Analysis

Profitable firms provide employment and pay higher wages

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AUTHORS



Matti Virén
Consultant



Juuso Vanhala
Head of Forecasting

An economy does not export products or create jobs – firms do. These are, however, very heterogeneous and often far from the average. Only the few 'superstars' of high productivity and profitability stand out distinctively in the large mass. A situation in which a few successful firms deviate strongly from the mass may distort the picture of an average firm and lead to erroneous conclusions about the condition of the corporate sector. However, a characteristic common to all firms is that success is reflected in wages and employment, even if in the export sector, the effect is typically smaller. Economic policy should pay more attention to the considerable heterogeneity of firms.



Exports and jobs are generated in firms

Economic policy debate focuses often on macroeconomic factors, such as export success, productivity or unit labour costs of the economy as a whole or the various sectors of the economy. The economy per se does not, however, export products or create jobs; this is done by firms operating in the economy.

Firms are a heterogeneous group. An analysis of firm-level data reveal that the differences in productivity and profitability levels are considerable, even within narrowly defined industries.[1] Moreover, the firms are distributed asymmetrically: the few 'superstars' of high productivity and profitability are distinct in the large mass of firms, in which productivity and profitability levels are considerably more moderate. Corporate productivity and profitability have also changed over time. During the crisis since the turn of the millennium, firms' profitability distribution has weakened on two occasions, and by 2015 it had not recovered at all.

The success or lack thereof of firms is visible in wages and employment. Higher productivity has a positive effect on wages, as expected, even if in export firms, the effect is smaller than in the closed sector. In addition, firms with higher productivity create more jobs than lower-productivity firms, but in export firms, this effect, too, is smaller on average. The international competition faced by

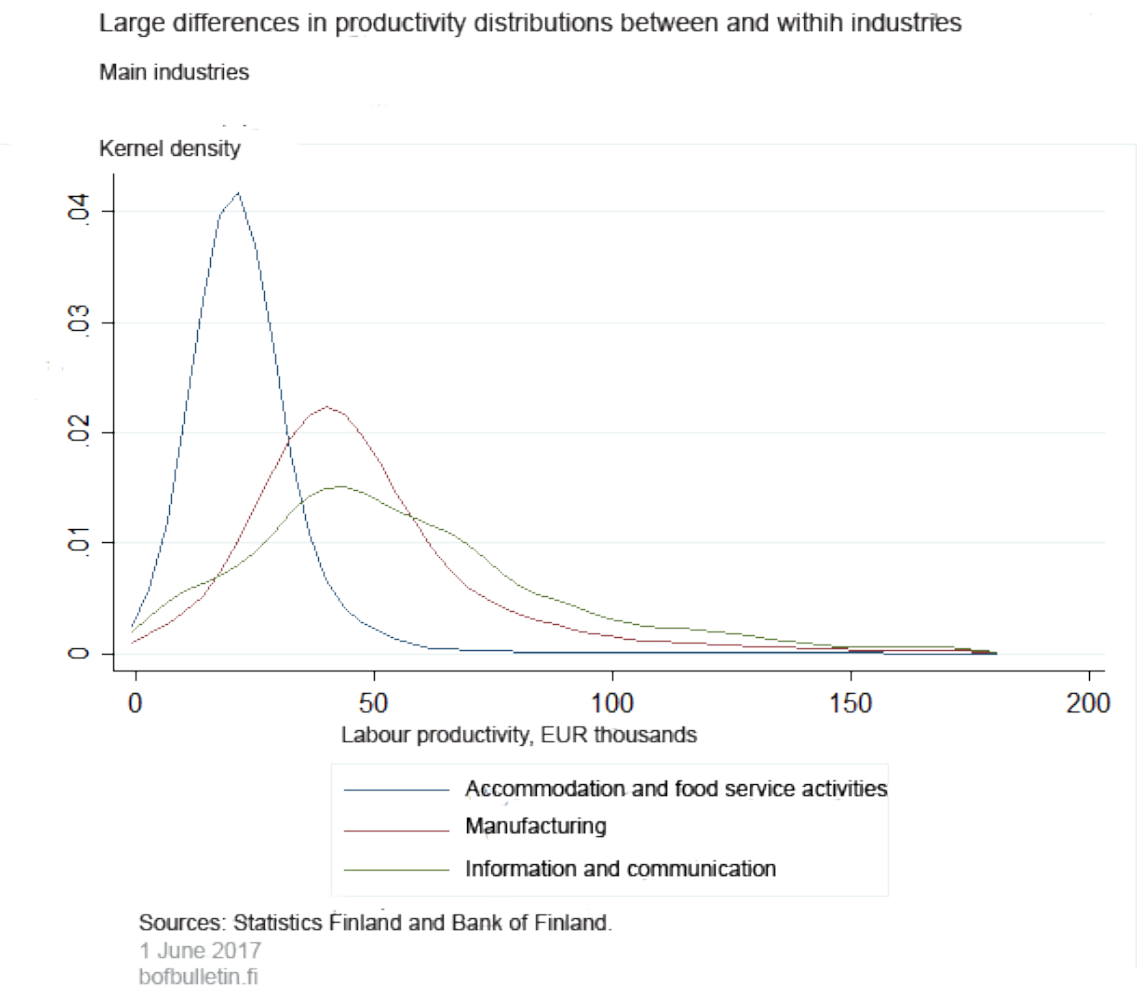
the export sector seems to force firms to moderate developments in wages, and differences in profitability are not reflected in job creation as strongly as in the other sectors of the economy.

For economic policy purposes, it is important to take into account the skewness of productivity and profitability distributions. Because a small group of very successful firms improve the mean of corporate productivity and profitability, determining the economic policy stance, for example, based on the average company is unsuitable for a large share of firms.

Large differences in corporate profitability and productivity

There is considerable heterogeneity in productivity in Finnish firms, and the dispersion of labour productivity is large and asymmetric. A notable feature, both in Finland and elsewhere, is the large number of firms with a relatively low level of productivity, while at the same time, only few firms reach very high productivity levels. The small number of high-productivity firms is visible as a relatively long right tail in the productivity distribution (Chart 1).[2] In the international research literature, this phenomenon is referred to as 'the happy few'.[3] Average corporate profitability then overstates labour productivity for a large proportion of firms.

Chart 1.



The distribution of wages is similar to that of labour productivity, but significantly more concentrated.[4] This reflects the fact that other factors than productivity have a strong impact on wages, e.g. wage bargaining institutions and/or competition.

The mean overstates profitability for a large proportion of firms

Skewed productivity and profitability distributions may distort the picture of the average company and lead to erroneous conclusions about the condition of firms. In addition to mean values, it is useful to examine the entire distribution of these variables. A more useful – or at least complementary – measure than the mean of labour productivity, wages or profitability is the median of productivity. The median firm is the one that is in the middle when the firms arranged in order from smallest to biggest in terms of productivity. As a result, the value is less affected by the

values of some few outliers. The difference between mean and median tells how much the few firms in the right tail of the distribution push up the mean.

An examination of differences in mean and median values in 2015 shows that the dispersion of labour productivity and the profitability margin is large (large standard deviation) and the median is considerably lower than the mean (Table 1). For a large share of companies, labour productivity and the profitability margin are relatively low, but the few firms with high productivity and profitability push up the mean values. These few firms do not, however, have a direct impact on the labour productivity or profitability of other firms, and hence on, for example, their capacity to pay wages.

The heterogeneity in wages is smaller (small standard deviation) and the difference between the mean and the median is small (also by international standards). When the median of labour productivity is 83% of the mean, the median wage is nearly the same as the mean wage. The median of profitability is only 61% of the mean.

Table 1.

Median of labour productivity and profitability significantly smaller than mean – figures for 2015

	Labour productivity (EUR 000)	Wages (EUR 000)	Profitability margin (EUR 000)
Mean	47.8	23.6	23.7
Median	38.5	22.6	14.5
p90	74.8	39.3	44.0
Median/Mean	0.81	0.96	0.61
Standard deviation	156.7	24.2	153.4

Source: Bank of Finland.

Labour productivity and wages as well as differences in their distributions have an impact on corporate profitability. If profitability is measured, in a simplified manner, as the difference between labour productivity and wages, and the wage distribution is very similar to that of the distribution of labour productivity, the profitability of firms is distributed very evenly, i.e. all the firms have fairly similar levels of profitability.[5] If, on the other hand, the wage distribution is more

concentrated than the productivity distribution, the differences in profitability may be large and asymmetrically distributed. In addition to the shape of the wage distribution, corporate profitability reflects the location of the wage distribution relative to the labour productivity distribution.

Large differences in and between industries

Differences in productivity are fairly large between industries, and the productivity distributions are very dissimilar. For example, in accommodation and food service activities, the majority of firms have relatively low productivity, and only very few are high-productivity firms (Chart 2a). In manufacturing, productivity is typically higher, which is visible in the distribution (Chart 2a) as a thicker tail. This means a larger number of high-productivity firms. In information and communication services, the location of the peak of the productivity distribution is broadly the same as in manufacturing, but the distribution is more even. The share of both low-productivity and high-productivity firms is larger than in manufacturing.

Intra-industry heterogeneity can also be very large (Chart 2b). For example, in the sub-industries of manufacturing, the differences in productivity distributions are considerable.

Chart 2.

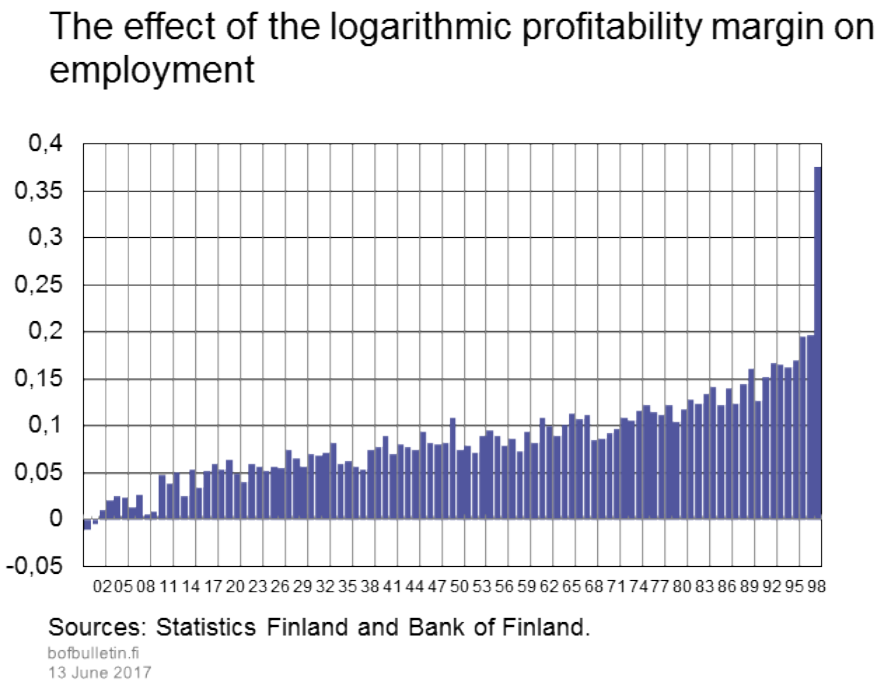
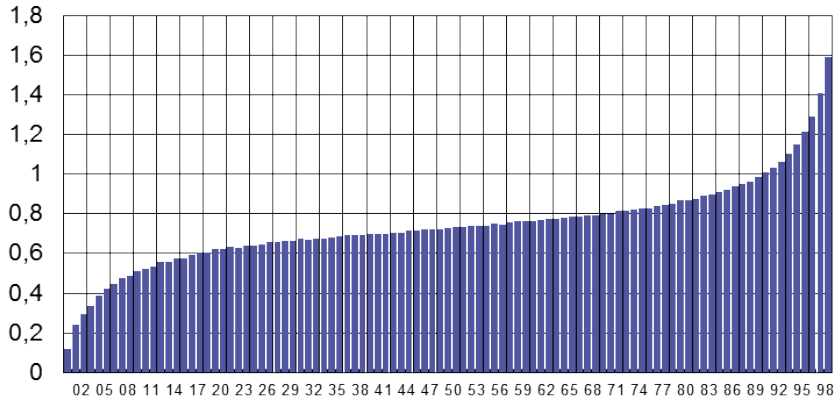


Chart 3.

The impact of changes in labour productivity on wages, all companies



The Y axis shows the regression coefficient from a model in which logarithmic wage differentials are explained with dummy variables that correspond to logarithmic productivity differentials (D1 is the lowest value and D100 the hundredth [highest] category of productivity growth). In the model, the control variables are the year dummy and the corporate structure dummy.

Sources: Statistics Finland and Bank of Finland.

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A one-size-fits-all economic policy is ill-suited for many

The heterogeneity of firms is of major importance in the economy.[6] A simultaneous shock to all the companies in the economy or within an industry, for example changes in exchange rates or energy prices, has a different impact on firms that differ in terms of profitability. If the productivity and productivity distributions are skewed, the capacity of an average company to adapt to a shock may differ considerably from that of the majority (cf. median) of firms. Correspondingly, a pay rise determined on the basis of mean productivity may be oversized for the majority (cf. median) of firms. A one-size-fits-all economic policy is unsuitable in an environment of considerable heterogeneity in productivity and profitability.

Corporate profitability has weakened since the turn of the century

During the crisis since the turn of the millennium, the profitability of firms has changed significantly on two occasions. In 2000–2008, the profitability distribution, which describes the margin between labour productivity and wages, remained broadly unchanged, but during the financial crisis in 2009, profitability weakened. In the graph (Chart 3), the weakening of profitability was reflected as a shifting to the left of the entire productivity distribution, and at the

same time, the share of high-profitability firms decreased and the share of low-profitability firms increased. The distribution remained broadly unchanged until 2012, and as we can see in the graph (Chart 3), the distribution shifted again to the left as the share of low-profitability firms started to increase again, at the expense of the number of firms with good profitability. Profitability had not recovered at all by 2015, which partly explains the anaemic developments in the Finnish economy in 2012–2015.

Chart 4.



The weakening of the profitability distribution was due on one hand, to the decline in labour productivity (productivity distribution shifted to the left and changes in its shape, to the loss of high-productivity firms) in 2009 and 2013.[7] In contrast, wages rose in 2009 (wage distribution shifted to the right and the share of large wages increased). In 2013, the wage distribution shifted to the left and the share of low-pay firms grew slightly, but changes in wages were smaller than changes in labour productivity.

Table 2.

Indicators of labour productivity wages and profitability 2000–2015				
		2000–2008	2009–2012	2013–2015

Indicators of labour productivity wages and profitability 2000–2015				
Profitability	Mean	27.0	25.0	22.9
	Median	19.3	16.9	14.4
	Median/Mean	0.72	0.68	0.63
	Standard deviation	83.0	97.5	123.5
Labour productivity	Mean	48.9	48.5	46.6
	Median	41.2	39.9	37.8
	Median/Mean	0.84	0.82	0.81
	Standard deviation	86.0	99.6	129.7
Wages	Mean	21.9	23.5	23.4
	Median	21.6	22.8	22.2
	Median/Mean	0.99	0.97	0.95
	Standard deviation	15.9	15.9	27.1
Source: Bank of Finland.				

Productivity is reflected in wages

Firm heterogeneity in productivity and profitability is significant, which is reflected as considerable differences in the capacity to pay wages. Productivity and profitability in individual firms varies over time, due, for example, to firm-specific shocks to demand and productivity. As noted above, the distribution of wages is more concentrated than the labour productivity distribution. This is due to the fact that other factors than productivity have a strong impact on wages. If labour productivity changes as a result of a demand or supply shock, will it have an impact on wages or will it lead to changes in profitability (i.e. will it affect the margin between labour productivity and wages)?

When we examine the indirect effect of productivity changes on wages by using a model in which relative changes in wages are explained by relative changes in labour productivity, we find that labour productivity is passed through to wages on the aggregate level and in all industries.[8]

However, the size of the effects (regression coefficients in the model) varies between industries (Table 3). For example, in construction, transportation as well as administrative and support service activities the pass-through is stronger than in manufacturing, wholesale and retail trade, and accommodation and food service activities. For all firms, the elasticity is 0.36, i.e. significantly below one. This, in turn, means that, in the short-term, an increase in productivity will improve corporate profitability, while a decrease in productivity will reduce profitability. However, the size of the coefficient does not mean that productivity growth would have a permanent impact on profitability, because it reflects the short-term effect of productivity on (real) wage growth. In the long term, real wages and productivity inevitably develop at a similar pace and the functional income distribution remains unchanged.

In export firms, and in general in firms participating in foreign trade, the pass-through of changes in productivity to wages is weaker than in the closed sector (smaller coefficient). In the closed sector the elasticity is 0.37, but for export firms it is only 0.25. This means that in export firms, changes in productivity do not pass through to wages in a similar manner (as rapidly) and fluctuations in profitability are correspondingly larger. This may be explained by the degree of competition: the price elasticity of export firms' products to demand is larger than in the closed sector, which forces the firms to stricter wage moderation and to maintain a higher profitability margin. In fact, the latter feature seems to hold true in the data examined here. For export companies, the average margin per employee for the entire period is EUR 31,600, whereas in non-export companies, the figure is EUR 25,400 per annum. The larger margin of the export companies may be due to higher capital intensity and thus also larger investment needs (export companies have on average 15 times more capital than companies on average).

The elasticity of wages to productivity is also nonlinear: the elasticity is larger when productivity grows than when it declines. This is consistent with the recent research literature, which finds (nominal) wages to typically exhibit downward rigidity.[9]

Table 3.

Regression coefficients in the model

No.	Coefficient	t-ratio	R^2	Industry	Panel	Explanation
1	.363	567.38	0.170	All	re	
2	.329	197.14	0.165	Manufactoring	re	
3	.426	281.03	0.220	Construction	re	

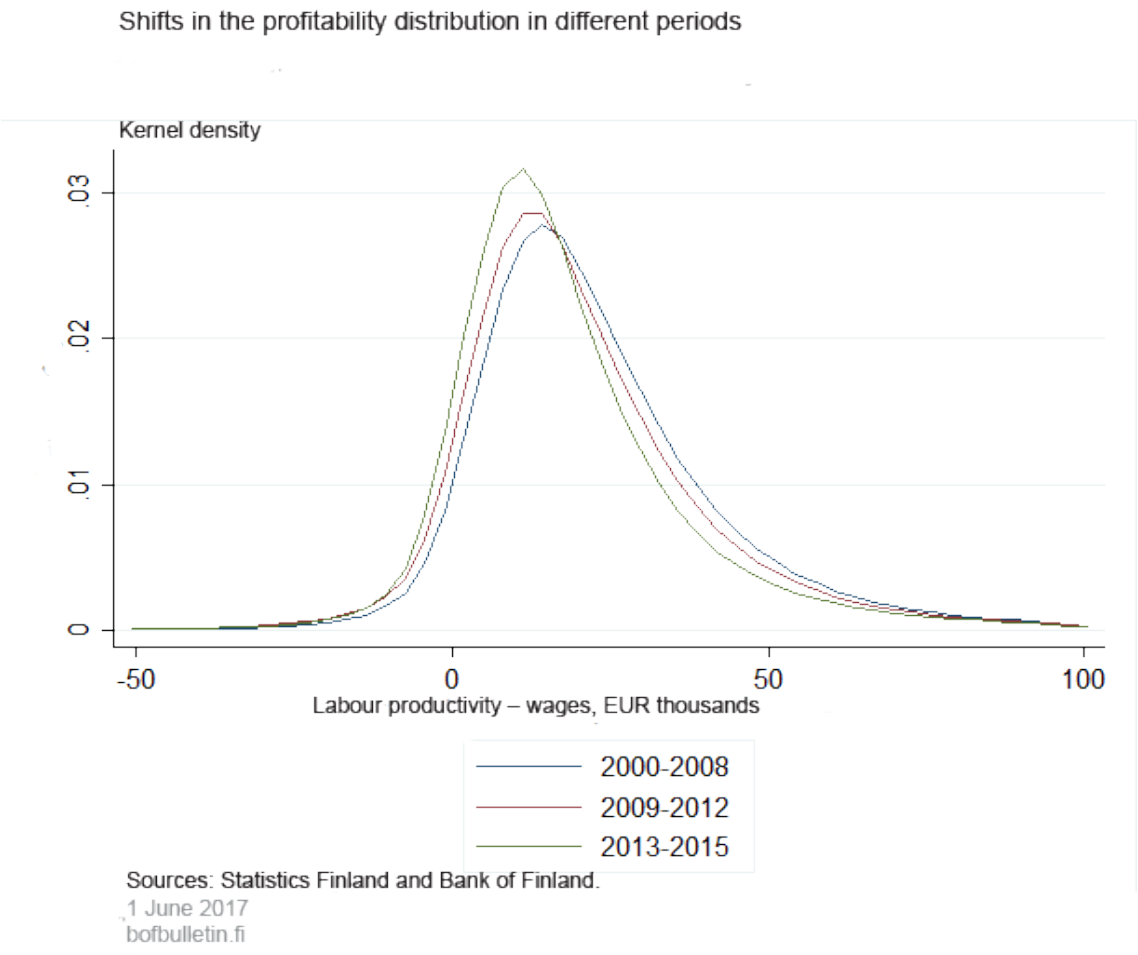
Regression coefficients in the model						
4	.302	260.68	0.161	Wholesale and retail trade	re	
5	.414	175.18	0.129	Transportation and storage	re	
6	.323	122.60	0.135	Accommodation and food service activities	re	
7	.356	118.61	0.181	Information and communication	re	
8	.299	75.27	0.114	Real estate activities	re	
9	.393	220.64	0.186	Professional, scientific and technical activities	re	
10	.456	154.13	0.220	Administrative and support service activities	re	
11	.247	140.90	0.157	All	re	Export>0
12	.371	550.86	0.172	All	re	Export = 0
13	.272	154.92	0.149	All	re	Export comppany
14	.450	309.90	0.269	All	re	Import comppany
15	.257	63.19	0.149	All	re	Foreign trade
16	.362	440.61	0.151	All	re	Non-foreign trade
17	.334	2251.01	0.171	All	fe,w	
18	.225	1277.76	0.136	All	fe,w	Export>0
17	.422	1890.66	0.175	All	fe,w	Export = 0
18	.202	1674.39	0.120	All	fe,w	<100%
19	.129	885.11	0.068	All	fe,w	<100%, Export = 0
17	.80	130.37	0.082	All	fe,w	<100%, foreign trade
18	.272	1458.78	0.123	All	fe,w	<100%, non-foreign trade

Regression coefficients in the model						
19	.151	165.80	0.040	All	re	<100%, Δlogpr>0
20	.135	158.82	0.041	All	re	<100%, Δlogpr<0
21	.295	288.77	0.111	All	re	<200%, Δlogpr>0
22	.120	125.86	0.029	All	re	<200%, Δlogpr<0
In the table, *re* refers to the random effect model; *fe* is the fixed effect model; *w* refers to weight (number of employees); '*export>0'* means that the firm's export deviates from zero; 'export firm indicates that the firm is registered as an export firm; 'import firm is defined correspondingly and 'foreign trade' shows that the firm is registered as a firm involved in both export and import. The figures <100% (<200%) mean that the sample is designed so that the rise in real wages can be 100% (200%) at a maximum; t ratios are non-clustered.						
Source: Bank of Finland.						

Due to the considerable heterogeneity of firms even within industries, it is advisable to examine the pass-through of productivity to wages in firms with different productivity developments. When firms are divided into percentiles based on productivity growth and we examine the pass-through of productivity to wages in each group, we find that the pass-through is nonlinear.[10] The pass-through of productivity to wages (size of the regression coefficient) is larger in firms with high productivity growth than in those with low productivity growth.

If productivity growth is weak, the rise in wages will also be minor (Chart 4). For the majority of productivity growth values, the rise in wages is, however, of similar size. But on the highest level of productivity growth, there is excess flexibility, although this applies to only some 10–20% of firms.

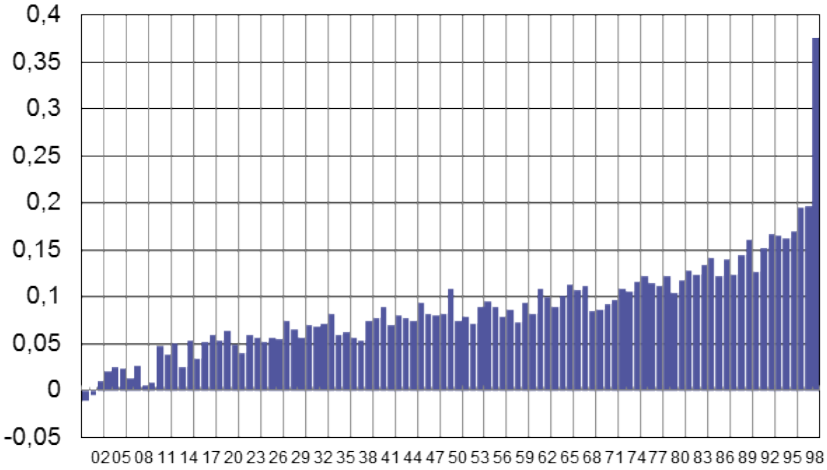
Chart 5.



If we examine separately manufacturing (macro industry 1) and the export sector (Chart 5), we find that the coefficients are smaller, but the company-level distribution of wage growth is nonetheless similar to that in the economy as a whole. In manufacturing, and in the export sector in particular, the pass-through of labour productivity to wages seems to be smaller than in other industries. The smaller pass-through in the export sector may reflect not only the above-mentioned differences in capital intensity but also restrictions in wage setting that are due to international competition: company-level productivity developments do not in the same manner define the capacity to pay wages as in the closed sector. The figures may also reflect the general trend in economic developments in recent years. In manufacturing and in the open sector in general, developments have been weaker than in the service industries or in the closed sector in general.

Chart 6.

The effect of the logarithmic profitability margin on employment

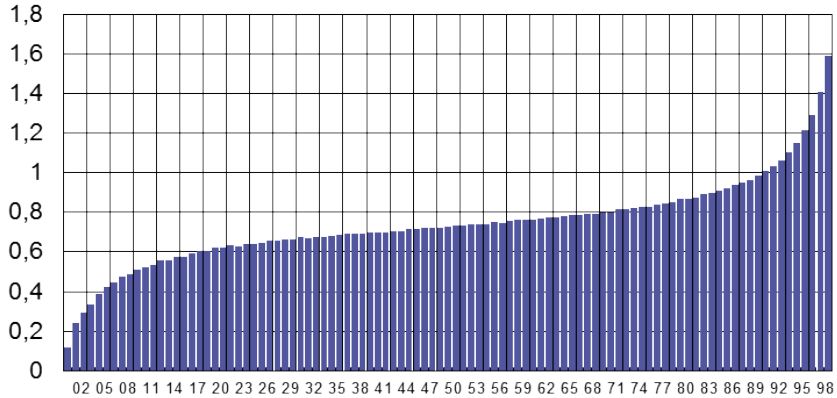


Sources: Statistics Finland and Bank of Finland.

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Chart 7.

The impact of changes in labour productivity on wages, all companies



The Y axis shows the regression coefficient from a model in which logarithmic wage differentials are explained with dummy variables that correspond to logarithmic productivity differentials (D1 is the lowest value and D100 the hundredth [highest] category of productivity growth). In the model, the control variables are the year dummy and the corporate structure dummy.

Sources: Statistics Finland and Bank of Finland.

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Another indication of the considerable heterogeneity of firms is that the rise in wages related to

productivity growth is at its largest more than double the amount in the reference group with the weakest productivity growth (lowest percentile). In the export sector, the dispersion of the coefficients is considerably smaller, and the largest coefficient is only just above one. This suggests that in the export sector, both the average effect of productivity growth on wages and the dispersion of the effects are smaller.

Corporate profitability affects job creation

The heterogeneity of firms is also reflected in the number of jobs they create. The employment effect of different types of firms can be examined from the macroeconomic perspective, in which case the focus of interest is the contribution of certain types of firms to the number of jobs created in an industry or in the economy. On the other hand, we can examine the effects of a company's characteristics on its own level of employment.

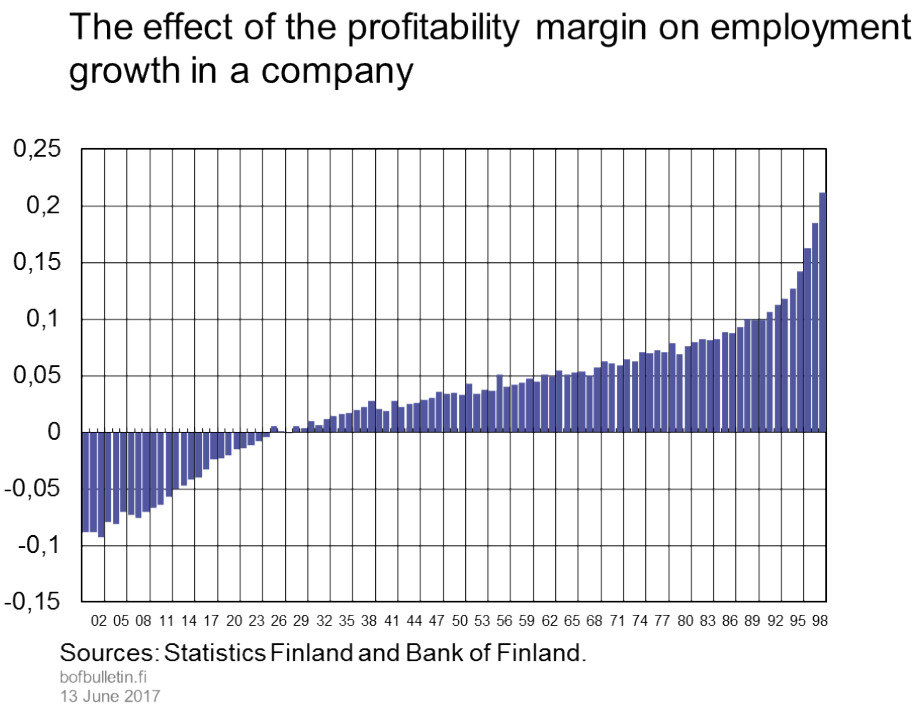
When we divide firms into percentiles based on profitability and examine the contribution of each group to employment in a sector we find that the contribution of firms with weak profitability to job creation in a sector is typically smaller than that of firms with higher profitability (Chart 6). The effect is, however, relatively small and is evident mainly at the lower end of the productivity-wage margin.

Chart 8.



A somewhat similar result is achieved when we analyse the effect of the size of a company's profitability margin on its own level of employment growth (job creation in the company).[11] We observe that there is a positive, almost linear correlation between a company's employment growth and productivity (Chart 7). In firms with very weak (or even negative) profitability, employment growth is negative, i.e. firms reduce their labour force. For the sake of comparison, it should be noted that the share of observations of negative productivity-wage margin is 12%, i.e. the group of firms with negative employment growth also includes firms with a positive (but small) productivity-wage margin.

Chart 9.



When we examine the effect of the profitability margin on a company's employment growth in the export sector (Chart 8) we find a qualitatively similar relation as in the previous exercise (Chart 7). The positive values are, however, larger and the group of negative values is smaller, i.e. the result is in line with the results for wage growth. The dispersion of the coefficients is smaller, i.e. in terms of behaviour, the export sector is clearly more homogeneous.

Chart 10.

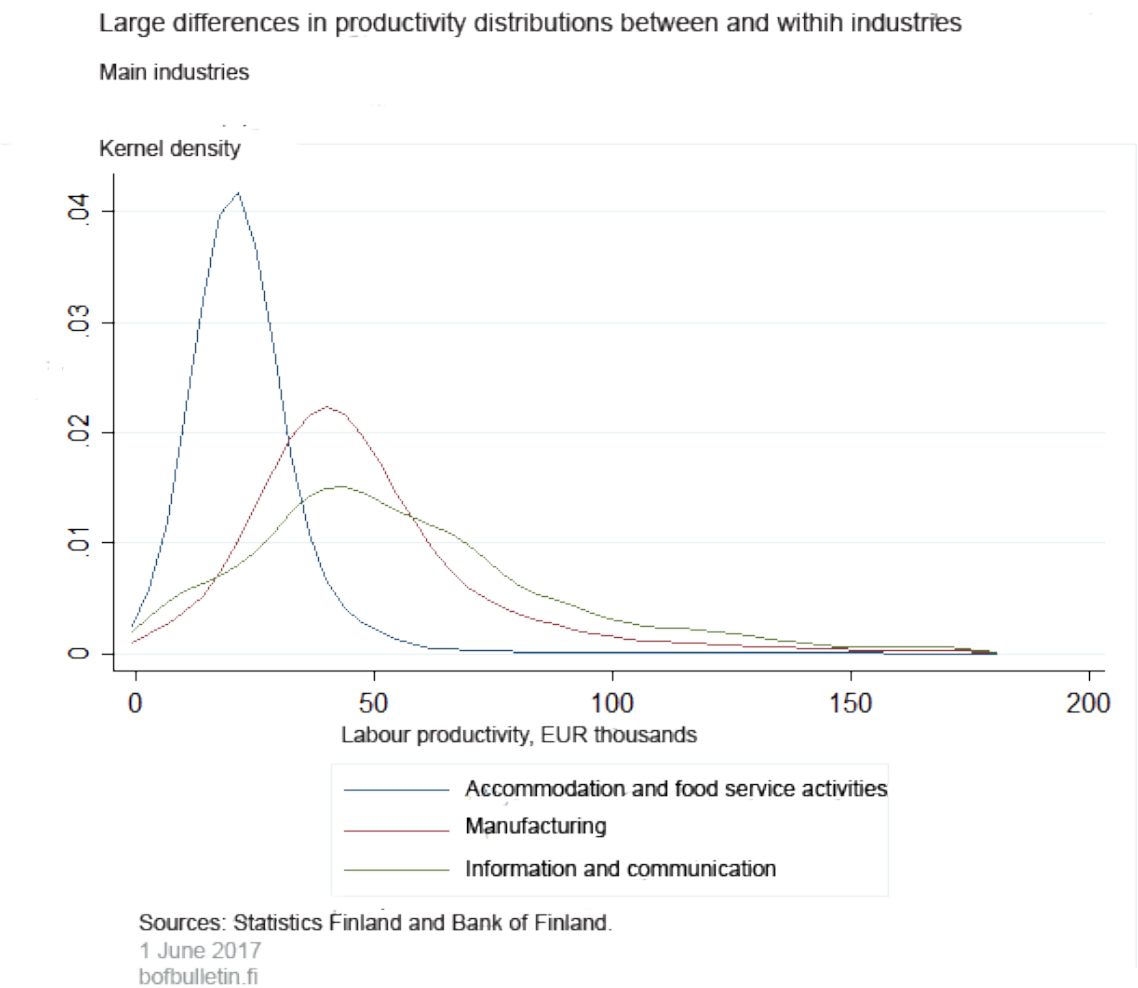
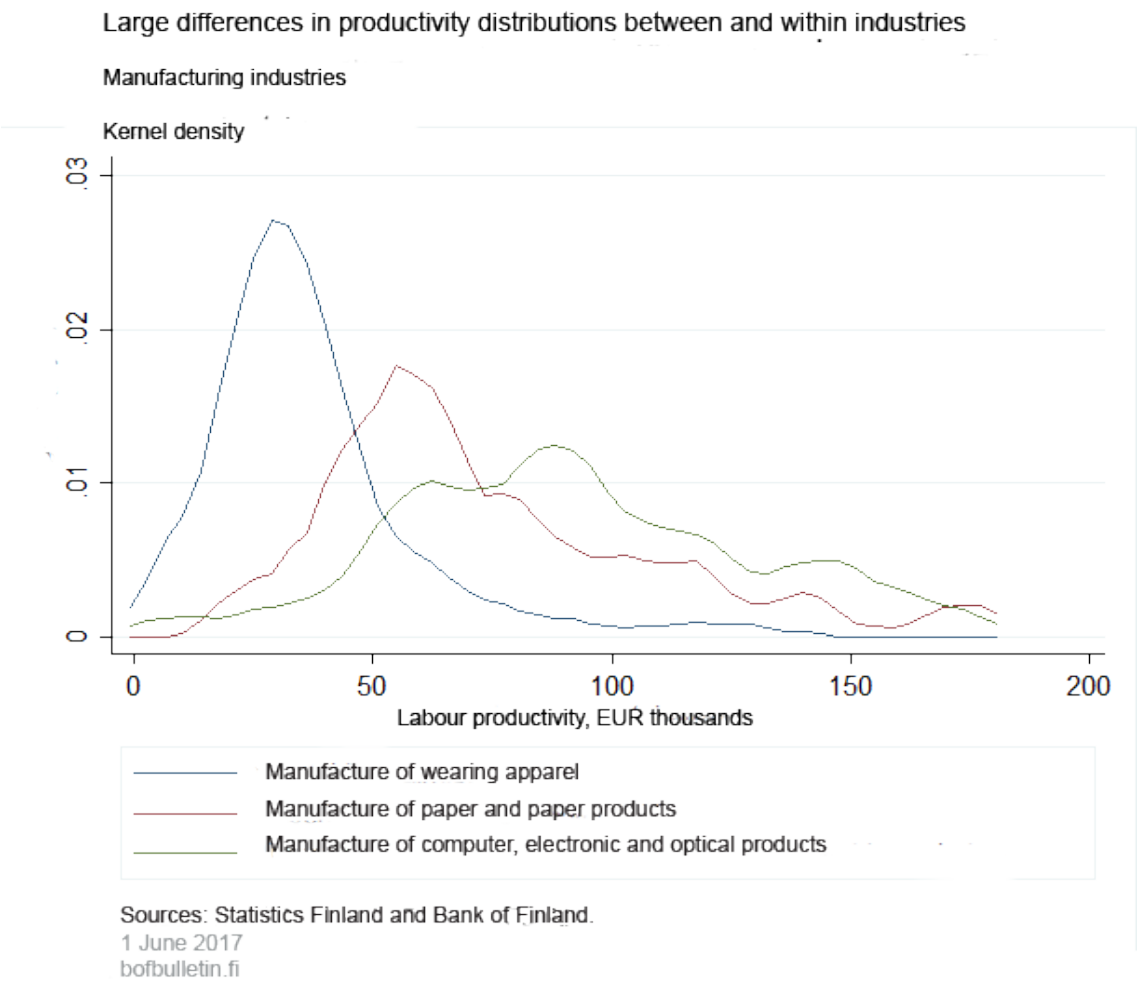

Large differences in productivity distributions between and withih industries
Main industries
Kernel density
0
.01
.02
.03
.04
0
50
100
150
200
Labour productivity, EUR thousands
Accommodation and food service activities
Manufacturing
Information and communication
Sources: Statistics Finland and Bank of Finland.
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Chart 11.



In terms of employment growth (net changes in the number of jobs), a company's profitability is of key importance. If the profitability margin is small (or negative) jobs are not created. This is evident when we compare firms with a negative margin against firms with a positive margin. Of the former, 10.7% increase and 16.2% reduce their labour force, whereas in the case of firms with a positive margin, 15.0% increase and 10.8% reduce their labour force.

This is most clearly evident in the estimation results of the simplified model accounting for changes in employment (Table 5). The results show that in export companies, employment growth is clearly less sensitive to the margin than in other companies. On the other hand, if we examine the logarithmic margin (which excludes firms with a negative margin), the difference is virtually non-existent.

Table 4.

Estimation results on employment growth
$\Delta logl = 036log_margin_{-1} -. 135logl_{-1} - 149OY$ + year dummies; all, $R^2 = 0.011$, $t_1 = 99.44$, $t_2 = 267.74$, $t_3 = 82.72$
$\Delta logl = 037log_margin_{-1} -. 074logl_{-1} - 190OY$ + year dummies; export>0, $R^2 = 0.018$, $t_1 = 34.65$, $t_2 = 59.31$, $t_3 = 13.74$
$\Delta logl = 556margin_{-1} - 212logl_{-1} -.129OY$ + year dummies; all, $R^2 = 0.035$, $t_1 = 49.70$, $t_2 = 472.58$, $t_3 = 74.83$
$\Delta logl = 326log_margin_{-1} - 110logl_{-1} - 175OY$ + year dummies; export>0, $R^2 = 0.027$, $t_1 = 119.45$, $t_2 = 99.24$, $t_3 = 12.6$
Here 'margin' refers to the difference of real productivity and wages per employee; l is the number of employees and company. t_i are t ratios. The number of observations is 1,601,948 and the number of companies, 238,679.
Source: Bank of Finland.

We need labour market flexibility

Finnish firms are a heterogeneous group, in which the few 'superstars' of high productivity and profitability stand out in the large mass of firms. These differences between firms play a significant role, as the importance of various types of demand and productivity shocks can differ considerably, depending on the location of the firms in the profitability distribution. If the productivity and profitability distributions are skewed, the capacity of an average company to adapt to a shock may differ considerably from that of the majority (cf. median) of firms. This is important also in terms of economic policy, as a one-size-fits-all economic policy is unsuitable in an environment of large differences in productivity and profitability. Skewed distributions also distort the picture of an average company and may lead to erroneous conclusions about the condition of firms.

Both competitiveness and employment would benefit if a more flexible wage-setting system were introduced in the labour market, both on the industry level and the company level. For a small open economy like Finland, it is of course important that the price-competitiveness of the export sector is good. This, in turn, requires reasonably good profitability. For the economy as a whole, it is somewhat problematic if closed sector wages react in a considerably stronger manner to

changes in productivity (and other domestic factors). An increase in costs in the closed sector will inevitably in the long term be reflected also in the competitiveness of the export sector, as it pushes up the costs of export firms.

The results of our analysis show that high corporate profitability is reflected in employment growth. It is clear that firms that record losses cannot create permanent jobs, but this applies also to firms with very low profitability.

As for wage flexibilities, they do not necessarily have to be similar in, for example, all industries. In some industries, various forms of performance-related pay may be the most appropriate way of implementing flexibilities. On the other hand, it may be advisable to implement them via adjustments in the number of hours worked. Thus far only a small amount of research has been conducted into the suitability and appropriateness of the various alternatives for the Finnish labour market.

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Notes

1. The calculations in this article are based on financial statement statistics for 1999–2015 compiled by Statistics Finland. The minimum size of the firms is set at one employee (≥1), and the calculations include the private sector, with the exception of certain specific industries. ↑
2. In studies by the Competitiveness Research Network (CompNet), this phenomenon is identified in many countries (e.g. Lopez-Garcia et al.{2015}). ↑
3. Ottaviano – Mayer (2008) use the term 'the happy few' in discussing the success of export firms. ↑
4. In this article, wages are the real wages and salaries paid by a company, divided by the number of full-time equivalent employees. ↑
5. In this article, corporate profitability is the difference between labour productivity and wages, all at constant prices. ↑
6. See e.g. Melitz – Redding (2014), Barba Navaretti et al. (2012) or Lopez-Garcia et al. (2015). ↑
7. The renewal of Statistic Finland's business statistics in 2013 may affect the figures slightly. ↑
8. Regression coefficients are examined in the model, in which wr is real wages and pr real labour productivity, $\Delta logwrit = \alpha 0 + \alpha 1j\ \Delta logprit + \alpha 2i \sum i\ yearjt + \alpha 3\ OYit + \varepsilon it$, in which wr is real wages and pr real labour productivity. ↑
9. Dickens et al. (2007), Holden – Wulfsberg (2014) and Messina et al. (2010). ↑
10. The regression coefficient is estimated from the equation $\Delta logwrit = \alpha 0 + \alpha 1j \sum j\ Djt + \alpha 2i \sum i\ yearit + \alpha 3\ OYit + \varepsilon it$, in which Dj is the ordinal dummy variable of productivity growth (D1 is the lowest value and D100 the hundredth [highest] category of productivity growth). In the model, the control variables are year dummies and the stock company dummy OY representing the corporate legal structure. ↑
11. The dummy variables are again corporate size, year dummies and a corporate legal structure dummy. ↑

Keywords

companies/firms, employment, Finland, productivity, profitability, wages