ETLA ELINKEINOELÄMÄN TUTKIMUSLAITOS
THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY

ETLA Raportit
ETLA Reports

13 October 2016

No 60

Firm Subsidies, Wages and Labor Mobility

Mika Maliranta* – Niku Määttänen** – Mika Pajarinen***

* ETLA – The Research Institute of the Finnish Economy and University of Jyväskylä, mika.maliranta@etla.fi
** ETLA – The Research Institute of the Finnish Economy, niku.maattanen@etla.fi
*** ETLA – The Research Institute of the Finnish Economy, mika.pajarinen@etla.fi

Suggested citation: Maliranta, Mika, Määttänen, Niku & Pajarinen, Mika (13.10.2016).
"Firm Subsidies, Wages and Labor Mobility".
ETLA Reports No 60. https://pub.etla.fi/ETLA-Raportit-Reports-60.pdf

This report relates findings of a project entitled "Labor mobility as a mechanism of spillovers and creative destruction" funded by Tekes – the Finnish Funding Agency for Innovation (project 2867/31/2013).

ISSN-L 2323-2447
ISSN 2323-2447 (print)
ISSN 2323-2455 (pdf)

Table of Contents

Firm Subsidies, Wages and Labor Mobility

Abstract

The bulk of innovation subsidies in Finland are allocated to firms in industries where the employment share of "innovators," i.e., workers who are specialized in R&D&I, is very high. The average subsidy per employee is typically the highest among young firms. At the firm level, an increase in innovation subsidies is typically associated with an inflow of innovators from high-productivity firms. These findings suggest that innovation subsidies contribute to economic renewal and the diffusion of knowledge between firms. Non-innovation subsidies, in contrast, appear to support established industry structures: a large share of them has been granted to relatively old firms within "traditional" manufacturing industries. Since non-innovation subsidies are systematically allocated to different types of firms than innovation subsidies, they may also crowd out resources from firms that receive innovation subsidies, thereby overriding some of the possible beneficial effects of innovation subsidies.

Key words: Firm subsidies, innovation, productivity, labor mobility

JEL: O31, O33, O38, J62

Yritystuet, palkat ja työntekijöiden liikkuvuus

Tiivistelmä

Suomen innovaatiotuet kohdentuvat voittopuolisesti aloille, joissa ”innovaattoreiden”, eli T&K&I-tehtäviin erikoistuneiden työntekijöiden työllisyysosuus on erityisen suuri. Innovaatiotukien määrä työntekijää kohden on myös tyypillisesti suurin nuorissa yrityksissä. Innovaatiotukea saaneeseen yritykseen alkaa myös usein siirtyä innovaattoreita muista korkean tuottavuuden yrityksistä. Innovaatiojärjestelmän toimivuuden näkökulmasta näitä voidaan pitää myönteisinä havaintoina. Havainnot viittaavat siihen, että innovaatiotuet edistävät taloudellista uudistumista ja tiedon leviämistä yritysten välillä. Sen sijaan muut yritystuet kuin innovaatiotuet näyttävät tukevan vanhoja yritysrakenteita: ne kohdentuvat erityisesti ”perinteisille” teollisuusaloille ja voittopuolisesti vanhoihin yrityksiin. Muihin tarkoituksiin kuin innovaatioihin tukea saaneet yritykset käyttävät osin samoja tuotannontekijöitä kuin innovaatiotukia saaneet yritykset. Tästä syystä muut tuet saattavat vaimentaa innovaatiotukien mahdollisia myönteisiä vaikutuksia kansantaloudessa.

Asiasanat: Yritystuet, innovaatiot, tuottavuus, työntekijöiden liikkuvuus

JEL: O31, O33, O38, J62

1 Introduction

Firm subsidies are on the policy agenda in Finland. Many observers and politicians have called for reducing them. In 2014, direct firm subsidies were estimated to amount to around 567 million euros.[1]

The single most important class of firm subsidies in Finland is innovation subsidies provided by the Finnish Funding Agency for Innovation (TEKES). From the standpoint of economic theory, the main rationale for these subsidies likely relates to innovation externalities. Another justification originates from financial market frictions. Since R&D investments or other innovation activities often do not provide collateral, new firms in particular may find it difficult to finance them.

However, there are also many other types of direct firm subsidies, such as regional subsidies to specific tangible investments. The economic rationale behind them is often less clear than it is in the case of innovation subsidies. The general aim appears to be to encourage investments and job creation and to prevent job destruction, particularly in poorer areas or troubled industries.

In this brief, we document how innovation subsidies, by which we mean subsidies provided by TEKES, and other firm subsidies, which we call non-innovation subsidies, have developed over the recent years and how they are allocated across different industries and firms.

Based on the externality argument, we may expect the greatest social returns from innovation subsidies that are directed to industries capable of developing general purpose technologies (see Bresnahan and Trajtenberg, 1995). Advances in such technologies increase the productivity of firms in other industries as well through productivity spillovers and therefore have broader productivity effects on the entire economy than advances made in industry-specific, not to mention firm-specific technologies. This argument also emphasizes the greater focus in innovation policy on firms that are close to technology frontiers instead of those aiming to approach the frontier. High-productivity firms are more likely to generate positive spillover effects on low-productivity firms than other way around. Because of financial market frictions, we may also desire that young firms are granted a larger share of innovation subsidies than more established firms.

We also consider how firm subsidies are related to labor mobility and wage formation. Innovation subsidies are unlikely to have real effects unless they contribute to labor reallocation in an appropriate manner. Labor mobility is also potentially a channel of knowledge spillovers. Related to this, there is a need to consider wage formation. One of the concerns with innovation subsidies is that they mainly stimulate the wages of employees having the education and the skills needed in innovation activities.

Innovation subsidies are often analyzed separately from other firm subsidies. However, there is a need to consider both types of subsidies side by side. For instance, it is possible that

[1] In addition to direct subsidies, there are also various indirect subsidies, such as reduced energy taxes and government-backed loan guarantees. In this analysis, we ignore loans, guarantees, and tax subsidies. These instruments also involve an element of public support, but it is only a small proportion of the loan or guarantee, and the size of the proportion is hard to measure.

non-innovation subsidies are systematically allocated to firms that invest little in innovation activities, thereby crowding out resources from firms that receive innovation subsidies and overriding some of the possible beneficial effects of innovation subsidies.

We perform our empirical analysis using a comprehensive *Finnish longitudinal linked employer-employee data* (FLEED).[2] The data are based on registers on firms and individuals that in principle cover the total business sector and the total workforce. Their information content is supplemented by different survey data. The data allow the performance level of the firm, its occupation structure, and the earnings of the individuals to be measured with near-perfect coverage.

The data called *Business Aid Database* include information on different direct firm subsidies from different ministries and other public organizations.[3] In addition to innovation subsidies from TEKES, the data allow subsidies provided for other purposes by other governmental organizations to be gauged. These other subsidies include those aiming to encourage tangible investments and job creation and to prevent job destruction. We call them non-innovation subsidies.[4]

Our main findings can be summarized as follows:

1. The bulk of innovation subsidies have been allocated to young firms in "innovative" industries such as information services and computer programming, where a large share of employees is involved in innovation activities.

2. Innovation subsidies seem to encourage the mobility of workers who are specialized in innovation activities from high-productivity firms to firms that have been granted innovation subsidies. Hence they may induce knowledge spillovers from higher- to lower-productivity firms, in so doing potentially inducing convergence in firm-level productivity and accelerating aggregate productivity growth.

3. We find worrisome indications that non-innovation subsidies have a tendency to preserve established industry and firm structures. In particular, old firms within "traditional" manufacturing industries, such as basic metals, textiles, and food products, have recently been granted increasing amounts of non-innovation subsidies.

4. Reassuringly, we do not find strong indications that innovation subsidies would directly increase the wages of the workers specialized in innovation activities. This seems to hold particularly true for the firms that have a high productivity level within their industry (i.e., are close to the productivity frontier).

The rest of this brief is structured according to these four findings.

---

[2] For more details on the data, see http://stat.fi/tup/mikroaineistot/me_kuvaus_henkilo_en.pdf (accessed on July 8, 2016).

[3] For more details on this database, see http://stat.fi/meta/til/yrtt_en.html (accessed on July 8, 2016).

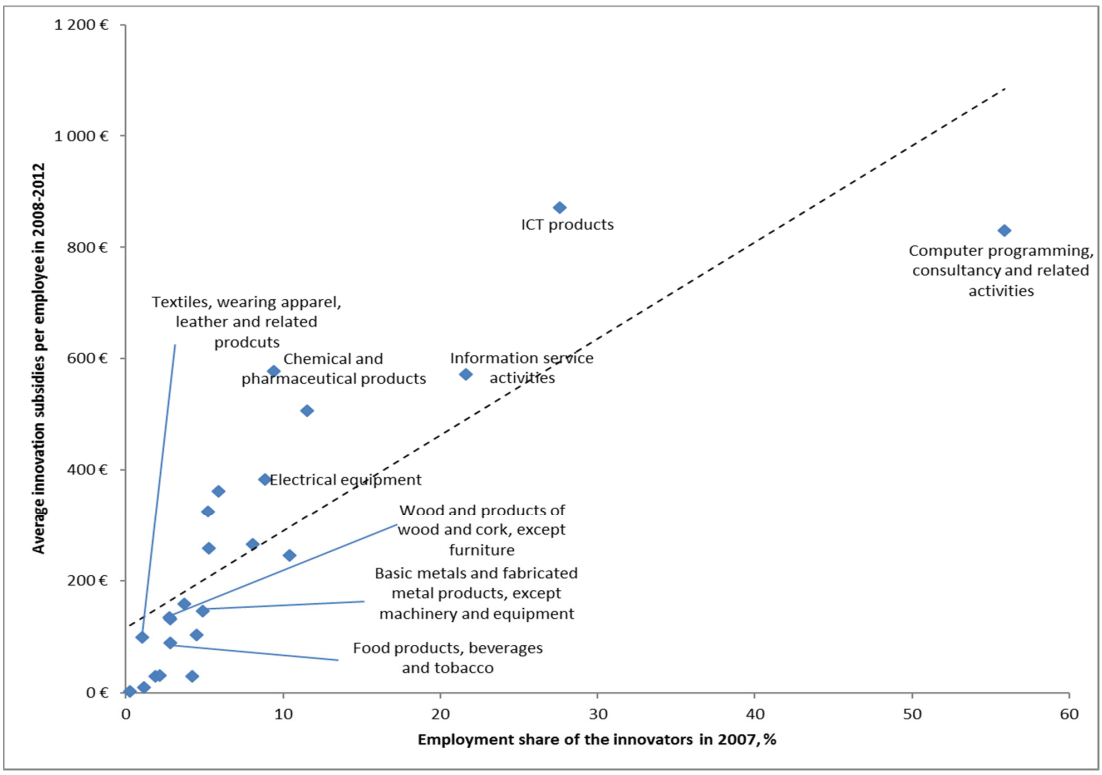
[4] Non-innovation subsidies include direct subsidies granted by the Ministry of Trade and Commerce, the Ministry of Labour (since 2008 the Ministry of Employment and the Economy) and the Ministry of Agriculture and Forestry for purposes including tangible investments, operational environment, start-ups, energy, employment, internationalization, and agri-environmental purposes. Agricultural subsidies and tax subsidies are not included (see http://stat.fi/meta/til/yrtt_en.html, accessed on September 23, 2016).

2 Innovation subsidies contribute to economic renewal by supporting young firms within innovative industries

As an indicator of subsidy intensity, we use granted subsidies in euros per employee. The vertical axis of Figure 1 shows the average innovation subsidy intensity level in different industries in 2008–2012. The horizontal axis shows the share of "innovators," i.e., workers involved in innovation (broadly defined),[5] in 2007.

The figure shows that the innovation subsidy intensity typically increases with the innovator share.[6] Subsidies per employee have been the highest in information services, computer programming and related activities, and ICT products.[7] In these industries, the innovator share varies from about 22% to about 55%. These industries can also be seen as examples of industries developing general purpose technologies (Bresnahan and Trajtenberg, 1995). As such, they have potential to increase productivity in the entire economy (e.g. Daveri and Silva, 2004).

Figure 1 Average innovation subsidies per employee in 2008–2012 and employment share of innovators by industry in 2007



Sources: Computations from subsidy database and FLEED.

5 For the details of our definition of "innovators," see Bagger et al. (2016).

6 For non-innovation subsidies, the relationship is, unsurprisingly, negative (not reported here).

7 The manufacture computer, electronic, and optical products, to be more precise.

Figure 2 displays the evolution of innovation subsidies in these three industries over time. It also compares innovation subsidies received by young and old firms. We define young and old firms here as firms that are not older than 5 years and at least 16 years old, respectively. The figure reveals, first of all, that the relatively high level of innovation subsidies in these industries in years 2008–2012 is essentially a consequence of a noteworthy increase after 2008. It also shows that in 2012, young firms received considerably more innovation subsidies per employee than old firms. In fact, apart from a few exceptional years in the computer programming industry and the ICT products industry, the average innovation subsidy intensity has been low and stable among old firms.

Figure 2 Innovation subsidies per employee in ICT industries in young (not older than 5 years) and old firms (at least 16 years old)

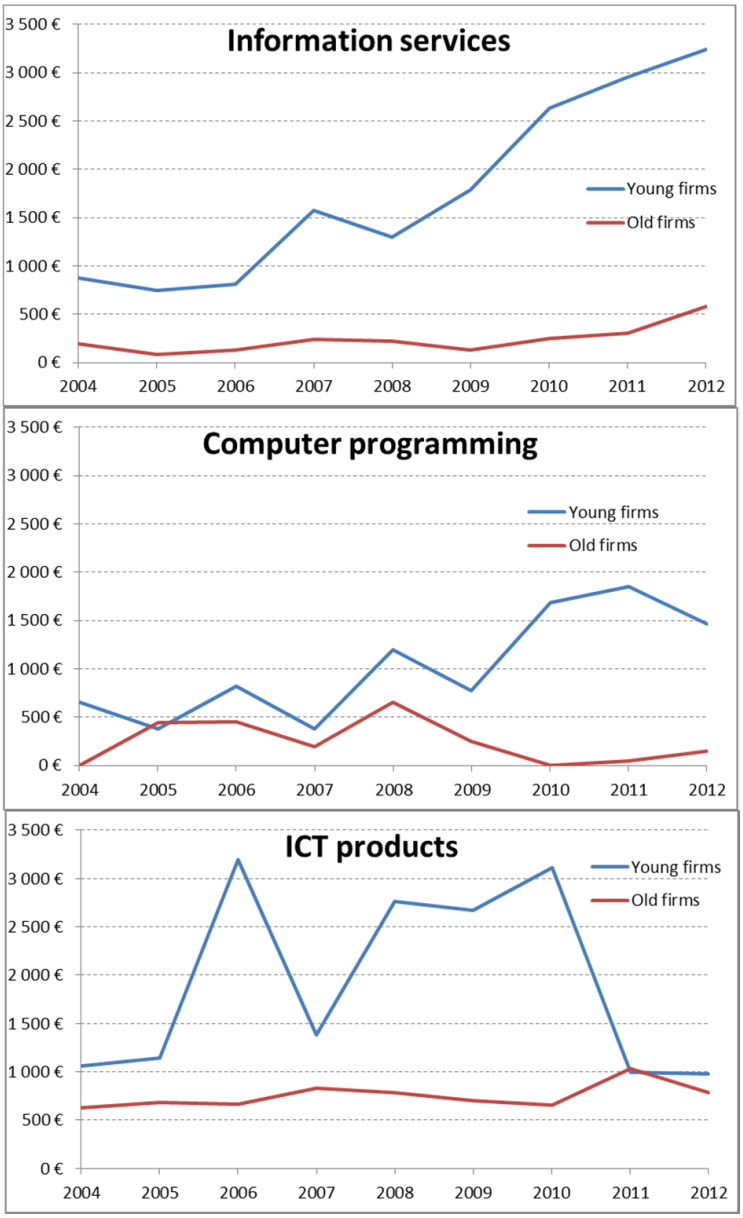
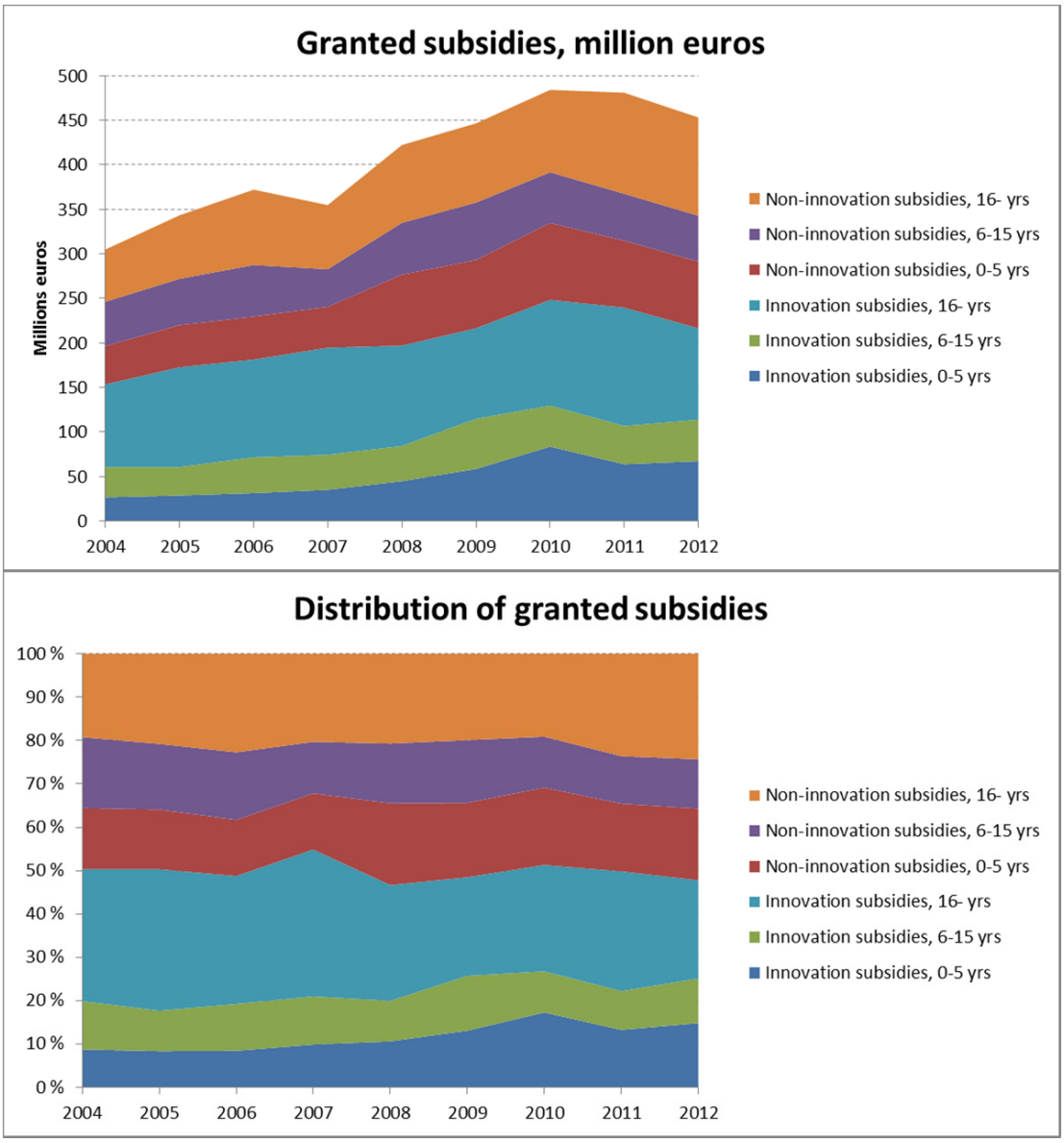


Figure 3 presents the amount of subsidies by purpose (innovation or non-innovation) and by firm age (young, middle-age, and old firms) in our data. The total amount of granted subsidies was 453 million euros in 2012, of which 48% was granted for innovations. As can be seen from the figure, the proportion of subsidies devoted to the innovations of young firms has increased since 2004, which may be justified. However, the proportion of non-innovation subsidies granted to old firms has also increased in recent years. This is a somewhat more questionable tendency from the standpoint of economic theory.

Figure 3 Granted subsidies by type, firm age, the amount, and distribution



3 Innovation subsidies contribute to reallocating innovators from high-productivity firms to supported firms

We now move to the firm level. We are interested in how an increase in the subsidies is reflected in firms' payroll. To this end, we consider all firms that existed both in 2010 and 2012.[8] For both years, the firms have been split into three groups in each two-digit industry on the basis of subsidy intensity and the type of the subsidies received (innovation or non-innovation). The low-subsidy group consists of the firms that have not received any subsidies. Remaining firms (i.e., firms that have been granted some subsidies) have been split into two equal-sized groups: those that have been granted at most a medium subsidy (among firms that received some subsidies), and those that have been granted more than a medium subsidy. The former group is called the "medium-subsidy" and the latter "high-subsidy" group (see Table 1).

Table 1 shows the great skewness in the subsidies: 99.5% (= 165 741/(165 741 + 417 + 403) of the firms have not received any direct innovation subsidies and 93.9% (=156 458/(156 458 + 5 057 + 5 046) non-innovation subsidies, and 16% of the workforce are employed by a firm that has received some innovation subsidies and 30% are employed by a firm that has received

Table 1 Classification of firms by innovation and non-innovation subsidy intensity, continuing firms (staying in 2010 and 2012), the numbers concern the year 2010

		Innovation subsidy intensity				*Non-innovation subsidy intensity*			
Group	*Description*	*Subsidy intensity, €*	*Number of persons*	*Number of firms*	*Number of employees*	*Subsidy intensity, €*	*Number of persons*	*Number of firms*	*Number of employees*
Total business sector									
Low subsidy	No subsidies	0	993 523	165 741	6	0	826 596	156 458	5
Medium subsidy	Subsidy intensity is not higher than medium of 2-digit industry among receivers	466	173 400	417	416	115	326 059	5 057	64
High subsidy	Subsidy intensity is above medium of 2-digit industry among receivers	8 454	13 185	403	33	5 742	27 453	5 046	5
Manufacturing									
Low subsidy	No subsidies	0	222 863	20 904	11	0	215 632	18 908	11
Medium subsidy	Subsidy intensity is not higher than medium of 2-digit industry among receivers	480	98 079	154	637	149	101 103	1 152	88
High subsidy	Subsidy intensity is above medium of 2-digit industry among receivers	4 801	8 809	149	59	6 245	13 017	1 147	11
Private services									
Low subsidy	No subsidies	0	642 119	111 444	6	0	508 053	105 720	5
Medium subsidy	Subsidy intensity is not higher than medium of 2-digit industry among receivers	495	64 129	250	257	96	190 498	3 111	61
High subsidy	Subsidy intensity is above medium of 2-digit industry among receivers	17 554	3 808	242	16	5 576	11 506	3 105	4

Note: Data include all firms that have appeared both in 2010 and 2012 (i.e. entrants and exitors are excluded). Variables refer to year 2012.

[8] Here we focus on the continuing firms in the business sector, i.e., firms that existed both in 2010 and 2012. These firms employed 1.2 million employees in 2012.

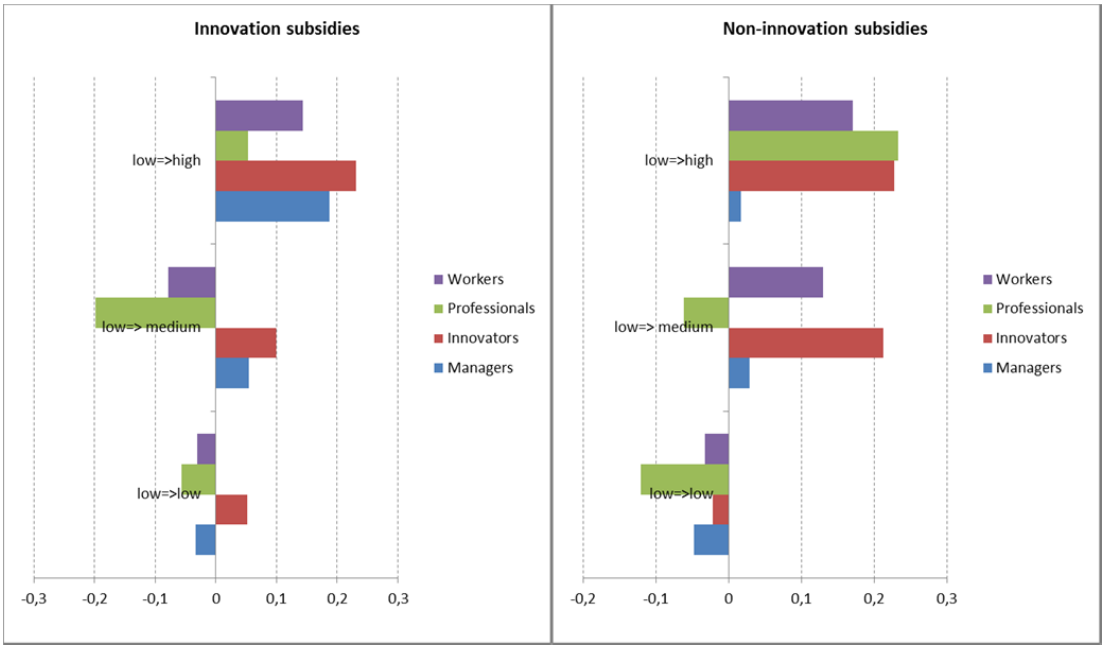
non-innovation subsidies. On the other hand, the average subsidy in the high-innovation subsidy group is 8,454 euros per person. In private services, the corresponding number is not less than 17,554 euros.

We first examined what happens to the number of innovators and other employees in the firms that have been granted more innovation subsidies in 2012 compared to 2010. For simplicity, here we consider only firms that received no subsidies in 2010. Reassuringly, the left-hand panel of Figure 4 shows a positive relationship between the relative change in the number of firm's innovators and the change in the innovation subsidies it has received. In the firms where the innovation subsidy intensity has increased from low to high, the number of innovators has increased on average by 23%. In other words, an increase in innovation subsidies is associated with an increase in the number of innovators at the firm level.

We also consider three other different occupational groups, namely production workers,[9] professionals, and managers.[10] A similar positive relationship can also be found for managers, but not for production workers and professionals.

For the sake of a comparison, the right-hand panel of Figure 4 presents corresponding patterns with non-innovation subsidies. An increase in the non-innovation subsidy intensity from low- to high-intensity groups is associated with a marked increase in employment in all

Figure 4 Relative change in employment and change in subsidy intensity by the type of subsidy and by occupation. Total business sector, years 2010–2012.



Note: the x-axis denotes the share of firms' employees that worked in another high- or low-productivity firm in 2010.

[9] It should be noted that production workers include both blue- and white-collar lower-skill occupations, including technicians, clerical support workers, service and sales workers, craft and related trades workers, plant and machine operators, and other elementary occupations.

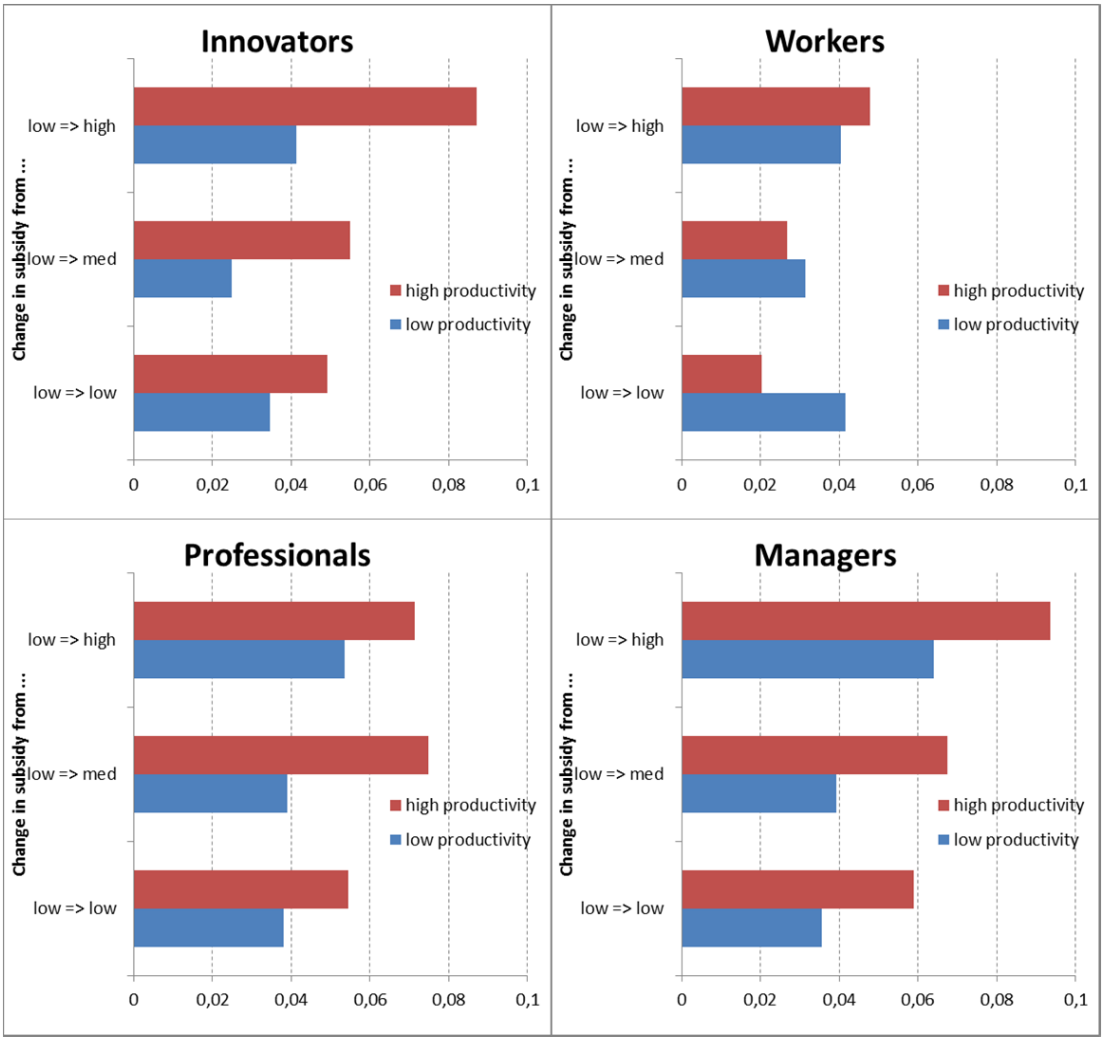
[10] Again, see Bagger et al. (2016) for the details on how we have defined these groups.

occupation groups except for managers. All in all, the group of managers notwithstanding, there is substantial labor mobility toward firms that have been granted increasing amounts of non-innovation subsidies.

Having shown that increases in subsidies are associated with increases in the number of innovators at the level of firms, we next examine where these new innovators come from. In particular, we are interested in whether they come from high- or low-productivity firms. As above, we focus on firms that did not receive innovation subsidies in 2010 and split these firms into three groups (i.e., low-, medium-, and high-subsidy intensity groups) on the basis of how much they received subsidies in 2012.

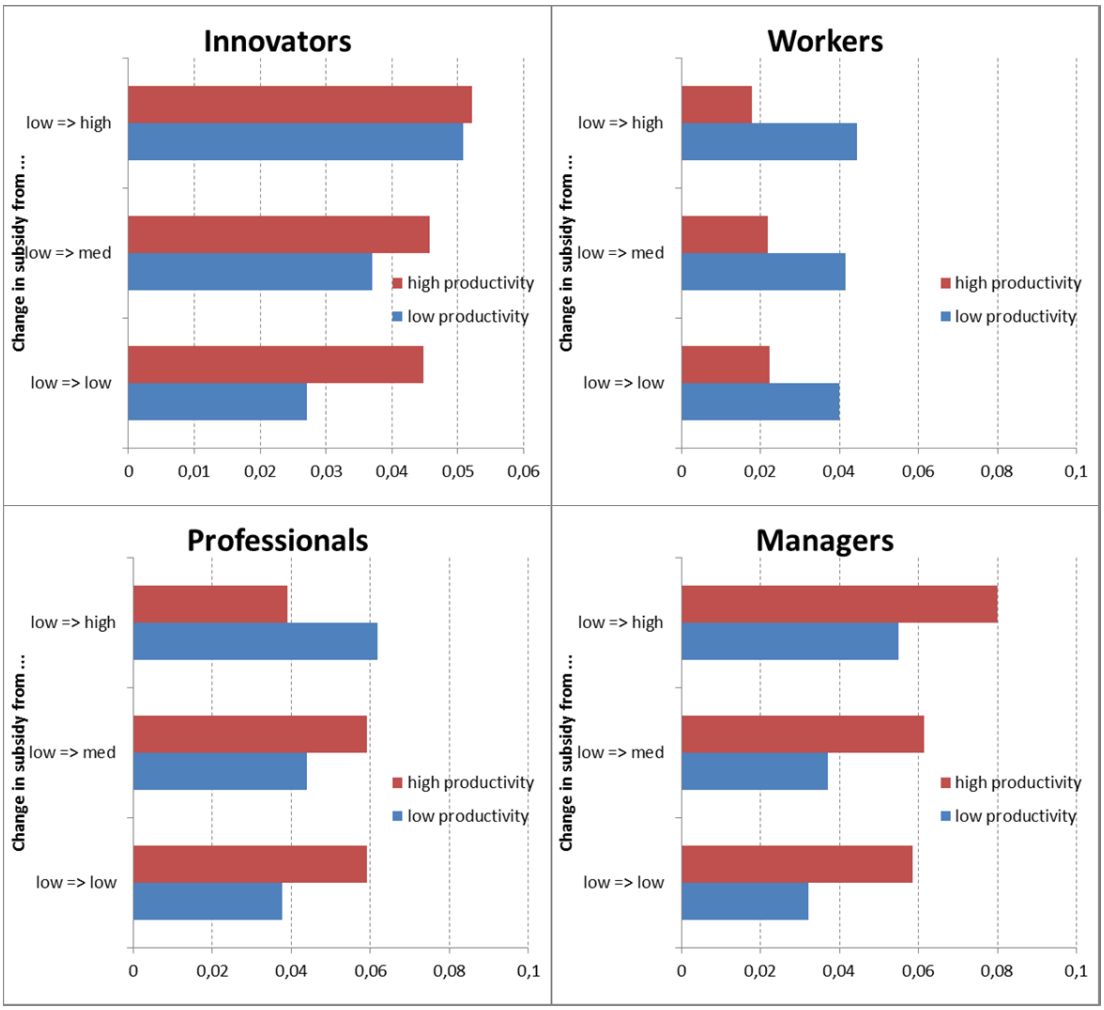
The horizontal axis in Figure 5 shows the share of firms' employees that in 2010 worked in some other firm in 2010. These source firms are further split into groups of low-, medium-,

Figure 5 Change in innovation subsidies from 2010 to 2012 and labor mobility from other firms in the business sector



Note: the x-axis denotes the share of firms' employees that worked in another high- or low-productivity firm in 2010.

Figure 6 **Change in non-innovation subsidies from 2010 to 2012 and labor mobility from other firms in the business sector**



and high-productivity firms based on their labor productivity in 2010.[11] For instance, the top two bars in the left-hand side of the figure reveal that about 4% of the innovators in firms that received a lot of subsidies in 2012 (but no subsidies in 2010) were recently recruited from a low-productivity firm, whereas about 9% of them were recruited from a high-productivity firm. (For readability, we do not present the share of new employees that came from medium-productivity firms.)

The figure shows that in relative terms, high-productivity firms are a particularly important source of innovators for firms that have been granted increasing amounts of innovation subsidies. The share of innovators coming from high-productivity firms is the greatest amongst

[11] Analogously to the classification of firms in terms of innovation subsidy, productivity is measured here relative to other firms within a narrowly defined industry (at about the two-digit industry level). In each industry, firms are classified into three groups in terms of productivity so that the "low" and "high" productivity groups each account for 25% of employment, and the remaining 50% is accounted by the "medium" productivity group.

firms where the innovation intensity has increased from a low to a high level between the years 2010 and 2012.[12] As can be seen from the figure, this pattern is much weaker for production workers and professionals. As for managers, an increase in innovation subsidy is associated with a substantial increase in labor inflow from both low- and high-productivity firms. A similar flow of innovators from high-productivity firms to the supported firms can be found both in the manufacturing sector and in the private service sector (not reported).

These patterns of labor mobility are interesting from the point of view of innovation policy. Presumably, innovators in high-productivity firms are often exposed to advanced technological knowledge. Those employees can be expected to be particularly valuable for firms striving for an upsurge in technology and productivity (Maliranta, Mohnen and Rouvinen, 2009).

Figure 6 shows the results of an analysis of labor mobility and non-innovation subsidies analogous to that shown in Figure 5. Comparing Figures 5 and 6 reveals an interesting difference between innovation and non-innovation subsidies as it comes to the sources of the flows of innovators to the supported firms. Figure 5 indicates that the importance of high-productivity firms as a source of new innovators increases with the change in innovation subsidies. The top-left panel in Figure 6 instead shows that when non-innovation subsidies increase from low- to high-level subsidies, low-productivity firms are an equally important source of new innovators as high-productivity firms (the height of red and blue bars is almost equal). Further, high-productivity firms are an almost equally important source of innovators both for firms that have experienced an increase in non-innovation subsidies and for those that have not (the heights of red bars are almost the same on the top-left panel in Figure 6). In other words, contrary to the case of innovation subsidies, non-innovation subsidies do not seem to be associated with mobility of innovators from high-productivity firms to the supported firms.

4 Non-innovation subsidies support established firm and industry structures

Both innovation and non-innovation subsidies have increased in manufacturing and private services from 2004 to 2012. As shown in Table 2, innovation subsidies (per employee) have increased, especially in private services, while non-innovation subsidies have increased strongly in both manufacturing and services. It should perhaps be noted that since most firms do not receive any subsidies, the average subsidies are naturally much higher among firms that have been granted some subsidies.

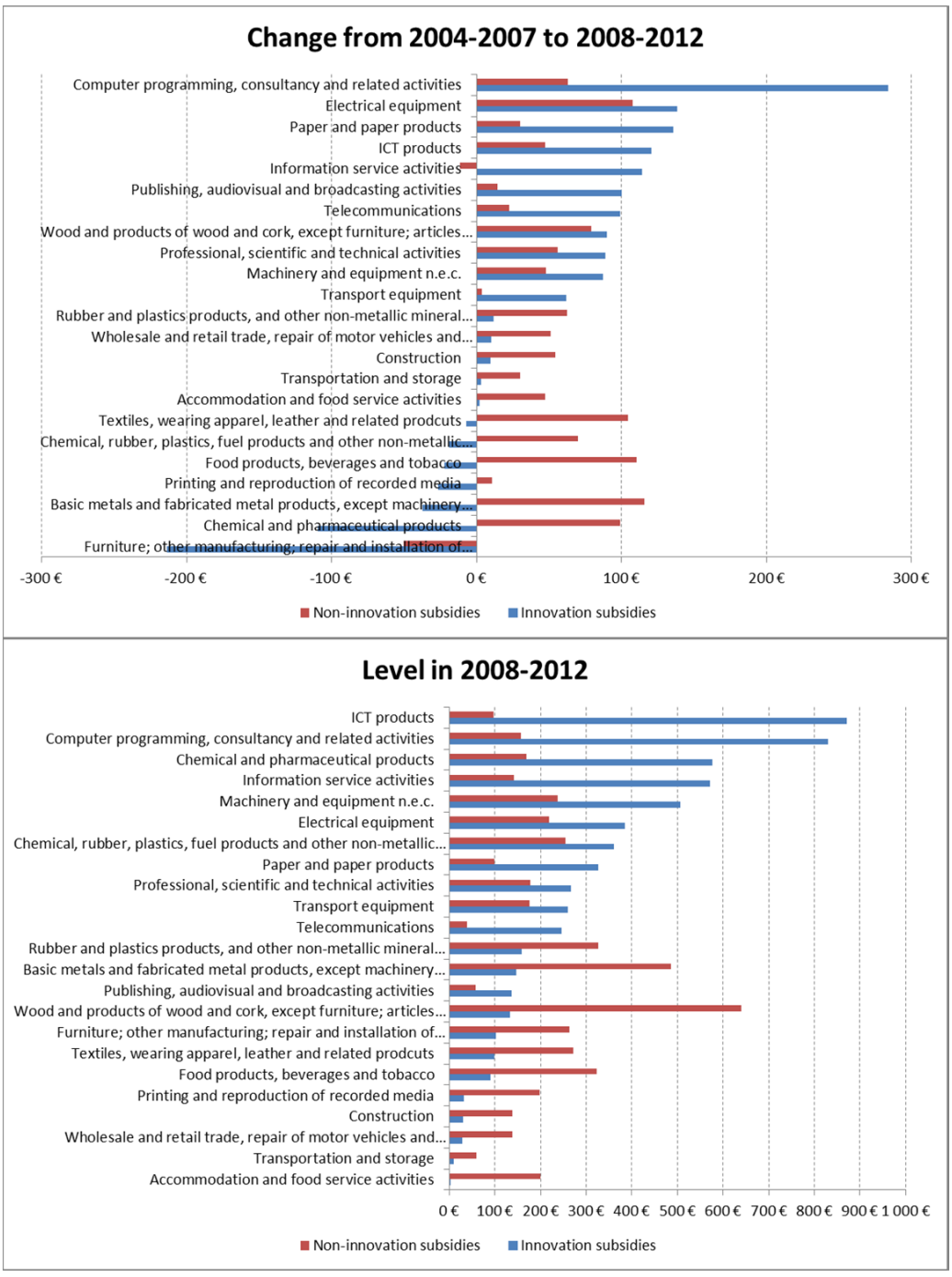
Table 2 Average subsidies per employee, in nominal euros

	Manufacturing		*Private services*	
	Innovation	*Non-innovation*	*Innovation*	*Non-innovation*
2004–2007	285,5	228,0	83,0	82,7
2008–2012	308,2	289,9	138,3	130,2

[12] To be more concrete, 8.7% of the innovators worked two years earlier in another firm that had a high relative productivity level. The corresponding number in our total data covering all firms and occupation groups is 2.5%.

Figure 7 presents the changes (the upper panel) and the recent levels (the lower panel) in innovation and non-innovation subsidies at a more detailed industry level. Industries are sorted in descending order in terms of innovation subsidy intensity changes or levels. The greatest increase in innovation subsidies was witnessed in computer programming ("62"), electri-

Figure 7 Change in granted subsidies between the time periods 2004–2007 and 2008–2012



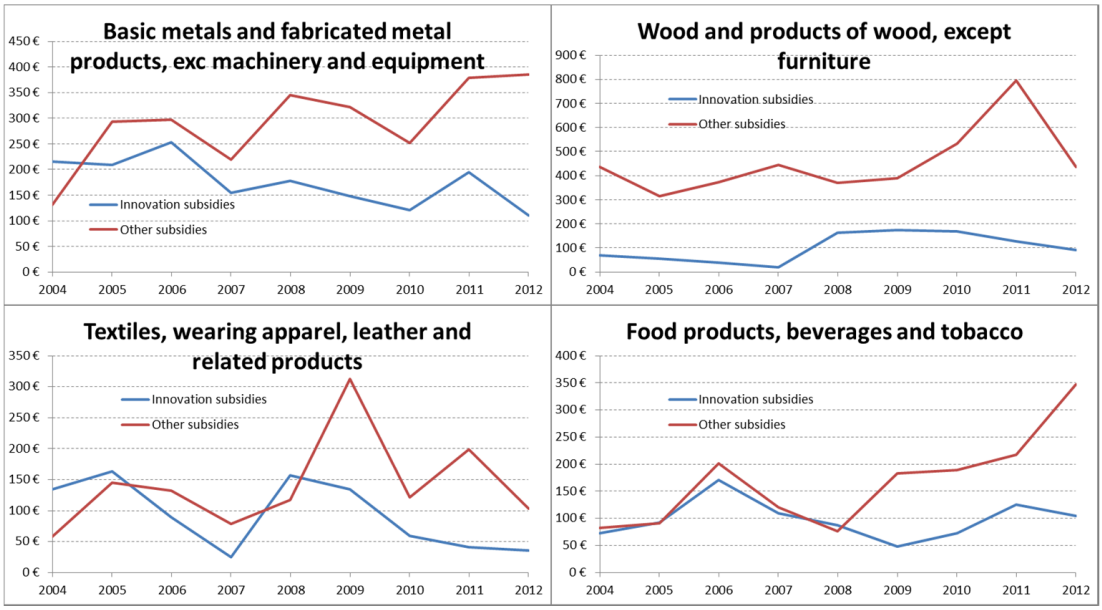
Note: the vertical axis shows the granted subsidies per employee; see the text.

cal equipment ("27"), and perhaps a bit surprisingly, in the paper and paper product industry ("17"). These increases largely explain the high level of innovation subsidies in many of these industries, as illustrated in Figure 1.

In terms of non-innovation subsidies, the largest increases and the highest current levels are found in basic metals and fabricated products ("24–25"), wood and products of wood ("16"), textiles and wearing apparel etc. ("13–15"), and food products and beverages ("10–12"). On the other hand, these same industries have typically experienced negative or low growth in the innovation subsidy intensity, as shown in Figure 7.

A closer look at the firm structures within "traditional" manufacturing industries in Figure 8 reveals that old firms have been granted increasing amounts of non-innovation subsidies in years 2004–2012. On the other hand, in recent years, young firms (less than 5 years old) have also received increasing non-innovation subsidies in these traditional manufacturing industries (not reported here).

Figure 8 Subsidies per employee in the old firms (at least 16 years old) of the traditional manufacturing industries



5 Innovation subsidies are not associated with large pay rises in high-productivity firms

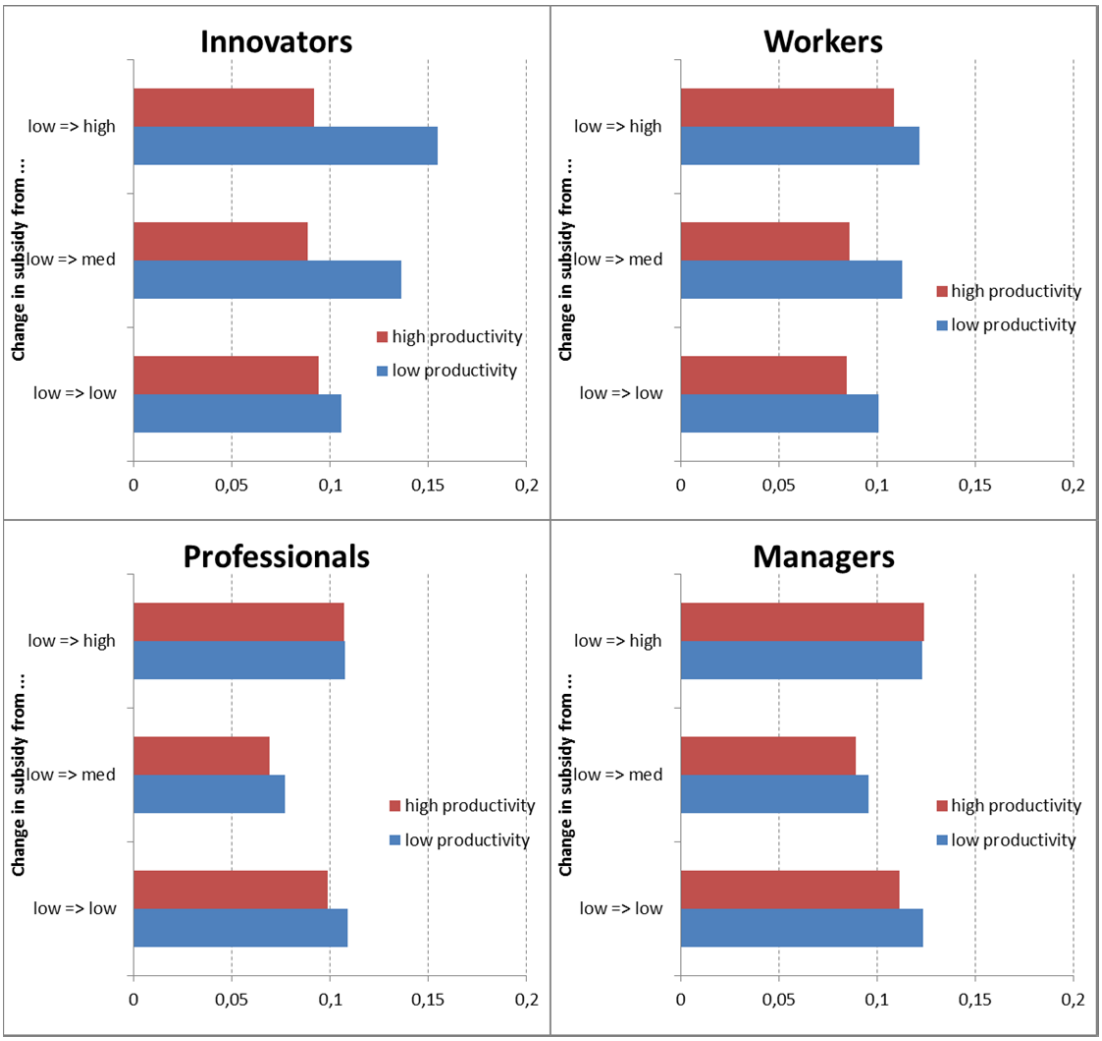
We now examine how subsidies are associated with earnings.[13] We are particularly interested in the changes in the earnings of innovators in firms that have received an increasing amount of innovation subsidies.

[13] We examine monthly earnings that are estimated by dividing the annual earnings (originated from taxation records) by the number of months being employed (originated from employment registers) during the year.

The results are reported in Figure 9. Again, we consider only firms that did not receive innovation subsidies in 2010. As earlier, firms are classified into three groups based on the increase in innovation subsidies per employee from 2010 to 2012. Within these groups, the firms are again also divided into three groups based on their labor productivity in 2010. In contrast with our earlier investigations, instead of following the paths of the movers (i.e., examining the patterns of labor mobility), we now focus on the "stayers," i.e., those who worked in the same firms both in 2010 and 2012.

Let us first consider innovators. When focusing on innovators in firms that had a relatively high labor productivity level in 2010, we observe that the median earnings increase is roughly the same in firms that received an increasing amount of innovation subsidies than in other firms. This increases the confidence that innovation subsidies can be used to boost innovation activity. This result would also be consistent with a view that the labor market for innovators

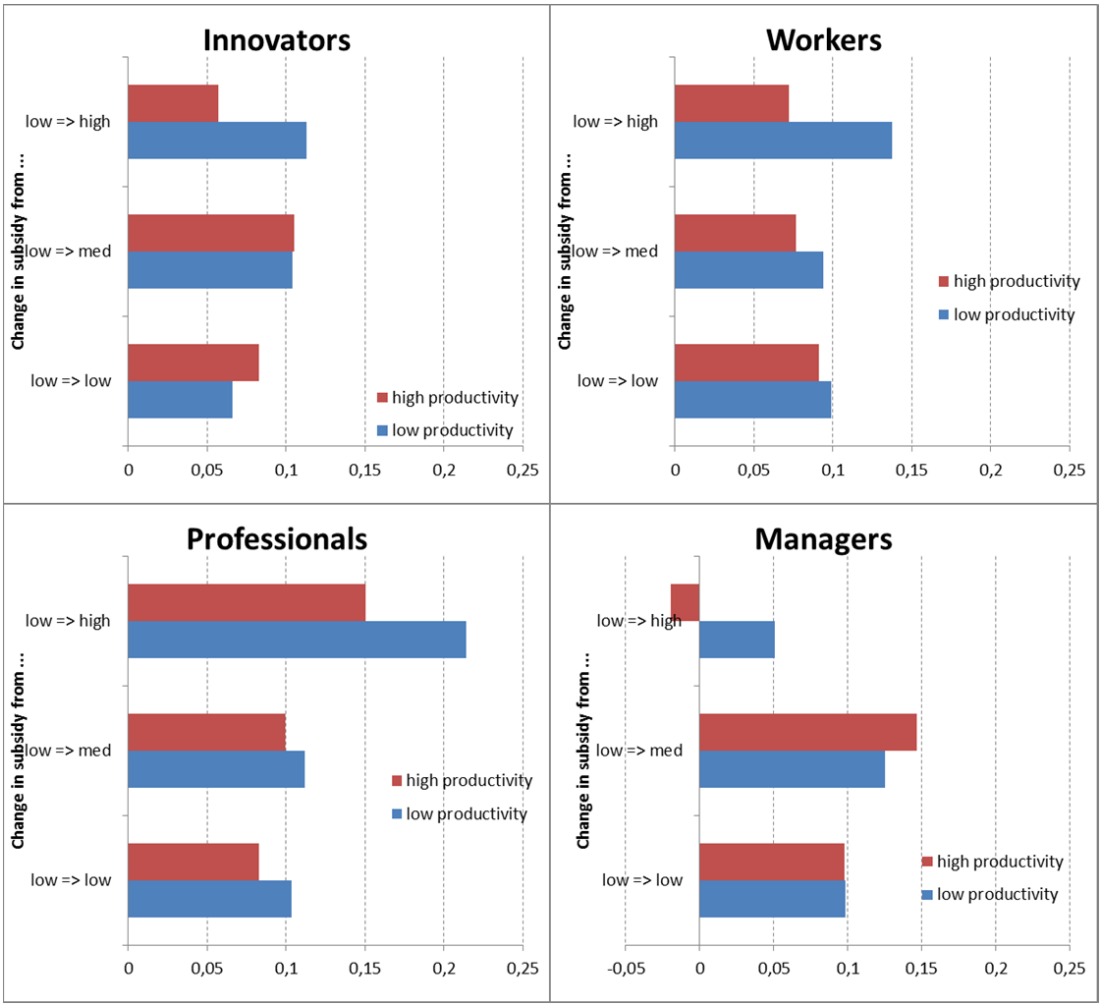
Figure 9 **Change in the innovation subsidy intensity and growth rate of median earnings of stayers in 2010–2012**



is relatively competitive. In a competitive labor market, all firms need to pay the same wage, independent of the economic situation of the firm. On the other hand, the results are somewhat different for innovators in firms that had low labor productivity in 2010. In such firms, an increase in innovation subsidies does seem to be positively correlated with the increase in average earnings.

Figure 9 also presents the patterns in pay increases among production workers, professionals, and managers. By and large, the results are similar to those concerning innovators. For completeness, we also repeat the same analysis for non-innovation subsidies. The results, which are shown in Figure 10, are somewhat mixed. In the case of innovators and production workers, the results are similar to those in Figure 9. That is, non-innovation subsidies do not seem to be associated with substantial effects on wages at the firm level. In the case of professionals, we observe much larger wage increases in firms that have seen their non-innovation subsidy intensity increased from a low to a high level. In the case of managers, this result is actually reversed.

Figure 10 Change in the non-innovation subsidies and growth rate of median earnings of stayers in 2010–2012



6 Conclusions

The bulk of innovation subsidies in Finland are allocated to firms in industries, where the employment share of innovators is very high. Moreover, the average subsidy per employee is typically the highest in young firms that are typically also small. We also found that innovation subsidies are associated with innovators moving from high-productivity firms to subsidies firms. Arguably, these are positive findings. They suggest that innovation subsidies contribute to economic renewal.

Non-innovation subsidies, in contrast, appear to have a tendency to preserve established industry and firm structures: a large share of them has been granted to relatively old firms within "traditional" manufacturing industries, such as basic metals, textiles, and food products. Since non-innovation subsidies are systematically allocated to different types of firms than innovation subsidies, they may also crowd out resources from firms that receive innovation subsidies, thereby overriding some of the possible beneficial effects of innovation subsidies.

References

Bagger, J., Maliranta, M., Määttänen, N. and Pajarinen, M. (2016). Innovator Mobility in Finland and Denmark. Vol. The Research Institute of the Finnish Economy.

Bresnahan, T.F. and Trajtenberg, M. (1995). General Purpose Technologies: 'Engines of Growth'? *Journal of Econometrics,* 65(1), 83–108.

Daveri, F. and Silva, O. (2004). Not only Nokia: what Finland tells us about new economy growth. *Economic Policy,* 19(38), 117–163.

Maliranta, M., Mohnen, P. and Rouvinen, P. (2009). Is Inter-Firm Labor Mobility a Channel of Knowledge Spillovers? Evidence form a Linked Employer-Employee Panel. *Industrial and Corporate Change,* 18(6), 1161–1191.

Aikaisemmin ilmestynyt ETLA Raportit-sarjassa (ennen ETLA Keskusteluaiheita)

Previously published in the ETLA Reports series (formerly ETLA Discussion Papers)

No 45 *Juri Mattila – Timo Seppälä*, Blockchains as a Path to a Network of Systems – An Emerging New Trend of the Digital Platforms in Industry and Society. 13.8.2015. 16 p.

No 46 *Annu Kotiranta – Joona Widgrén*, Esiselvitys yhteiskunnallisesta yrittämisestä – Katsaus yhteiskunnallisiin yrityksiin ja vaikuttavuusinvestoimiseen Suomessa. 23.10.2015. 37 s.

No 47 *Timo Seppälä – Marco Halén – Jari Juhanko – Heidi Korhonen – Juri Mattila – Päivi Parviainen – Jaakko Talvitie – Heikki Ailisto – Kirsi-Maria Hyytinen – Jukka Kääriäinen – Martti Mäntylä – Sampsa Ruutu*, "Platform" – Historiaa, ominaispiirteitä ja määritelmä. 23.11.2015. 14 s.

No 48 *Jesper Bagger – Mika Maliranta – Niku Määttänen – Mika Pajarinen*, Innovator Mobility in Finland and Denmark. 13.1.2016. 20 p.

No 49 *Paavo Suni – Vesa Vihriälä*, Finland and Its Northern Peers in the Great Recession. 15.1.2016. 33 p.

No 50 *Antti Kauhanen – Vesa Vihriälä*, Työn määrä: Miksi Suomessa pitäisi tehdä enemmän työtä? 18.2.2016. 29 s.

No 51 *Tero Kuusi – Mika Pajarinen – Petri Rouvinen – Tarmo Valkonen*, Arvio t&k-verokannusteen vaikutuksista yritysten toimintaan Suomessa. 11.3.2016. 55 s.

No 52 *Joonas Tuhkuri – Hans Lööf – Ali Mohammadi – Petri Rouvinen*, Offshoring R&D. 4.5.2016. 13 p.

No 53 *Jyrki Ali-Yrkkö – Timo Seppälä – Juri Mattila*, Suurten yritysten ja niiden arvoketjujen rooli taloudessa. 18.5.2016. 37 s.

No 54 *Joonas Tuhkuri*, ETLAnow: A Model for Forecasting with Big Data: Forecasting Unemployment with Google Searches in Europe. 25.5.2016. 16 p.

No 55 *Klaus Castren – Aleksi Kortelainen – Timo Seppälä*, Rajaresurssien puute hidastaa teollisen internetin alustaekosysteemien syntyä. 26.8.2016. 12 s.

No 56 *Niku Määttänen – Olli Ropponen*, Listaamattomien yhtiöiden osinkoverotus, tuotantopanosten allokaatio ja tuottavuus. 26.8.2016. 16 s.

No 57 *Kristian Lauslahti – Juri Mattila – Timo Seppälä*, Älykäs sopimus – Miten blockchain muuttaa sopimuskäytäntöjä? 12.9.2016. 29 s.

No 58 *Antti Tahvanainen – Peter Adriaens – Annu Kotiranta*, Growing Pains of Industrial Renewal: Case Nordic Cleantech. 26.9.2016. 59 p.

No 59 *Hannu Karhunen – Niku Määttänen – Roope Uusitalo*, Opintotukijärjestelmän uudistaminen: Rakenteelliseen malliin perustuvia vaikutuslaskelmia. 10.10.2016. 26 s.

Sarjan julkaisut ovat raportteja tutkimustuloksista ja väliraportteja tekeillä olevista tutkimuksista.

Julkaisut ovat ladattavissa pdf-muodossa osoitteessa: www.etla.fi » julkaisut » raportit

Papers in this series are reports on research results and on studies in progress.

Publications in pdf can be downloaded at www.etla.fi » publications » reports

ETLA
Elinkeinoelämän tutkimuslaitos
The Research Institute of the Finnish Economy
Arkadiankatu 23 B
00100 Helsinki

Puh. 09-609 900
www.etla.fi
etunimi.sukunimi@etla.fi

ISSN-L 2323-2447, ISSN 2323-2447, ISSN 2323-2455 (Pdf)