be exploited in low-productivity agriculture or even in black economy. In this case, the impact of structural transformation on the overall productivity is negative (de Vries et al. 2011, Rodrik 2011). Therefore, in this paper we pay special attention to the links between employment and productivity. If this link is negative, the structural burden occurs - employment shift away from relatively progressive industries towards those with lower growth of labour productivity (Baumol 1967). In the opposite case, if the positive relation emerges, there is a specialization in economy as the labour shifts from low to high productivity sectors, which amplifies the average productivity growth (structural bonus). In the latter case, to a certain extent we can also refer to the process of smart specialization. Previous studies have not, however, given an unambiguous justification for those linkages between productivity and employment shifts[4]. Rodrik (2012: 40) for instance believes that the explanation lies in the country-specific effects of globalization that depend on the framework conditions of each particular country e.g. the local policy and development strategies. McMillan et al (2011) emphasize the intensity of import competition, availability of natural resources, over-regulated labour market and the overvalued currency as the main barriers for productivity enhancing transformations. In this paper, we investigate and control the previous results with comparing Estonia and Korea. The required further work should be done on the basis of an econometric analysis of a larger sample.

[4] The “structural bonus and burden” hypothesis were examined on example of Asian economies by Timmer and Szirmai (2000), on a large sample of OECD and developing countries (Fagerberg, 2000), and more recently by Peneder for USA, Japan and EU member states (Peneder, 2003) and by Havlik (2013) for CEE countries. Based on a structural decomposition, de Vries (2011) find that for China, India and Russia reallocation of labour across sectors is contributing to aggregate productivity growth, whereas in Brazil it is not. This strengthens the findings of McMillan and Rodrik (2011).

1. Results of Productivity Decomposition

The most general measure in cross-country comparison of productivity levels is GDP *per capita*. However, this figure is significantly dependent on the employment rate and the average annual hours worked. Table 1 shows a comparison of Korea and Estonia with respect to U.S.

Table 1. Productivity levels of Korea and Estonia in 2011 (U.S. = 100)

Country	GDP *per capita*	GDP per hour worked	Hours worked *per capita*
Estonia	46	43	106
Korea	63	49	128

Source: OECD

As GDP per capita accounts for 63% of the U.S. level in Korea and 46% in Estonia, the rate of GDP per hour worked is somewhat lower – 49% and 43% respectively. This indicates that the intensity of labour utilization in Estonia and Korea is higher than in the U.S. The number of hours worked per capita makes up 103% of the U.S. level in Estonia and 128% in Korea. Higher intensity of labour utilization in Estonia and especially in Korea is the basis for considerable discrepancies between the ratios of GDP per capita and GDP per hour worked compared to the U.S. With regard to the comparison between Estonia and Korea, the hourly productivity in Korea exceeds Estonian level by a narrow 15%, whereas on a *per capita* basis, the Korean advantage is around 38%. This particular feature will be the object of interest in the present work and the basis for the decomposition.

Before focusing on the results of the decomposition analysis, we will explain in a bit more detail the differences in the employment and productivity of Estonia and Korea at the relatively aggregated level of NACE classification (14 activities, which we call the economic sectors).

In both countries, the largest share of employment is in the manufacturing sector, as in Estonia the share is over 20% and in Korea a bit less (Table 2). In terms of employment share, energy and water management, construction, transportation and communications and the public sector are also of high importance in Estonia. In Ko-

rea, by contrast, the share of labour employed in finance, trade, in other services and in agriculture exceeds the corresponding levels of Estonia. To understand the relevance of these differences in employment structure on average productivity, it is relevant to briefly examine the sectoral productivity levels. At first, we consider the so-called relative productivity, which is obtained by dividing the share of the value added of the sector with the corresponding employment share. The result is the reference coefficients, which describe the productivity of the particular sector with respect to the average sector or nation's average.

Table 2. The sectoral structure of employment and value added and relative productivity indexes of Korea and Estonia in 2006 (%)

	Employment share		Share of value added		Relative productivity index	
	Korea	Estonia	Korea	Esto-nia	Korea	Estonia
Agriculture, hunting, forestry and fishing	7.7	5.0	3.2	3.2	41.0	63.5
Mining and quarrying	0.1	0.8	0.2	1.0	303.3	119.5
Manufacturing	18.0	21.1	27.5	17.0	152.5	80.7
Electricity, gas and water supply	0.3	1.9	2.3	3.1	692.4	159.1
Construction	7.9	9.7	7.5	8.7	95.0	89.5
Wholesale and retail trade – repairs	16.0	13.7	8.7	14.5	54.0	105.8
Hotels and restaurants	8.9	3.5	2.4	1.7	27.0	48.8
Transport, storage and communication	6.4	9.5	6.8	11.1	107.1	117.0
Financial intermediation	3.4	1.1	6.8	4.0	199.6	351.3
Real estate, renting and business activities	9.4	7.4	14.6	20.1	155.9	270.4
Public admin. and defence - compulsory social security	3.5	6.0	6.4	5.2	185.3	85.5
Education	7.2	9.1	6.3	4.2	87.5	46.8
Health and social work	3.0	5.8	3.9	3.0	131.0	51.7
Other community, social and personal services	8.3	5.3	3.5	3.3	42.7	61.9
Total	100.0	100.0	100.0	100.0	*	*

Source: OECD

Although, the relative productivity indexes of the two countries are moderately correlated (r=0.3), which refer to the rather similar general tendencies, some significant differences occur. Productivity levels in Korean electricity, gas and water supply sector and in mining significantly exceed the average levels in Korea (nearly seven and three times respectively). Financial intermediation and business services are approx-

imately in the same role in Estonia with over 2.5 times higher productivity compared to the Estonia's average and also exceeding the corresponding levels of Korea. These are the regularities we have also observed in a previous study (Sepp et al 2009) - in transition economies the financial sector is relatively more profitable than in older market economies. The same applies for the real estate, renting and business activities. In both countries, the share of agriculture, hotels and restaurants and other community, social and personal services in total value added is relatively small. However, in Korea these sectors are of particularly low return compared to an average. The striking difference between Korea and Estonia appears on public sector figures. Three public sector branches included in the analysis comprise 13.7% of the employment in Korea, meanwhile as much as 20.9% in Estonia. In terms of value added the share of public sector accounts for 16.8% of total economy in Korea and 12.4% in Estonia. In other words, the productivity of a single employee of the public sector of Korea exceeds the national average. In Estonia, however, the corresponding level is only about 60% of the average. As a whole, the sectoral productivity variation in Korea is considerably higher than in Estonia.

It is also remarkable that due to the higher relative productivity, manufacturing sector in Korea accounts for more than 27% of the total value added. In Estonia the relative productivity of manufacturing sector remained below the nation's average, and therefore the contribution to overall value-added was smaller compared to the employment share.

We take cognizance of these notable disparities and now focus on productivity decomposition. We use the same productivity (GDP *per capita*) gap notation, which according to the Table 1 is 38% between Korea and Estonia.

This gap could be decomposed into three components as follows:

$$t\text{-}1 = \Sigma se*(qk-qe) + \Sigma(t*sk-se)*qe + \Sigma(t*sk-se)*(qk-qe), \quad (1)$$

where

t - the ratio of the average productivity in Korea and Estonia;

t-1 - the average productivity gap between Korea and Estonia;

qk and qe – share of industry in total employment in Korea and Estonia (Table 2);

sk and se - the relative productivity of industry in Korea and Estonia (Table 2).

With using the multiplier t we can switch from relative productivity deviations to the actual deviations adjusted with the average productivity levels (Table 3). It appears that in as many as six sectors, the productivity in Korea lags Estonian levels. The largest backlog exists in the wholesale and retail trade – around 30%. However, the real productivity in Korean electricity, gas and water supply sector exceeds the corresponding level of Estonia almost six times, the difference is 3.5 to 2.6 times in mining and manufacturing. Korea has also about three times higher productivity in the public sector. Essentially, the latter means better financing.

Table 3. Relative and real sectoral productivity deviations and reference coefficients of Korea compared to Estonia in 2006 (%)

	Productivity deviations		Reference coefficient
	Relative	Real	
Agriculture, hunting, forestry and fishing	-22.5	-6.8	89
Mining and quarrying	183.8	299.3	350
Manufacturing	71.8	129.9	261
Electricity, gas and water supply	533.3	797.0	601
Construction	5.5	41.7	147
Wholesale and retail trade – repairs	-51.8	-31.2	70
Hotels and restaurants	-21.8	-11.5	76
Transport, storage and communication	-9.9	30.9	126
Financial intermediation	-151.7	-75.7	78
Real estate, renting and business activities	-114.5	-55.1	80
Public admin. and defence, social security	99.8	170.4	299
Education	40.7	74.1	258
Health and social work	79.4	129.3	350
Other community, social and personal services	-19.1	-2.9	95

Source: Author's calculations

In equation 1, the first component describes the effect of the differences in the sectoral structure of employment, the second component describes differences due to the inter-industry productivity differences and the third component represents the cross effect of first two components. The formation of these individual components is shown in Table 4. Sectoral productivity differences in manufacturing clearly play the largest role in Korean-Estonian productivity gap. Assuming equal productivity levels in the other economic sectors, the productivity gap between Korea and Estonia would

be 27.3% due to the manufacturing sector only. Therefore, we will explore the impact of manufacturing in more detail below. Productivity discrepancies in energy and water management sector increase the overall productivity gap by another 15.3%. However, the third component of the decomposition, the cross effect, reduces that margin by 12.7%, which means that higher productivity in Korea has concurred with lower share of employment. In terms of structural differences (between effect), the contribution of the financial intermediation to the productivity gap is the largest with 8%.

Table 4. Decomposition of productivity gap across sectors

	Structural difference	Productivity difference	Cross effect	Total
Agriculture, hunting, forestry and fishing	1.7	-0.3	-0.2	1.2
Mining and quarrying	-0.9	2.4	-2.2	-0.6
Manufacturing	-2.5	27.4	-4.0	20.9
Electricity, gas and water supply	-2.5	15.3	-12.7	0.1
Construction	-1.6	4.0	-0.7	1.7
Wholesale and retail trade - repairs	2.4	-4.3	-0.7	-2.6
Hotels and restaurants	2.6	-0.4	-0.6	1.6
Transport, storage and communication	-3.7	2.9	-1.0	-1.7
Financial intermediation	8.0	-0.9	-1.7	5.4
Real estate, renting and business activities	5.2	-4.1	-1.1	0.0
Public admin. and defence, social security	-2.2	10.3	-4.4	3.7
Education	-0.9	6.7	-1.4	4.4
Health and social work	-1.5	7.5	-3.7	2.4
Other community, social and personal services	1.8	-0.2	-0.1	1.6

Source: Author's calculations

The summary results of the decomposition analysis are presented in Table 5. The important finding of our analysis is that the discrepancies in productivity levels of individual sectors play the dominant role on productivity gap formation between Korea and Estonia as these discrepancies account for 66%. Fortunate for Estonia, the interaction or cross effect of productivity and structural differences is clearly negative (correlation coefficient about -0.4), which indicates a structural burden exist. Significantly higher productivity levels in some sectors of the Korean economy are mostly related to the smaller share of employment compared to Estonia. In this particular

case, the structural and productivity difference components have the opposite signs in every single sector (Table 4). Consequently, the within-component of the productivity gap between Korea and Estonia would be 32% if the calculations are based on the structure of employment in Korea instead of Estonia.

Table 5. Components of productivity gap 2006 (%)

	Structural difference	Productivity difference	Cross effect	Total
Effect	6	66	-34	38
Percentage	16	175	-90	100

Source: Authors' calculations

The net effect of pure structural transformations is rather modest (16% of the total productivity gap), but still important. However, the between-component of the decomposition becomes negative (-28%) if we use the productivity levels of Korea as the basis of our calculations. Hence, the crowding-out hypothesis is confirmed in our analysis at the sectoral level. An interesting notion is that in Korea, alongside manufacturing and energy sector with ultra-high productivity levels, relatively large share of people are employed in low productivity agriculture, trade, hotels and restaurants.

2. Decomposition of Manufacturing Sector Productivity

Whereas the conception that positive deviations of productivity levels between countries tend to result in negative deviations in employment structure at aggregate level is generally accepted, the contributions, linkages and connections of the individual branches are not enough studied in order to talk about general knowledge, even at the empirical level. In the following paragraphs we analyse these branch-level relations taking manufacturing sector as an example. We compare Korean and Estonian manufacturing sectors using a STAN database of 12 manufacturing industries (Table 6).

A number of differences, even larger than at sectoral level, occur between Korean and Estonian economy. Whereas Korea has virtually no forest and wood industry, in Estonia it is the second important manufacturing branch in terms of employment share (behind the textile industry). In contrast, Estonia has not had much of the mechanical engineering industry compared to Korea. Three branches of the mechanical engineering industry included in the analysis account for only 15.8% of total employ-

ment in Estonia, while in Korea the corresponding figure is as high as 46.4%! Korea has also relatively higher employment share in the chemical industry.

Table 6. Employment, value added and relative productivity in different branches of manufacturing sector of Korea and Estonia in 2006 (%)

	Employment		Productivity		Relative productivity	
	Korea	Estonia	Korea	Estonia	Korea	Estonia
Food products, beverages and tobacco	6.5	11.7	5.0	12.5	78.1	106.6
Textiles and textile products	8.8	16.9	4.3	8.3	49.6	49.2
Leather, leather products and footwear	1.0	1.5	0.5	0.6	45.2	43.2
Wood and products of wood and cork	0.9	15.8	0.5	13.8	58.2	87.2
Pulp, paper, paper products, printing and publishing	5.5	5.8	4.1	7.7	74.7	133.0
Chemical, rubber, plastics and fuel products	12.0	5.9	16.3	10.4	136.1	174.8
Other non-metallic mineral products	3.0	4.0	3.3	8.8	111.7	223.0
Basic metals and fabricated metal products	13.0	12.2	15.8	10.3	121.9	84.5
Machinery and equipment, n.e.c.	11.6	2.8	9.4	4.7	81.3	167.3
Electrical and optical equipment	21.6	8.2	24.3	11.1	112.8	134.7
Transport equipment	13.2	4.8	14.7	4.2	110.8	88.7
Manufacturing n.e.c. and recycling	3.0	10.4	1.7	7.6	54.9	72.6
Total	100.0	100.0	100.0	100.0	*	*

Source: OECD and authors' calculations

In addition to the review of employment shares, it is relevant to examine the relative productivity levels of different manufacturing branches. Interestingly, the differences within the manufacturing sector do not appear to be as large as the differences at the sectoral level. Correlations between the productivity levels of the two countries (around 0.6) are significantly stronger here, compared to correlations between the aggregated sectors. Hence, the manufacturing branches with higher and lower level of productivity coincide rather well. In both countries, productivity levels are the lowest in the textile and leather industries with relative productivity less than half the average of manufacturing sector. Chemical industry and machinery can be regarded as the branches with the highest productivity.

If at the sectoral level the variability in productivity was greater in Korea, then in manufacturing industry it is larger in the context of Estonia. This is in line with the hypothesis of McMillan and Rodrik (2011) that the lower variability in productivity levels is a characteristic feature of higher level of development of the state.

We should not forget that on average Korean manufacturing sector was 2.61 times more productive than Estonian. Taking that in account, we have calculated the real deviations of productivity in addition to relative ones (Table 7). It turns out that in all of the manufacturing branches, the productivity in Korea is higher compared to Estonia. The largest discrepancies in favour of Korea stand in metalworking industry and in the manufacturing of transport equipment, particularly the automotive industry, where the productivity exceeds Estonian level by more than three times. The smallest gap between Korea and Estonia occurs in the industries of non-metallic mineral products and machinery and equipment wherein Korea has the lead of about 30%.

Table 7. Deviations of the relative and real productivity in branches of manufacturing industry in 2006 (%)

	Productivity deviations		Reference coefficient
	Relative	Real	
Food products, beverages and tobacco	-28.4	97.1	191.1
Textiles and textile products	0.4	80.0	262.6
Leather, leather products and footwear	2.0	74.7	272.8
Wood and products of wood and cork	-29.0	64.5	174.0
Pulp, paper, paper products, printing and publishing	-58.3	61.7	146.4
Chemical, rubber, plastics and fuel products	-38.6	180.1	203.1
Other non-metallic mineral products	-111.3	68.1	130.5
Basic metals and fabricated metal products	37.4	233.2	376.0
Machinery and equipment, n.e.c.	-86.0	44.6	126.7
Electrical and optical equipment	-22.0	159.3	218.2
Transport equipment	22.1	200.1	325.5
Manufacturing n.e.c. and recycling	-17.7	70.5	197.1

Source: Authors' calculations

Subsequently, the decomposition analysis is applied for examining the impact and contribution of individual branches on the formation of manufacturing productivity gap (161%).

Table 8. Decomposition of productivity gap across manufacturing branches

	Structural difference	Productivity difference	Cross effect	Total
Food products, beverages and tobacco	-5.6	11.4	-5.1	0.6
Textiles and textile products	-4.0	13.5	-6.5	3.0
Leather, leather products and footwear	-0.2	1.1	-0.3	0.6
Wood and products of wood and cork	-13.0	10.2	-9.6	-12.4
Pulp, paper, paper products, printing and publishing	-0.4	3.6	-0.2	2.9
Chemical, rubber, plastics and fuel products	10.6	10.7	10.9	32.2
Other non-metallic mineral products	-2.2	2.7	-0.7	-0.1
Basic metals and fabricated metal products	0.6	28.6	1.7	30.9
Machinery and equipment, n.e.c.	14.7	1.2	3.9	19.9
Electrical and optical equipment	18.0	13.1	21.3	52.3
Transport equipment	7.5	9.5	16.9	34.0
Manufacturing n.e.c. and recycling	-5.3	7.3	-5.2	-3.2

Source: Authors' calculations

It is particularly noteworthy that in a number of major manufacturing branches of Korea, the structural and productivity effects are both positive and together shape a positive cross effect. The industry with the largest contribution to the manufacturing sector productivity gap is electrical equipment. It is followed by manufacturing of transport equipment, metalworking and manufacturing of chemical products with more or less equal contribution to the productivity gap. The only industry that contributes to the reduction of the productivity gap is forest and wood industry, particularly through the higher share of employment in Estonia. The summary results of industry level decomposition are represented in Table 9.

Table 9. Components of productivity gap in manufacturing sector in 2006 (%)

	Structural difference	Productivity difference	Cross effect	Total
Effect	21	113	27	161
Percentage	13	70	17	100

Source: Authors' calculations

The importance of different components in explaining the productivity gap in manufacturing sector is rather different compared to the component structure in a more

aggregated sectoral level. The positive cross effect should be noted in particular, which means that in the manufacturing sector, the increase in productivity does not necessarily mean a crowding out of labour, but rather the opposite – the attraction of labour. The structural bonus hypothesis finds some support in Korea – the employment has shifted towards the most successful industries. However, the within component still accounts the largest share (70%) of manufacturing sector productivity gap. About 30% of Estonia's backlog in manufacturing sector could be accounted for differences in employment structure if the calculations are based on the productivity levels of Korea. This result is consistent with our previous study, in which the structural bonus accounted for approximately 20% of the productivity gap between Estonian manufacturing compared to Finnish and EU average and as much as 40% compared to Ireland (Sepp, Eerma 2009).

3. Concluding Remarks

The decomposition of the productivity gap between Korea and Estonia lead us to the following conclusions:

1. The impact of the employment structure on average productivity varies on different structural levels. Whereas at more aggregated sectoral level the structural burden hypothesis was confirmed, in less aggregated level – taking manufacturing industry in our study – the structural bonus prevailed. In the first case, high level of productivity was accompanied with decreasing share of employment. In the second case, contrarily, the labour was converging to the manufacturing branches with higher productivity. It needs a further research, whether it is a random structural specificity or a regular legitimacy.
2. At aggregated sectoral perspective, Korea lags Estonian productivity levels in several areas, particularly in traditional private sector services (trade, hotels and restaurants etc.) and the overall productivity gap (38%) is mainly related to the manufacturing industry. Significant sectoral variations in productivity can be considered as one of the weaknesses of the Korean economy.
3. In accordance with the previous studies, the relatively high productivity in financial intermediation and real estate sector in the young market economies was confirmed.

4. The situation in the public sector is substantially different in those two countries. Korea is characterized by a relatively low public sector employment share, but significantly higher productivity or the funding compared to Estonia.

5. In manufacturing sector, the average productivity in Korea is 2.6 times higher compared to Estonia and unlike the more aggregated sectoral level, it concerns all the manufacturing branches. Electronics and manufacturing of transport equipment are playing the most important role in formation of the productivity gap. Considering both productivity, employment and their interaction, there is just one branch in Estonian manufacturing industry that somewhat mitigates the productivity gap – the wood and forest industry.

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