

EXECUTIVE SUMMARY

FIRM GROWTH, INNOVATION AND THE BUSINESS CYCLE

Background Report for the 2014 Competitiveness Report

European policy regards innovation as an engine for growth. Measures to encourage the development and diffusion of new technologies are seen as a suitable instrument to promote employment in Europe.

This report studies the relationship between employment growth and innovation with a large sample of European firms. In particular, the report investigates how the relationship between innovation and employment changes in various phases of the business cycle in general and in particular for different types of firms depending on their technological intensity, business cycle sensitivity, size, ownership structure or geographical location. Understanding how this mechanism works at the firm-level is central for the design of innovation policy.

The results show that **employment creation is larger in innovative firms than in non-innovative firms in all phases of the business cycle**. The number of employees in innovating firms grows faster than in non-innovating firms. This pattern can be observed in all phases of the business cycle but it is particularly pronounced in downturn and recession periods where the gap between innovating and non-innovating firms is particularly large. So, innovation is positively correlated with employment growth.

In a firm perspective, the relationship between employment and innovation is a race between **jobs creation** due to additional demand for new products and **jobs destruction** due to productivity effects and lower demand for old products. **Product innovators** generate more employment growth than non-innovators because they create more employment with higher sales of new products than they lose due to decreasing sales of old products. This effect is particularly strong in an economic upturn and during boom periods, when product innovators create much more new sales than they destroy due to higher productivity and substitution effects between old and new products.

Particularly important is product innovation during a **recession**, where it has an employment-preserving effect. Employment losses for product innovators are much smaller than for non-product innovators in manufacturing, because output from new products partly compensates losses in sales of old products. In services, the net contribution of product innovation to employment growth turns out to be positive even in the recession whereas firms which do not introduce any new products suffer from a large decline in demand for old products. Another factor that dampens employment losses during recessions is **labour hoarding**; firms are willing to accept productivity losses during recessions to avoid laying off employees. Otherwise, employment would have dipped much stronger during the past recession.

The effects of **process and organisational innovation** on employment growth are smaller than the effects of product innovation in all phases of the business cycle. In manufacturing, employment estimates have pointed towards significant increases in productivity – and hence to reductions in labour demand – in upturn and downturn periods due to both process innovation and organizational innovation. In services, we find the same pattern for organizational innovation but no effect of process innovation. In boom periods and recessions, however, the employment estimates did not reveal any productivity effects of both types of innovation. Overall, their contributions to employment growth are rather small and do not vary much over the business cycle.

Firm size and the **sector of the firm** are important determinants of the strength of the aforementioned effects of innovation. Product innovation has a much more profound effect on employment growth in **high-technology** and **knowledge-intensive sectors** than in low-technology and less knowledge-intensive sectors. Product innovation is also responsible that employment fluctuations related to innovation over the business cycle are stronger in these sectors. Moreover, the results point to the pivotal role of small and medium sized firms for employment creation in upturns and booms. In times of a recession, however, SMEs lose proportionately more employment than large firms, which have much higher gains in sales from new products and fewer losses from old products.

Our results further show that employment growth is more volatile in **foreign-owned firms** than in domestic firms. Foreign-owned firms create more employment due to more product innovation and a stronger demand effect in upturn, boom and downturn periods (overcompensating stronger productivity effects of product innovation). At the same time, they lost more jobs due to product innovation during the crisis which affected export-oriented firms more strongly and foreign-owned firms show a higher export orientation. In upturn, boom and downturn phases of the business cycle, the positive effect of product innovation is somewhat dampened by the larger general productivity gains in foreign-owned firms due to benefits from internal technology transfer and

learning effects. In the recession, however, the general productivity trend and less labour hoarding reinforces the employment growth disadvantage of foreign-owned firms in manufacturing.

Overall, this study has shown that (i) different types of innovation affect productivity and employment growth differently, (ii) the absolute and relative size of these effects furthermore vary over the business cycle and (iii) the effects are moderated by different firm characteristics and industry characteristics. Regarding employment growth, product innovation turns out to be the most important type of innovation. Product innovation stimulates employment growth in all phases of the business cycle, the absolute effect being particularly strong in boom periods which are characterized by high demand. In recessions our results indicate an employment-preserving effect of product innovation.

The full report can be downloaded at: <http://www.zew.de/de/publikationen/7526>