Box 5
Wages, productivity and competitiveness: a granular approach

Firm-level data, which have only been accessible in recent years, have suggested that a simple comparison of average wage and productivity developments may be insufficient for an accurate analysis of country competitiveness.[1] Indeed, granular data have unveiled the existence of a large degree of firm heterogeneity in terms of labour productivity, not only across sectors but also across firms which operate within the same industry. This implies that, even when average annual wage growth in a country is aligned with average productivity developments, there may be a large number of firms featuring lower productivity growth which would lose competitiveness. It is therefore important to analyse whether wage growth reflects the productivity dynamics of each individual firm.

Using micro-aggregated data, this box shows, first, that there was a substantial misalignment between wage and productivity growth at the firm level during the pre-crisis period in some euro area economies which exacerbated their competitiveness losses and, second, that the magnitude of this misalignment was correlated with some aspects of the design of labour market institutions affecting the formation of wages.

Wage and productivity dynamics are misaligned across narrowly defined sectors. Chart A shows the correlation between average annual productivity growth and growth in labour cost per employee in each manufacturing industry in Germany, Spain, France and Italy over the pre-crisis period 2001-07.[2] Chart B provides the same information for the services industries.[3] During the pre-crisis period wage growth in Spain and Italy exceeded productivity growth across almost all manufacturing and services industries (shown above the 45 degree line in the charts), which is consistent with the persistent loss of competitiveness in both countries. In France and, to a lesser extent, in Germany, the picture varies greatly depending on the sector considered. In the manufacturing sector, wage growth was generally in line with or even below productivity growth, whereas that was not the case in a large number of services industries, especially in France.

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[1]   Competitiveness in this box is understood in its narrow sense, that is, as unit labour cost or the nominal cost of labour per unit of product.
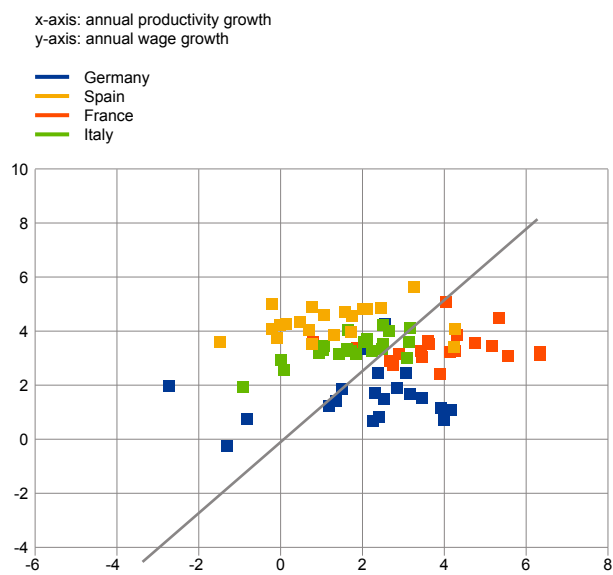
[2]   The data used in this box come from the Competitiveness Research Network (CompNet), a network set up by the European System of Central Banks in 2012 to analyse competitiveness developments from a comprehensive and multi-dimensional perspective. One of the main outputs of the network is the construction of a micro-aggregated dataset featuring several competitiveness-related indicators for a large set of EU Member States/sectors and years. For more information, see Lopez-Garcia, P. and di Mauro, F., "Assessing European competitiveness: the new CompNet micro-based database", *Working Paper Series*, No 1764, ECB, Frankfurt am Main, March 2015.

[3]   The data cover industries defined at the two-digit level according to the NACE Rev.2 system of sector classification, which corresponds to approximately 20 manufacturing industries and about 30 services industries.

Chart A

Productivity and wage growth in two-digit manufacturing industries in Germany, Spain, France and Italy; 2001-07

(average year-on-year percentage changes)

x-axis: annual productivity growth
y-axis: annual wage growth
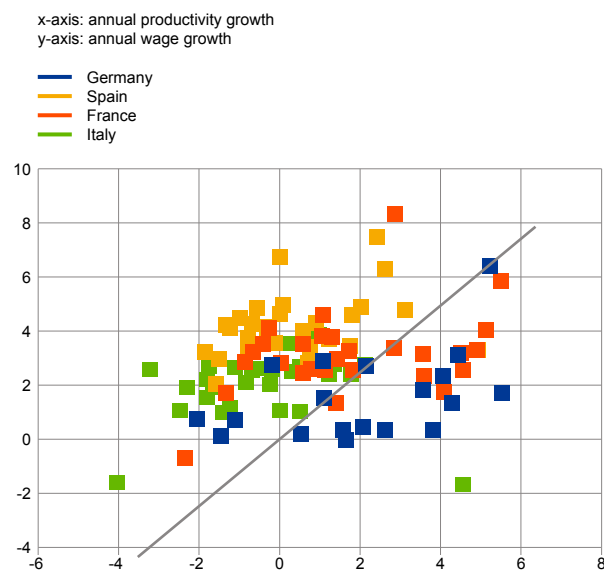
- Germany
- Spain
- France
- Italy

Sources: CompNet data and author's calculations.
Notes: The wage growth rate at the sector level is computed as the weighted average growth in labour cost per employee for all firms with at least 20 employees operating in the corresponding industry. The same procedure is used for sector productivity growth. The sectors above the 45 degree line are those where wage growth exceeds productivity growth.

Chart B

Productivity and wage growth in two-digit services industries in Germany, Spain, France and Italy; 2001-07

(average year-on-year percentage changes)

x-axis: annual productivity growth
y-axis: annual wage growth
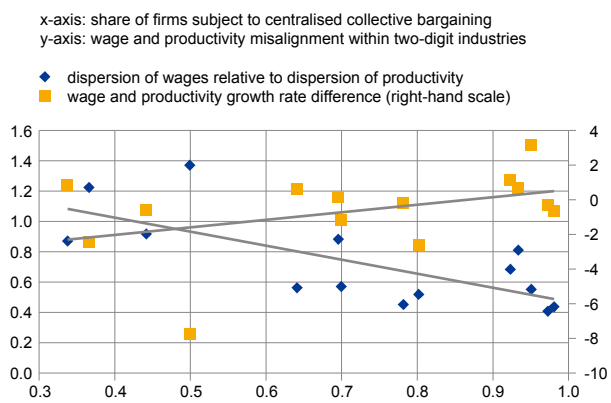
- Germany
- Spain
- France
- Italy

Sources: CompNet data and author's calculations.
Notes: The wage growth rate at the sector level is computed as the weighted average growth in labour cost per employee for all firms with at least 20 employees operating in the corresponding industry. The same procedure is used for sector productivity growth. The sectors above the 45 degree line are those where wage growth exceeds productivity growth.

As firms are very heterogeneous even within sectors, wage developments should differ across firms operating in the same sector insofar their productivity dynamics differ. As Charts A and B suggest, there is a great deal of variation in the relationship between productivity growth and wage growth across sectors, which is often masked by aggregate measures. The use of sector developments to assess the extent of wage and productivity alignment across countries is, therefore, preferable to the use of country averages. What really matters for competitiveness, however, is that wage growth and productivity growth are aligned at the individual firm level. Sector-level evidence may be too aggregated to assess this, given the documented large degree of firm heterogeneity even within narrowly defined sectors. To give a sense of the magnitude of this heterogeneity, according to CompNet data, firms in the top 10% of the productivity distribution of a two-digit manufacturing industry are three to four times more productive than firms in the bottom 10%. This dispersion is even larger in services, with the ratio reaching five times more productive in certain countries. Given this large degree of heterogeneity, it is reasonable to expect different productivity developments and, therefore, different wage dynamics in firms within narrowly defined sectors. However, there is evidence that misalignments occur owing to the presence of rigidities in the labour market resulting from the design of labour market institutions (see also Box 4).

The design of labour market institutions might prevent firm-level alignment of wage and productivity growth. One example of such institutions is collective bargaining agreements signed at the sector, regional or national level. In those

Chart C

Wage and productivity misalignment and centralised collective bargaining in broad sectors; 2005-07

x-axis: share of firms subject to centralised collective bargaining
y-axis: wage and productivity misalignment within two-digit industries

◆ dispersion of wages relative to dispersion of productivity
■ wage and productivity growth rate difference (right-hand scale)

Sources: CompNet data, 2007 firm survey by the Wage Dynamics Network and author's calculations.
Notes: The dispersion is measured as the difference between the 80th decile and the 20th decile of the distribution of the variable in a given industry. Data are provided by CompNet and refer to firms with at least one employee in four euro area countries for which matching with Wage Dynamics Network data was possible, namely Spain, Italy, Austria and Portugal. Both misalignment measures refer to the period 2005-07. The share of firms subject to centralised bargaining refers to 2007.

agreements, wage growth is set according to the average productivity growth in the region or sector at best, or even according to the productivity growth of the largest (and normally more productive) firms. Firms with lower productivity growth have to comply with those agreements, which normally set the floor for wage increases. As a result, these firms will lose cost competitiveness. In the absence of compensatory measures to improve price and/or non-price competitiveness, this may imply that such firms may need to downsize in order to realign labour productivity with wages. Chart C shows the correlation between two measures of wage and productivity misalignment in a given country and sector and the share of firms subject to centralised collective agreements (at the national, sector or regional level) in the corresponding country and sector. Misalignment is measured, first, as the ratio of wage dispersion to productivity dispersion in the industry and, second, as the difference between the median wage growth rate and the median productivity growth rate. Both indicators refer to firms operating in narrowly defined manufacturing and services industries.[4] The lower the ratio, the greater the misalignment – because it would imply that wages are similar despite large differences in terms of firm productivity – and the larger the difference between wage and productivity growth rates. Irrespective of the measure of misalignment used, Chart C delivers the same message: in countries or sectors where wages are not set by firms, the misalignment of wage and productivity developments is greater, and so will be the loss of cost competitiveness.

In summary, given the large degree of heterogeneity in the performance of firms within narrowly defined sectors, what really matters for cost competitiveness is not the alignment of average wage and productivity developments, but the consistency of wage and productivity growth at the firm level. This consistency may, however, be hampered by the design of some labour market institutions which do not take sufficient account of firm specificities.

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[4]   In both cases, misalignment is measured at the two-digit industry level and then aggregated to broader sectors (manufacturing, construction, wholesale and retail trade and other services) using value added weights to enable the data to be merged with Wage Dynamics Network data.