

## Does Innovation Affect the Demand for Employment and Skilled Labor?

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# Does Innovation Affect the Demand for Employment and Skilled Labor?

Adriana Peluffo\*

## Abstract

The objective of this work is to analyze the effect of innovation on labor demand, particularly, the level of employment and the skills composition of the labor force, in level and growth rates. Additionally, we analyze the ratio of skilled to unskilled labor and wages.

The data for this study come from the Innovation Surveys for Uruguayan manufacturing and service firms over the 2000-2015 period matched with the Industrial Surveys of Economic Activity. We analyze the whole sample and each sector according to technological/knowledge intensity and firm size.

Our results for ordinary least squares, instrumental variables, and generalized method of moments show positive effects of innovation in the level of total employment and skilled workers, its rate of growth, and wages. Product and Enhancing productivity innovation show positive impact on employment.-Splitting by manufacturing firms we observe that product innovation affect growth in employment for high-tech firms while organizational innovation and productivity enhancing innovation affects growth in skilled labor with a greater effect for low-tech firms, while organizational innovation affects growth in skilled labor and in the share of skilled labor. Small manufacturing and service firms are less responsive to innovation. Growth in employment of service firms are affected mainly by organizational innovation and productivity enhancing innovation. Thus, enhancing productivity innovation and its component of organizational innovation seems to play an important role on employment growth.

Keywords: Employment, Skilled Labor, Product Innovation, Process Innovation.

JEL Code: D2, J23, L1, O31, O33

## Resumen

El objetivo de este trabajo es analizar el efecto de la innovación sobre la demanda de empleo, en particular, el nivel de empleo y la demanda de trabajo calificado y las tasas de crecimiento de estos. Además, analizamos el ratio entre la mano de obra calificada y la no calificada y los salarios.

Los datos para este estudio provienen de las Encuestas de Innovación de las empresas manufactureras y de servicios de Uruguay para el período 2000-2015, unidas a las Encuestas Industriales de la Actividad Económica. Se analiza toda la muestra de empresas manufactureras y servicios y luego cada sector, y clasificándolos de acuerdo a la intensidad tecnológica/conocimiento y el tamaño de la empresa.

Tomando todas las empresas se encuentra que para mínimos cuadrados ordinarios, variables instrumentales y método generalizado de momentos muestran efectos positivos de la innovación en el nivel de empleo total y de trabajadores calificados. Para la proporción de mano de obra calificada en el empleo total, las innovaciones sólo de producto muestran un impacto positivo. El crecimiento del empleo y el crecimiento de la mano de obra calificada también parecen ser afectados positivamente por las actividades innovativas. La innovación de productos exhibe el mayor impacto en el empleo, pero también la innovación que mejora la productividad tiene un efecto beneficioso en el empleo y la mano de obra calificada.

Luego se analiza de acuerdo a la actividad de las empresas clasificando en manufacturas y servicios. Se encuentran efectos positivos de la innovación de producto en el crecimiento del empleo total, en tanto que para el crecimiento del trabajo calificado y la participación de este en el empleo total las actividades de innovación organizacional y de mejoras en la productividad presentan efectos positivos y significativos.

Para las empresas del sector servicios encontramos efectos positivos de la innovación de productos sobre el crecimiento total del empleo y del trabajo calificado y del crecimiento de la participación de este en el empleo total.

Clasificando los sectores manufacturero y de servicios de acuerdo a la intensidad tecnológica y tamaño empresarial, para las empresas manufactureras, observamos que la innovación de productos afecta el crecimiento del empleo en las empresas de alta tecnología, mientras que la innovación organizacional y la innovación que mejora la productividad afecta el crecimiento de la mano de obra calificada con un mayor efecto en las empresas de baja tecnología, mientras que la innovación organizacional afecta el crecimiento de la mano de obra calificada y de la proporción de mano de obra calificada.

Las pequeñas empresas manufactureras y de servicios responden menos a la innovación. El crecimiento del empleo de las empresas de servicios se ve afectado principalmente por la innovación organizativa y la innovación que mejora la productividad. Por lo tanto, la mejora de la innovación en materia de productividad y

su componente de innovación organizativa parece desempeñar un papel importante en el crecimiento del empleo.

En definitiva, el hallazgo más importante es que la innovación afecta en forma positiva el empleo con un efecto ligeramente mayor sobre el trabajo calificado.

Palabras clave: Empleo, Trabajo Calificado, Innovación de Producto, Innovación de Proceso.

Código JEL: D2, J23, L1, O31, O33

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## 1. Introduction

The fear of technological change conveyed by the spectrum of rising unemployment is a topic that can be easily tracked back to the first industrial revolution. Opposing the popular distress, most economists pondered the role of the compensating mechanisms triggered by technological change: increasing productivity raises the demand for new products and creates new jobs to replace the old (Vivarelli, 2014). However, are the new jobs better? And if they are, do their benefits reach all the displaced?

Technological innovation is expected to boost economic growth and to have a sizable impact on employment. Policy circles often expect growth to solve unemployment problems, but economic growth and productivity growth can cast competing forces acting on labor demand. Have innovation a dominating labor-saving impact, aggregate demand may suffer as a consequence of technological unemployment and reallocation of workers in low productivity jobs could jeopardize the productivity gains at the national level (Bogliacino, 2014). The employment intensity of growth is likely to be mediated by the kind of innovations introduced (Edquist et al., 2001). Neither economic growth always lead to more employment, nor productivity growth necessarily reduces it.

Understanding the impact of technological change on employment is at the center of the policy debate. The kind of shifts in employment that innovation brings matters for the inequality debate and the definition of appropriate labor policies aimed at minimizing negative impacts of innovation and technological change. Increased inequality in developing countries has been associated with an increase in the skill premium prompted by globalization (Goldberg and Pavcnik, 2007). So far, the effects of innovation on labor demand have been difficult to discern.

Employment has been a major preoccupation in developing countries dealing with technical progress and trade liberalization. These processes are often interlinked as trade liberalization increases competition forcing firms to incorporate technology to survive. Uruguay is not an exception. Trade liberalization during the 1990s was associated with increasing productivity, as firms responded to the reductions in trade barriers incorporating capital intensive technologies, but also significant job destruction and wage dispersion (Casacuberta et al., 2004).

Uruguay provides an interesting framework to study the impact on innovation on employment and its composition for a small Latin American country. Moreover, we have a long time span of data with the first years signed by the 2002 crisis and the recession followed by the beginning of economic growth in the country until the last year of the sample (2015).

We aim at answering questions such as: which is the impact of innovation on employment? Does it affect differently skilled labor?, does productivity enhancing innovation has the same effects as product innovation? In this way, we contribute to the literature providing evidence for a small emerging country over a relative long time span, and for manufacturing and service firms according to knowledge intensity and firm size. Differently to several works that uses the Harrison et al (2014) methodology,

which has the drawback of assuming well behaved production functions, we rely on OLS and IV-GMM techniques without imposing tacitly the assumption of homogenous degree one production functions with constant returns to scale like in Harrison et al. (2014).

We find evidence that innovation has a positive effect on the level of employment and the number of skilled workers, while the evidence for the share of skilled labor seems to be mixed with OLS showing a positive effect but IV-GMM estimates are not significant. Nevertheless, when we test for endogeneity we find that the variables that capture innovation and its various types are exogenous for the share of skilled workers, except for product only innovation. Then we rely on OLS estimation and conclude that innovation increases the demand of skilled workers. Finally, average wages are also positively affected by innovation.

Splitting according to manufacturing and service firms we observe that for manufacturing firms, product innovation affect growth in employment for high-tech firms while organizational innovation and productivity enhancing innovation affects growth in skilled labor with a greater effect for low-tech firms, while organizational innovation affects growth in skilled labor and in the share of skilled labor. Small manufacturing and service firms are less responsive to innovation. Growth in employment of service firms are affected mainly by organizational innovation and productivity enhancing innovation. Thus, enhancing productivity innovation and its component of organizational innovation seems to play an important role on employment growth.

## **2. Literature review**

### **2.1. Theoretical aspects**

Economic theory does not provide a clear prediction of the employment effect of innovation since the net result depends on the type of innovation, and the interplay between displacement and compensation effects, which at its time is mediated by market structure, and institutional factors.

The effect of innovation on employment is determined not only by direct effects, but also by various types of compensation mechanisms and the channels through which these mechanism operate. Disentangling the innovation employment links is particularly complex, both from a theoretical and empirical perspective.

Consider firms that are observed through two or more consecutive periods. In the first period, firms can only produce one type of product (old products). Afterwards, firms have the choice to implement product innovation and introduce a second type of product (new products).

For a given level of outcome, the productivity trend and process innovations should reduce the demand for workers (displacement effect). At its time, the effect of product innovation on labor demand depends on the productivity difference between new and old products.

There is also a demand effect. Both the reduction of costs derived from process innovation and the introduction of new products may increase demand due to lower prices and new products. Others things equal, higher output means higher demand for labor (compensation effect).

The net impact of innovation will depend on the relative strength of the displacement and compensation effects. Such impact can differ by type of innovation.

Suppose now that, in addition to the two types of products already presented, we can differentiate two types of labor: skilled and unskilled. The production of old and new products requires a combination of skilled and unskilled labor that can be substitute or complementary to technology.

Changes in the technological parameter can have different effects according to the type of labor. Improving efficiency would still have a negative partial effect on overall labor demand for a given output, but it depends on the nature of the new technology how this is going to affect the demand for skilled and unskilled workers. If process innovation introduces skilled biased technology, the ratio of skilled to unskilled labor is expected to rise even though the impact on the absolute level of skilled labor utilized is ambiguous. For product innovation, the result may depend on the ratio of skill intensity required for old and new products. Thus, the composition of the labor force can be altered by innovation.

The relationship between skills and technology may run in both directions. Innovators decide skill intensity of technological change. If skills are abundant, it makes sense to direct innovation towards the skilled. Hence, new technologies would be complementary to skills by design (Acemoglu, 1998). In countries where skills are not relatively abundant, it would make sense to substitute technology for skills provided that new technologies are locally produced and not imported from countries with higher skills endowment.

Moreover, increased demand for skills can be reflected on the skills premium and not in the number of workers. While the Innovation Surveys do not record data on wages Industrial Economic Surveys do, so we match both surveys and analyze the impact of innovation on the average wages at the firm level. We have data on wages for the period 1998-2012.

Summing up, productivity-enhancing innovations that improve efficiency in the production process are likely to reduce the demand for labor thereby displacing workers. Meanwhile, the introduction of new products that expands demand is expected to increase the demand for labor. Nevertheless, the relationship is not clear cut. The displacement effect of productivity-enhancing innovation can be offset by increasing demand (innovative firms get more sales and steal labor from their competitors). In addition, when newer products are produced more efficiently, the replacement of the old product may result in labor reduction.

Increasing productivity while holding output constant would reduce the demand for labor, the opposite ensues when increasing sales for a given efficiency level. Productivity reduces employment per unit of output but output expansion can



overcomes this effect raising employment. Thus, the impact of innovation and its various types on employment is an empirical matter.

## **2.2. Empirical studies**

As we mention above, innovation can create or destroy employment depending on market structure, the type of innovation and the institutional setting. In general, the introduction of new products is expected to increase employment due to an increase in demand for new goods. Nevertheless, if the innovator enjoys market power and increases prices, this may translate in a reduction of output and displacement of workers. Furthermore, new products can be designed in a way that also increases efficiency, and decreases the need of labor. Process innovation can also have an ambiguous effect on employment. Process innovation may lead to increase efficiency and lower prices. While increased efficiency may lead to contraction in the inputs used for a given level of output, a reduction in prices may lead to an increase in demand, with an expansion of the inputs needed in production. Usually, higher productivity and reduction of employment are expected as a result of process innovation. Nonetheless, as argued by Pianta (2006) if process innovation aside increasing efficiency also increases quality or decreases prices, then a rise in demand may follow with an increase in employment.

There is a group of studies on the links of innovation and employment. Nevertheless, the evidence on Latin America thought it has increase in recent years, is smaller than for developed countries. Moreover, results from developed countries cannot be extrapolated to developing countries since innovation is mainly acquisition of knowledge from abroad (Elejalde et al., 2015).

Most studies for developed countries find a positive association between product innovation and employment but no consensus on process innovation (Lachenmaier and Rottmann, 2011). Some studies show that only product innovation generates new jobs in the sector, while process innovation generates job within the innovative firm at the expense of competitors (Greenan and Guellec, 2000). Moreover, while manufacturing is expected to receive the displacement of process innovation a positive employment impact is expected to dominate in the service sector.

A number of studies confirm a positive role of innovation on employment growth at the firm level. This is particularly so for high-growth firms in higher-tech sectors (Bogliacino et al., 2012; Coad and Rao; 2011; Van Roy et al.; 2015). Nevertheless, these studies do not analyze the impact of product and process innovation on employment.

Other studies in manufacturing and services in developed countries found a large increase in employment due to product innovation that more than compensates for the negative effect of process innovation (Harrison et al., 2014). Nevertheless, contrary to theoretical expectations, for Germany, process innovation has a greater positive impact on employment than product innovation (Lachenmaier and Rottmann, 2011).

Vivarelli (2014) argue that the microeconomic literature tends to support the existence of a positive relationship between innovation and employment, especially

when R&D or product innovation are adopted as proxies to innovative activity and mostly when high technology sectors are at the center of the analysis.

Goedhuys and Veugelers (2012) found that a large share of workers with secondary education is important for process innovation among Brazilian manufacturing firms, whilst product innovation is more skill intensive. In this particular context, product innovation appears as a more complex process requiring more knowledge and absorptive capacity than process innovation.

Studies for Latin American countries sometimes relate to the recurrent crises affecting the region. In a context of rising unemployment, innovative firms may be the better equipped to cope with the storm and preserve their working force. Indeed, innovation had a protective effect during the Argentinean crisis (Elejalde et al., 2015). The same study also concluded that product innovation creates jobs and is skilled biased, while process innovation has no effect either on skilled or unskilled jobs.

Crespi and Tacsir (2011) for Chile find that process and product innovations are important sources of employment growth at the firm level, while Benavente and Lauterbach (2008) find that product innovation increases employment and process innovation does not affect it.

Zuniga and Crespi (2013) found that Uruguayan firms that innovate generate more employment than firms that do not. The make only strategy has the largest impact. The buy only strategy has the lowest impact. Crespi and Tacsir (2019) analyze the impact of process and product innovation on employment growth and its composition in Argentina, Chile, Costa Rica and Uruguay. Using the model proposed by Harrison et al. (2014), the authors find that product innovation is associated with employment growth. Furthermore, there is some evidence of a skill bias although product innovation is more complementary to skilled than to unskilled labor.

Other studies find that innovation does not lead to job losses and generates demand for qualified labor force (Aboal et al., 2011). Interviews show that process innovation is expected to have a negative impact on employment. These authors compare the make or make and buy strategy and find that the make and make or buy strategy tend to have a more positive effect on employment quantity and quality. Product innovation is complementary to labor, but process innovation displaces it.

There are some studies that analyze the level of employment and its composition (Autor, Katz and Krueger, 1998; Caroli and Van Reenen, 2001; Bresnahan et al., 2002; and Greenan, 2003).

Other strand of the literature on developing countries has focused on skill-enhancing trade. Liberalization accelerates the flow of physical capital encouraging adaptation to skill-intensive technologies. Firms exporting to high income countries employ more skilled workers (Brambilla et al., 2012). Management is important to the success of both innovation and exporting. Skills needed to enter the exports market may differ from those required to succeed in them (Love and Roper, 2015). For a recent

survey Calvino and Virgillito (2018) present works since 2010 onwards, methodology, results, shortcomings and a future agenda of research.

The focus of this study is on the effect of innovation on labor demand. Our interest lies on the level of total employment and the skill composition of the labor force, both in levels and growth rates. Additionally we analyze wages.

All variables are measured at the firm level. The explanatory variable tested is innovation, which is further discriminated in different types of innovations such as productivity-enhancing innovations and product innovation. Productivity-enhancing innovation is broader than the commonly used process innovation as it includes also organizational and commercialization innovation. We conduct the analysis for the whole sample and discriminating in manufacturing and service sectors, its technological/knowledge intensity and firm size.

We expect the innovative strategies of Uruguayan firms to be dominated –not exclusively- by the adoption of technologies produced in developed countries. Such technologies are likely to be more skilled-biased than the locally developed ones (Acemoglu, 2003). Hence, the adoption of new technologies may increase the relative demand of skilled workers.

Thus, we aim at answering: which is the impact of innovation on employment? Does it affect differently skilled labor? Does productivity enhancing innovation has the same effects as product innovation? We conduct the analysis for the whole sample of Manufacturing and Services firms, and then we split the sample and study the firms for each sector, considering also its knowledge content and size.

To answer these questions we use Ordinary Least Squares regressions and instrumental variables and generalized method of moments (GMM) to control for endogeneity. We should keep in mind that firm-level analyses do not always directly allow for inference at the industry level. In particular, works that analyze different samples of firms with varying characteristics in terms of age, size and sectors of activity are able to offer different perspectives on the microeconomic relationship between innovation and employment (Calvino and Virgillito, (2018).

### **3. Empirical Strategy**

#### **3.1. Data and Variables**

The data for this study comes from the Innovation Activities Surveys (Encuestas de Actividades de Innovación en la Industria – EAI) collected by the National Bureau of Research and Innovation (Agencia Nacional de Investigación e Innovación – ANII). Surveys were delivered at three-year intervals. We have at our disposal the last five waves, corresponding to the years 2000, 2003, 2006, 2009, 2012, and 2015. Some information from the first wave –EAI 2000- which is missing is taken from the Industrial Economic Surveys (Encuestas de Actividad Económica, EAE) carried out by the INE (Instituto Nacional de Estadística), for instance skilled workers and sales for the year 2000, and average wages for 2000 till 2012.

Information is collected through personal interviews that are compulsory for all the sampled firms. The questionnaire follows the guidelines of the Bogota Manual (Jaramillo et al., 2001).

Surveys combine two inclusion criteria: (1) compulsory participation for big firms<sup>1</sup> until 60 percent of employment within the industry is covered –after such a quota is filled, some big firms may be exempt from the survey-; (2) representative random selection of small and medium firms stratified by industry. A public firm was excluded from the analysis since it is clearly an outlier.<sup>2</sup>

### **3.1.1. Innovation Variables**

The EAII Surveys provide binary information on whether firms have introduced or not four different types of innovation. Such types are product, process, organizational, and commercialization innovation. Product innovation implies putting in the market a new product or service whose characteristics or intended uses are either completely novel or significantly improved from previous version already offered. Process innovation is the implementation of new methods of production and can be directed to produce new goods or to increase the efficiency in producing those already existing. Organizational innovation includes changes in management and administration, and may include changes that affect labor such as economic incentive systems, working groups, new ways of decision-making. Finally, innovation in commercialization occurs when the firm introduces new ways of selling, delivering, or packing the products.

For the purpose of this study, we differentiate between product innovation and the other three types, which we referred to as productivity enhancing innovation based on the assumption that any of these either should increase efficiency in production or in the distribution of the goods offered by the firm. Any of those forms of innovation should allow firms to provide more with the same resources because the output requires less input, workers produce more, or the consumers face less hassle to find the product.

This aggregation is not atypical. The original definition of process innovation given by Joseph Schumpeter already mentioned it: “the introduction of a new method of production or a new way of handling a commodity commercially” (Schumpeter, 1934).

Distinctions made, we can define the variables in two different ways. One is using dummies for every type of innovation, each one independent of the other. The second form is creating four mutually exclusive categories and then using binary variables representing various possible combinations. Thus we try different combinations of innovation activities defined as dummy variables.

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<sup>1</sup> Participation in EAII Surveys is mandatory for firms that either reported: (A) more than 50 employees in 2000, 2003, and 2006; or 100 employees from 2009 onwards; or (B) annual sales higher than: \$U13 million (EAII2000), USD 1 million (EAII2003), \$U25 million (EAII2006), \$U120 million (EAII2009). Additionally, some activities are defined as of mandatory inclusion regardless of size.

<sup>2</sup> We exclude the state owned firm of oil refinery (ANCAP) since it produces important changes in the composition of the sample, as it is by far the biggest firm in the universe.

Statistical correlation between the types of innovation is high. Nevertheless, having various types of innovations is an asset of the data, since some previous studies have found that combining different types of innovation may be crucial for firm performance such as for exporting (Greenaway and Kneller, 2007).

### **3.1.2. Labor and Control Variables**

We define skilled labor as the sum of professionals and technicians, and unskilled those workers in production activities. The skilled workers share is the ratio between skilled over total employment. Furthermore, we define the ratio of skilled to unskilled workers within the firm. We try also variables in growth rates and wages.

Empirical models also include a set of control variables that relate to size and age of the firm, foreign ownership, industry, and time dummies. In some models, we also include the exporting status of the firm, though this variable is lacking for the first wage.

The size of the firm is measured in terms of sales and categories of sales, in particular discriminating big firms, or medium and big firms according to the sales distribution in the sample. In this work, we report results with logarithm of sales as our proxy for size.

Foreign ownership is included as a dummy variable taking the value one whenever there is foreign capital participation in the firm and zero otherwise. It is a stylized fact that foreign-owned firms tend to be more intensive in knowledge and capital than domestic firms. Previous studies in Uruguay have shown that foreign-owned firms employ more skill labor both in absolute and relative terms, and the wage gap between skilled and unskilled workers tend to be higher when compared with domestic firms (Peluffo, 2015).<sup>3</sup>

## **3.2. Econometric model**

We analyze the level and the growth of total employment, skilled workers and the share of skilled workers in the labor force. In addition, we analyze average wages at the firm level. Firstly, we estimate by OLS and then we use instrumental variable techniques in order to correct for the possible presence of endogeneity. Then, we check if the variables suspected as endogenous actually are endogenous or exogenous.

Endogeneity may be present due to omitted variables and measurement errors, to unobservable prices at the firm level and productivity shocks. The omitted variable may arise due to productivity shocks included in the error term.

Our baseline equation takes the same form regardless of whether the dependent variable is total number of workers ( $L_{it}$ ), number of skilled workers ( $SL_{it}$ ), the share of

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<sup>3</sup> At the international level, there are contrasting results on whether or not foreign ownership increases the wage gap. Studies on British firms acquired by US multinationals show reduced wage gap (Girma and Görg, 2007) while for Uruguay we find higher productivity in multinational firms but also a higher wage gap between skilled and unskilled workers.

skilled workers in total employment in levels (SL\_L<sub>it</sub>), wages or growth rates (Y<sub>it</sub>), all these variables in natural logarithms. Thus, our baseline model is:

$$Y_{it} = \beta_0 + \beta_1 IN_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (1)$$

Where  $i$  stands for firm, and  $t$  for time. IN indicates that the firm effectively innovated or the type of innovations undertaken.

The covariates included in  $\mathbf{X}$  differ according to the various specifications of the models that were tested. These include, size measured by the sales of the firm, or categories of size according to sales,<sup>4</sup> ownership of capital (foreign capital participation dummy), exporting status, age of the firm, year dummies to control for macroeconomic shocks, and industry dummies to control for industry-specific effects.<sup>5</sup>

The presence of foreign capital indicates a certain degree of internationalization that distinguishes the firm from the nationally owned firms.

Finally, we analyze price effects considering the impact of innovation on wages. As the demand for a certain type of workers increases, it is likely that the price of such labor will also increase and so the demand for workers may have grown further had wages remained unchanged. Thus, we take average wages at the firm level from the Industrial Economic Surveys and analyze the impact of various types of innovation.

## **4. Results**

### **4.1. Descriptive statistics**

Innovators are likely to be bigger in terms of sales and employees. They also tend to hire a higher proportion of skilled workers. This result verifies for developed as well as developing countries (Argentina, Chile and Uruguay).

From Table 1.1 to 1.6 we report some descriptive statistics. In Table 1.1 we present the share of firms that undertake innovations, and the share by different types of innovations. Over the period 2000-2015 we observe that 42 % of the firms undertake any type of innovations, 28 % undertake process innovations, 37 % productivity enhancing innovations, and 23 % undertake product innovations.

In Table 1.2 we show the correlation between the various types of innovation. The higher correlations are among any type of innovation, productivity enhancing innovation and product innovation.

In Table 1.3 we can observe that innovators are bigger in terms of employment and sales, and hire a higher number of skilled workers.

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<sup>4</sup> We analyze the distribution of sales pooled over the period and if the firm has sales lower than the median is considered small, between the median and the 75<sup>th</sup> percentile is considered a medium sized firm, and bigger than 75<sup>th</sup> percentile is considered big. We obtain similar results which are available upon request.

<sup>5</sup> Greenaway and Kneller (2007) show that the potential learning from exports effect is lower for industries already exposed to high level of international competition and high intensity of R&D.

Furthermore, we present the rates of growth of employment, skilled labor and its share, and growth in total sales. We observe that innovators present a higher total employment growth, and share and growth of skilled labor. Innovators also exhibit a higher rate of growth of total sales and sales of new products.

Regarding to the growth in skilled workers and total employment. We observe that for the full sample the average number of skilled workers per firm is 33 with a growth rate of 250 %, while total employment grow at a rate of nearly 150 % over the period. Moreover, for innovators the number of skilled workers is higher (55 skilled workers per firm) than for non-innovators (17) with a higher growth rate (250 %) which is also in line with the growth in total employment (217 %).

Manufacturing firms tend to undertake more innovation activities of any type than service firms except for product only innovation, which is slightly higher in the service, sector, as can be seen in Table 1.5 and 1.6. These differences are confirmed by the t-tests of differences in means.<sup>6</sup>

Furthermore, we observe that firms belonging to the manufacturing sector are smaller in terms of total employment, have fewer skilled workers and share of skilled labor, but in terms of total sales both manufacturing and services present similar figures. Besides, firms belonging to the service sector show higher rates of growth in employment, growth in skilled workers, growth in sales and growth in the share of skilled labor.

## **4.2. Econometric results**

### **4.2.1. Ordinary Least Squares Regressions**

#### **4.2.1.1. Whole Sample**

First, we present the models estimated with Ordinary Least Squares techniques. Since it is likely that our innovation variables, and in particular product innovation was endogenous, we will estimate by Instrumental Variable Generalized Method of Moments (IV-GMM), and test for endogeneity of the suspected endogenous variables in the models tried.

In Table 2.1, we present the results for OLS estimation for total number of workers and skilled labor per firm. Innovators have a higher number of workers. We find that the different types of innovation have a positive and significant effect, except for product innovation (model 2) and process only innovation and product only when (model 3). Enhancing productivity innovation exhibit has a positive impact on total employment with the highest coefficient. Moreover, there is some evidence (model 6) that undertaking more than one type of innovation may act as complements to create employment.

For skilled labor, we find positive effects of innovation. Innovators tend to hire a higher number of skilled workers. Productivity enhancing, product innovation, process and organizational innovations show positive associations with skilled labor. Moreover, the coefficients of innovation variable seem to be slightly higher for skilled labor

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<sup>6</sup> Results of t-tests are available upon request.

compare to total employment. This could be pointing out a higher effect of innovation variables for skilled labor. Product only, process only and organizational only innovations do not show significant effects.

In Table 2.2, we present the results for average wages per firm, and the share of skilled workers in total employment. Similarly, to our previous results, we find again that innovators have a positive association with both variables. Product only innovation shows the highest effect on average wages and the share of skilled workers. This is in line with the literature that argue that product innovation is more skill intensive than process innovation. On the other hand while enhancing productivity innovation has a positive and significant effect on average wages it is not significant for the share of skilled workers.

Age and size have a positive and significant effect for total employment, skilled labor, and average wages. Nevertheless, size have a negative effect on the share of skilled labor in total employment, implying that smaller firms tend to have a higher share of skilled labor. Foreign ownership of capital is positive for skilled workers, average wages and the share of skilled workers, but has a negative and significant impact on total employment. Exporting status has a positive effect on the number of skilled workers, and its share, while it is not significant for total employment and average wages.

Regarding to the rate of growth, for the pooled sample over the period there was an increase of 147 % in total employment and 250 % in skilled labor, as we commented above. We should note that our sample starts in the recession period and ends with high levels of economic growth for the Uruguayan economy in 2015. In Table 2.3, we present the results for growth in total employment and growth in skilled workers. We find positive effects of any type of innovation, product innovation, organizational innovation, and productivity enhancing innovation, on employment growth with a magnification effect of innovation, product innovation, process innovation and productivity enhancing innovations. For growth rate of skilled workers undertaking innovations of any type, organizational innovation, organizational only innovation and productivity enhancing innovation. Organizational only innovation exhibit the highest coefficient for growth in skilled labor.

Size is positive and significant for both dependent variables, but age is not significant for employment growth ( $gr_{po}$ ) and positive for growth in skilled labor ( $gr_{sl}$ ), and foreign ownership of capital is not significant for both variables. Export status is negative for growth in employment but not significant for growth in skilled labor.

As we comment above we also try OLS estimations but controlling for the exporting status of the firm, and with size as a categorical variable (medium and big firms defined according to sales as explained above). We find qualitatively similar results with



exports having a positive effect on employment and skilled labor but it is not significant for average wages.<sup>7</sup>

Finally, in Table 2.4 we analyze the ratio of skilled to unskilled workers (SL-UL) and the growth in the share of skilled labor. We find no effects of the innovation variables on the ratio SL-UL but for the rate of growth in the share of skilled labor we find positive effects of any type of innovation, organizational innovation, organizational innovation only and enhancing productivity innovations, all of them with a magnification effect.

Now we turn to the results for the subset of manufacturing firms.

#### **4.2.1.2. Manufacturing firms**

In Table 3.1, we analyze the impact of innovation and its various types on total employment and skilled workers at the firm level. For total employment, we find a positive effect of innovation and its different types, except for product only and process only innovation. We obtain similar results for skilled labor but with slightly higher coefficients, in line with previous results for the whole sample. Compared to the whole sample the results for manufacturing firms are relatively similar.

In Table 3.2 we find that for average wages at the firm level any type of innovation, product only innovation and organizational innovation show positive effects. While, for the share of skilled labor any type of innovation and enhancing productivity innovation have positive and significant effects.

For growth in total employment and skilled labor, we present the results in Table 3.3. For growth in employment, any type of innovation and product innovation show positive and significant effects. Moreover, we observe again magnification effects of the innovation variables for the growth variables.

Finally, for the ratio of skilled to unskilled workers and growth in the share of skilled labor we present the results in Table 3.4. For manufacturing firms we find that for this variable, any type of innovation, product innovation, process innovation and enhancing productivity innovation have positive and significant effects. While for the growth in the share of skilled labor any type of innovation, organizational innovation, organizational innovation only and enhancing productivity innovation shows positive and significant effects.

Age has a positive effect for total employment, skilled labor, average wages, and growth in skilled labor while it is not significant for the others variables analyzed. Foreign ownership has a positive and significant effect on skilled labor, average wages, share of skilled workers and growth in the share of skilled workers. On the other hand, we find that foreign ownership has a negative impact on the growth of total employment and it is not significant for the rest of the variables considered. This negative effect could be due to more intensive capital technologies used for foreign firms compare to domestic firms. Exporting status is positive for total employment,

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<sup>7</sup> Results are available upon request from the author.

skilled labor while it has a negative effect on growth of employment and it is not significant for all the other variables analyzed. Finally, size proxied by sales in natural logarithm has a positive effect for total employment, skilled labor, average wages, growth in employment and skill labor but has a negative effect on the share of skilled labor and the growth in the share of skilled labor, and it has not significant effects for the ratio skilled-unskilled labor.

#### **4.2.1.3. Services firms**

In Table 4.1, we present the results of the estimation by OLS for total employment and skilled labor. We find that any type of innovation, process innovation, organizational innovation, organizational innovation only and enhancing innovation have a positive and significant effect on total employment. For skilled labor, results are similar except that organizational innovation only is not significant.

For average wages and the share of skilled labor, we present the results in Table 4.2. We find that for average wages, any type of innovation, product innovation, product innovation only and enhancing productivity innovation have a positive and significant effect. Instead, for the share of skilled labor only product innovation has positive effect and surprisingly organizational innovation show a negative and significant effect.

In Table 4.3, we show the results for growth in total employment and growth in skilled labor. For both variables, growth in employment and skilled labor we find that any type of innovation organizational innovation and enhancing productivity innovation have positive and significant effects. For growth in the skilled labor, also product innovation shows a positive significant effect.

Finally, we find not significant effects of innovation variables on the ratio of skilled to unskilled labor while for the growth in the share of skilled labor we find positive significant effect of any type of innovation, organizational innovation and enhancing productivity innovation.

Age has a positive impact on total employment, skilled labor, average wage and the share of skilled labor and it is not significant for the other dependent variables considered. Foreign ownership of capital has a positive effect on average wages, share of skilled labor, skilled-unskilled labor ratio and growth in the share of skilled labor, while has a negative significant impact on total employment and not significant on skilled labor, growth of employment and growth of skilled labor. Exporting status has a significant positive effect on skilled labor, average wages, share of skilled labor and growth in the share of skilled labor, while has a negative significant effect on growth of skilled labor. Finally, size has a positive effect on total employment, skilled labor, average wages, and growth in employment and in skilled labor.

In Table 5 we present a comparison of the sign and significance (Table 5.1) of the variables for the whole sample, and for manufacturing and service firms (Table 5.2). While undertaking innovation activities is positive for all the employment variables analyzed product innovation seem to affect mostly skilled labor and productivity

enhancing innovation has a positive impact on all the variables analyzed except for the share of SL and the ratio SL-UL.

In what follows we address the issue of endogeneity using instrumental variables techniques.

#### **4.2.2. Instrumental Variable Estimation**

Firstly, we analyze the variables in levels for the whole sample. We run instrumental variables with fixed effects and standard errors clustered by firm robust to autocorrelation and heteroscedasticity.

We tried three different instruments: a dummy equal one if the firm received public support to innovate and zero otherwise, an increase in the range of products and services ranging from irrelevant=4, low=3, medium=2, high=1. The third instrument use is a categorical variable that captures if the firm enters into new foreign markets, again this variable takes the following values: irrelevant=4, low=3, medium=2, high=1. These instruments have been used successfully in several applied works. We assume that product innovation is endogenous and process innovation is exogenous. Since any type of innovation includes product innovation, we treat it as endogenous. In all the specifications of the various dependent variables, we test the exogeneity of the innovation variables.

The validity of the instrument relies in the correlation between the instruments and endogenous variables in the first stage regressions. Moreover, we always analyze the test of under-identification proposed by Kleibergen-Paap and of weak identification supports that our instrument is good.

In Table 6 we present the models for total employment and the number of skilled workers with sales in natural logarithm as a proxy of size. We find that any type of innovation, enhancing productivity innovation and product only innovations have a positive significant impact on total employment. The variable with the highest impact is product only innovation. Nevertheless, we notice that we reject the Hansen test in spite that F test in the first regression; under-identification and weak identification show that the instruments are adequate. Thus, we should take the results carefully. Once we control for size the impact of innovation reduces slightly. Product, process, product only, productivity enhancing and both types of innovations seems to have a positive impact on the employment level.

For skilled workers we also find that undertaking innovations, enhancing productivity and product only innovation have a positive impact on skilled workers, with the highest impact of product innovation. All the test of correct specification indicates that the instruments and the model are adequate. For both variables, size has a positive impact while age and foreign ownership of capital are not significant, and exporting firms have a positive effect only for total employment.

In Table 7, we present the results for average wages and the share of skilled workers. We find no significant effects of innovation variables for average wages and for the share of skilled labor except for product only innovation that shows a significant positive effect for skilled workers. Nevertheless, when we examine exogeneity we find that average wages for the innovation variables tested are exogenous while for the share of skilled labor also innovation variables are exogenous, except for product only innovation. Thus, if variables were exogenous the results from OLS would apply.

In Table 8, we present the results for growth of total employment and growth in skilled labor. For growth in total employment we find a not significant effect of innovation while for growth in skilled labor any type of innovation and enhancing productivity innovation have positive and significant effects.

Nevertheless, when testing for endogeneity we find that for the innovation variables analyzed they seem to be exogenous according to the exogeneity tests. Thus, again, we will rely on the OLS models.

We also analyze the ratio of skilled to unskilled workers defined as professional and technicians over workers in production activities, but have not found any significant effects of innovation. The results for the growth in the share of skilled labor show positive effects of any type of innovation, enhancing productivity innovation and product only innovation, with the highest effect for product only innovation. We report the previous results in Table 9.

Then, we study the impact of innovation on average wages of professionals and technicians and again find no effects.<sup>8</sup>

Finally, we perform tests of exogeneity of the innovation variables for each innovation variable and specification. To this aim, we use the `endogtest` option that comes with the `ivxtreg2` routine and has the advantage that it is robust to violations of conditional homoscedasticity. Thus, it is safer than the commonly used Wu-Hausman F-test. In Table 10 we present the results of the exogeneity tests finding that only for the share of skilled labor and product innovation only the variable is endogenous. Thus we will rely on the results of OLS.

## **5. Manufacturing and Service Firms according to technology/knowledge content and size**

### **5.1. Manufacturing firms according to technology intensity and size**

Now we split the sample for manufactures and services according to the technological intensity for manufactures and knowledge intensity for services. We also split the sample according to firms' size for manufactures and services.

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<sup>8</sup> Results are available upon request from the authors.

For manufactures we classified the sectors in high and low technological intensity according to the expenditure in innovation as a share of turnover as Aboal et al. (2015).<sup>9</sup> In Appendix we present the classification.

We define small and medium size firms (SMEs) are those with 49 or less employees.

Some features for low and high-tech intensive firms in manufacturing industries are presented in Table 11.1. We observe that high-tech firms undertake all type of innovative activities more frequently than low-tech firms and the whole sample of manufacturing firms. Moreover, they are bigger in terms of sales and employment, tend to have a higher presence of exporting firms and have a higher share of foreign firms. Finally, high-tech manufacturing firms also show a higher growth in skilled labor and a lower reduction in total employment.

Regarding to the features of manufacturing firms according to size big firms undertake all types of innovative activities more frequently than SMEs firms, are older and show a higher presence of exporting and foreign firms. Furthermore, they show a higher growth in skilled labor and total employment per firm (Table 11.2).

Due to space reason we restrict our analysis to growth in total employment, in skilled labor, and in the share of skilled labor in total employment, expressed in natural logarithm by means of OLS since we find no endogeneity issues.

#### **5.1.1. Effects of innovation on employment demand according to technological intensity**

For Manufactures we observe that any type of innovation has not significant effect on the whole sample of manufacturing firms, neither for firms in high-tech and low-tech sectors for growth in total employment. Nevertheless, product innovation has a positive effect for the whole sample as well as for high-tech firms. Also, product only innovation shows positive effect on high tech sectors for total employment growth.

Finally, for growth in total employment we do not find any significant effects of innovation for firms in low-tech sectors. Results are presented in Table 12.1.

When we analyzed growth in skilled labor (Table 12.2) we observe positive effects of innovation of any type, of product innovation, organizational innovation, and enhancing productivity innovation for firms in high-tech sectors.

Thus, it seems that growth in skilled labor in high-tech sector is much more responsive to innovation. While in low-tech sectors only organizational innovation has positive effect on the demand for skilled labor.

For growth in the share of skilled labor (Table 12.3) we observe positive effects of any type of innovation, organizational innovation, organizational only innovation and enhancing productivity innovation for the whole sample of manufacturing firms. For

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<sup>9</sup> Sectors below equal or below the median are classified as low-technological sectors and those above the median as high-technological intensive sectors.

high-tech firms there are positive effects of any type of innovation, organizational innovation and productivity enhancing innovation on the growth of the share of skilled labor in total employment. Finally, for low-tech firms only organizational innovation has positive significant effects.

### ***5.1.2. Effects of innovation on employment according to firm size***

When we split the sample of manufacturing firms according to firms' size we find that small firms growth in total employment is not affected by innovation, while product innovation has a positive effect on big firms (as well as for the whole sample) as can be observed in Table 13.1.

As regards to growth in skilled labor we observe positive and significant effects of any type of innovation and enhancing productivity innovation for the whole sample and for big firms. Small firms seem not to be affected by innovation (Table 13.2).

For growth in the share of skilled labor in the subsample of big firms any type of innovation, organizational innovation organizational only innovation and productivity enhancing innovation have positive significant effect on growth of the share of skilled labor. For small firms only organizational innovation only has any positive effect of growth in the share of skilled labor (Table 13.3).

## ***5.2. Services firms***

We follow the literature (Eurostat, Table 1, n.d. ; Schnabl & Zenker, n.d.), and classified as knowledge intensive (instead of high tech) those firms that are above the median in the share of professional and technicians in total employment. Low intensive are those firms below the median in the sample of service firms. In Table 1 of Appendix 3 we present the classification (definition 1).

First, we observe some features of high knowledge intensive firms (KIs) firms in Table 14.1. Similarly, to high-tech firms for manufacturing sectors, we observe that high knowledge intensive firms undertake all type of innovative activities more frequently than low-tech firms and the whole sample of service firms. Moreover, they are bigger in terms of sales and employment, tend to have a higher presence of exporting firms and have a higher share of foreign firms. Finally they also show a higher growth in total employment and skilled labor.

As regards to size, in Table 14.2 we observe that big firms have a higher frequency in undertaking all types of innovative activities, except for product innovation. Similarly to big firms in manufacturing industries, big firms are older and show a higher presence of exporting and foreign firms. Furthermore, they show a higher growth in skilled labor and total employment per firm.

### ***5.2.1. Knowledge intensive and Low-knowledge intensive firms***

For the whole sample of service firms we find positive effect of any type of innovation, organizational innovation and enhancing productivity innovations on growth of total employment (Table 15.1). While for knowledge intensive sectors there is also positive effect of any type of innovation, organizational innovation and enhancing productivity innovations, and product innovation. Also we observe a higher coefficients for knowledge intensive sectors than for the whole sample, and particularly for product and organizational innovations, for growth in total employment.

For firms in knowledge intensive sectors we observe positive effects on the growth of skilled labor of any type of innovation, product innovation and enhancing productivity innovations. While, for knowledge intensive sectors only any type of innovation has positive and significant effects on growth of skilled labor (Table 15.2).

For the whole sample of service firms we find that undertaking any type of innovation, organizational innovation, organizational innovation only, and productivity enhancing innovation have positive significant effects on the growth of the share of skilled labor. For the sub-sample of high knowledge intensive sectors there are no significant effects of innovation but for low knowledge intensive services the behavior is similar to that of the whole sample, with positive effects of any type of innovation, organizational innovation and productivity enhancing innovation (see Table 15.3).

For low knowledge intensive firms we find that undertaking any type of innovative activity, organizational and organizational only innovation as well as productivity enhancing innovation have positive effects on growth of skilled labor.

It is important to note that organizational along with enhancing productivity innovation seems to play a role on employment growth in the service sector.

### ***5.2.2. Effects of innovation on employment according to firm size***

When we split the services sector into small and big firms for growth in total employment, we find that for the whole service sector any type of innovation, organizational innovation and enhancing productivity innovation have a positive impact on employment growth. While for small firms only product innovation has a positive effect on total employment growth and we observe no effects of innovation on growth in total employment for firms with more than 50 employees (Table 16.1).

Regarding to growth in skilled labor for the whole sample of service sector firms we find positive effects of any type of innovation, product innovation and productivity enhancing innovation. For big firms these variables have also positive effects as well as enhancing productivity innovations. Finally, for small firms we do not observe any significant effect of innovation on growth of skilled labor (Table 16.2).

For growth in the share of skilled labor, any type of innovation, organizational innovation, organizational only innovation, and productivity enhancing innovation have positive effects on big firms but small firms do not show any significant effect of innovation (Table 16.3).

In Table 17 we present summary results for manufacturing and service sectors according to knowledge intensity and size.

## **6. Concluding remarks**

Our preliminary results indicate some evidence that innovation has a positive effect on the level and the rate of growth of employment and skilled labor. Product innovation seems to be the type of innovation with a positive impact on the level of total employment and skilled workers. Moreover, there is also some evidence that undertaking productivity enhancing innovation, and more than one type of innovation is beneficial for employment, skill composition and the rate of growth in total employment and skilled labor.

Product innovation seems to have a high positive impact in particular on skilled labor. Average wages seem to be positively affected by innovation with product innovation with the highest effect according to the OLS estimation. On the other hand the share of skilled labor on total employment is affected positively by innovation with a high effect of product only innovations.

Splitting by manufacturing firms we observe that product innovation affect growth in employment for high-tech firms while organizational innovation and productivity enhancing innovation affects growth in skilled labor with a greater effect for low-tech firms, while organizational innovation affects growth in skilled labor and in the share of skilled labor. Small manufacturing and service firms are less responsive to innovation. Growth in employment of service firms are affected mainly by organizational innovation and productivity enhancing innovation. Thus, enhancing productivity innovation and its component of organizational innovation seems to play an important role on employment growth.

Thus, we can say in few words that innovation is not detrimental to labor but all the opposite, while inequality should be further analyzed, since we find evidence of a higher effect on skilled labor, though innovation seems to be associate with a higher demand of skilled workers and higher average wages.



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Table 1.1: Share of firms undertaking innovation activities (period 2000-2015)

Variable	Mean	Std. Dev	No. Obs.	Min	Max
Innovation (product and/or process)	0.4224	0.4940	9554	0	1
Process Innovation	0.2886	0.4531	9554	0	1
Product Innovation	0.2297	0.4207	9554	0	1
Organizational Innovation	0.2376	0.4256	9554	0	1
Proces Innovation Only	0.0715	0.2577	9554	0	1
Product Innovation Only	0.0403	0.1967	9554	0	1
Enhancing Productivity Innovation	0.3732	0.4837	9554	0	1

Notes: Own elaboration based on surveys information provided by ANII.

Table 1.2: Correlation between different types of innovation, period 2000-2015

	Innovation	Process Innovation	Product Innovation	Organizational Inn.	Enhancing Productivity	Process Only	Product Only
Innovation	1						
Process Innovation	0.7447	1					
Product Innovation	0.6386	0.5176	1				
Organizational Inn.	0.6527	0.4374	0.3949	1			
Enhancing Productivity Inn.	0.9023	0.8253	0.5097	0.7234	1		
Process Only	0.3244	0.4357	-0.1515	-0.1549	0.3596	1	
Product Only	0.2396	-0.1305	0.3752	-0.1144	-0.1581	-0.0569	1

Notes: Own elaboration based on surveys information provided by ANII.

Table 1.3: Some features by innovation status and type, whole sample

	Total Emp	Skilled	Sales	Share Skilled	Growth in Emp	Growth SL	Growth Share SL
<b>Non-Innovators</b>							
Mean	74	17	91082.34	0.1456	94.99	37.64	-170.88
Sd	224	188	453205.8	0.3023	877.12	882.66	5660.42
No. Obs.	5518	5518	5518	5495	5504	2955	1850
<b>Innovators</b>							
Mean	192	55	414225.4	0.2097	217.00	472.69	280.90
Sd	596	371	3207142	0.3024	2807.83	11611.80	5619.93
No. Obs.	4036	4036	4036	4034	4024	2819	2383
<b>Total</b>							
Mean	124	33	227591.2	0.1727	146.5213	250.0448	83.46
Sd	427	281	2118632	0.3040	1943.50	8140.21	5641.45
No. Obs.	9554	9554	9554	9529	9528	5774	4233

Notes: Own elaboration based on surveys provided by the ANII; sd: standard deviation; No.Obs.: number of observations

Table 1.4: Innovation status and type of innovation by Manufacturing and Services firms

<b>Manufactures</b>	Innovation	Process Innovation	Product Innovation	Organizational Innovation	Process Only Innovation	Product Only Innovation	Org Inn Only	Enhancing Productivity Innovation
Mean	0.4595	0.345	0.2701	0.2485	0.0798	0.0384	0.0463	0.4107
Sd	0.4984	0.4754	0.444	0.4322	0.271	0.1921	0.2102	0.492
N	5162	5162	5162	5162	5162	5162	5162	5162
<b>Services</b>	Innovation	Process Innovation	Product Innovation	Organizational Innovation	Process Only Innovation	Product Only Innovation	Org Inn Only	Enhancing Productivity Innovation
Mean	0.3789	0.2222	0.1824	0.2247	0.0617	0.0426	0.0765	0.3292
Sd	0.4852	0.4158	0.3862	0.4174	0.2406	0.2019	0.2658	0.47
N	4392	4392	4392	4392	4392	4392	4392	4392
<b>Total</b>	Innovation	Process Innovation	Product Innovation	Organizational Innovation	Process Only Innovation	Product Only Innovation	Org Inn Only	Enhancing Productivity Innovation
Mean	0.4224	0.2886	0.2297	0.2376	0.0715	0.0403	0.0602	0.3732
Sd	0.494	0.4531	0.4207	0.4256	0.2577	0.1967	0.2378	0.4837
N	9554	9554	9554	9554	9554	9554	9554	9554

Notes: Own elaboration based on surveys provided by the ANII; sd: standard deviation; No.Obs: number of observations

Table 1.5: Some features by innovation status for manufacturing firms

<i>Non-Innovators</i>	Total Emp	Skilled	Sales	Share Skilled	Growth Emp	Growth in SL	Growth sales	Growth Share SL
Mean	53.59	3.62	89,471	0.08	0.47	-0.21	6.82	0.23
Sd	101.64	10.89	447,727	0.19	5	1.51	226.28	49.48
No. Obs.	2,790	2,790	2,790	2,786	2,786	1,372	2,782	808
<i>Innovators</i>	Total Emp	Skilled	Sales	Share Skilled	Growth Emp	Growth in SL	Growth sales	Growth Share SL
Mean	125.71	12.33	389,329	0.12	1.02	0.45	15,441	0.2
Sd	231.64	34.68	3,206,080	0.17	5.7	3.02	750,008	51.49
No. Obs.	2,372	2,372	2,372	2,371	2,364	1,629	2,362	1,343
<i>Total</i>	Total Emp	Skilled	Sales	Share Skilled	Growth Emp	Growth SL	Growth sales	Growth Share SL
Mean	86.73	7.62	227,259	0.1	0.72	0.15	7,094	0.21
Sd	177.56	25.21	2,202,926	0.18	5.34	2.47	508,224	50.74
No. Obs.	5,162	5,162	5,162	5,157	5,150	3,001	5,144	2,151

Notes: Own elaboration based on surveys provided by the ANII; sd: standard deviation; No.Obs: number of observations

Table 1.6: Some features by innovation status for Services firms

<i>Non-Innovators</i>	Total Emp	Skilled	Sales	Share Skilled	Growth Emp	Growth SL	Growth sales	Growth Share SL
Mean	94.16	31.02	92730.75	0.21	1.44	0.88	12.08	-3.21
Sd	300.23	266.07	458817.6	0.38	11.39	11.96	145.13	61.55
No. Obs.	2728	2728	2728	2709	2718	1583	2698	1042
<i>Innovators</i>	Total Emp	Skilled	Sales	Share Skilled	Growth Emp	Growth SL	Growth sales	Growth Share SL
Mean	287.08	116.71	449715.3	0.33	3.81	10.58	12.96	6.18
Sd	877	570.59	3209286	0.39	43.14	178.56	106.17	61.61
No. Obs.	1664	1664	1664	1663	1660	1190	1645	1040
<i>Total</i>	Total Emp	Skilled	Sales	Share Skilled	Growth Emp	Growth SL	Growth sales	Growth Share SL
Mean	167.25	63.48	227981.7	0.26	2.34	5.04	12.41	1.48
Sd	596.69	411.1	2015307	0.39	28.06	117.39	131.72	61.74
No. Obs.	4392	4392	4392	4372	4378	2773	4343	2082

Notes: Own elaboration based on surveys provided by the ANII; sd: standard deviation; No.Obs: number of observatio

Table 2.1: Effects of innovation on total employment and skilled workers, OLS, whole sample

VARIABLES	Ln Total Employment				Ln Skilled Employment			
	(1) Emp	(2) Emp	(3) Emp	(4) Emp	(1) Skilled	(2) Skilled	(3) Skilled	(4) Skilled
Innovation dummy	0.200*** (0.0247)				0.236*** (0.0318)			
Product Innovation		0.0247 (0.0275)				0.141*** (0.0431)		
Process Innovation		0.119*** (0.0261)				0.298*** (0.0403)		
Organizational Innovation		0.176*** (0.0260)				0.248*** (0.0384)		
Product Only Innovation			-0.00553 (0.0442)				0.0502 (0.0569)	
Process Only Innovation			0.0569 (0.0348)				2.78e-05 (0.0441)	
Organizational Only Innovation			0.0920** (0.0403)				0.0314 (0.0470)	
Enhancing Innovation				0.209*** (0.0244)				0.219*** (0.0307)
Age	0.00288*** (0.000928)	0.00286*** (0.000916)	0.00295*** (0.000963)	0.00288*** (0.000930)	0.00674*** (0.00106)	0.0140*** (0.00131)	0.00690*** (0.00107)	0.00675*** (0.00106)
Foreign Capital	-0.0884 (0.0547)	-0.0863 (0.0545)	-0.0935* (0.0554)	-0.0887 (0.0547)	0.151*** (0.0528)	0.559*** (0.0578)	0.144*** (0.0536)	0.149*** (0.0530)
Exporting Firms	-0.0331 (0.0366)	-0.0338 (0.0365)	-0.0143 (0.0370)	-0.0295 (0.0365)	0.107** (0.0425)	0.447*** (0.0463)	0.123*** (0.0433)	0.111*** (0.0427)
Ln Sales	0.506*** (0.0141)	0.505*** (0.0141)	0.519*** (0.0139)	0.506*** (0.0141)	0.369*** (0.0173)		0.384*** (0.0171)	0.371*** (0.0172)
Constant	-1.546*** (0.135)	-1.551*** (0.134)	-1.600*** (0.135)	-1.545*** (0.134)	-2.880*** (0.182)	0.680*** (0.0678)	-2.913*** (0.184)	-2.886*** (0.181)
Observations	8,693	8,693	8,693	8,693	5,495	5,519	5,495	5,495
R-squared	0.597	0.598	0.593	0.597	0.572	0.418	0.566	0.571
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Table 2.2: Effects of innovation on wages and the share of skilled workers, OLS, whole sample

VARIABLES	Ln Average Wages				Ln Share of Skilled Workers			
	(1) Ln Avg Wages	(2) Ln Avg Wages	(3) Ln Avg Wages	(4) Ln Avg Wages	(1) Skilled Share Logs	(2) Skilled Share Logs	(3) Skilled Share Logs	(4) Skilled Share Logs
Innovation dummy	0.0887*** (0.0232)				0.0623* (0.0326)			
Product Innovation		0.0451* (0.0258)				0.0693** (0.0351)		
Process Innovation		0.0355 (0.0246)				0.0483 (0.0328)		
Organizational Innovation		0.00459 (0.0237)				-0.0290 (0.0347)		
Product Only Innovation			0.153*** (0.0452)				0.0941 (0.0577)	
Process Only Innovation			0.0244 (0.0316)				0.0168 (0.0428)	
Organizational Only Innovation			0.0340 (0.0413)				-0.0247 (0.0545)	
Enhancing Innovation				0.0527** (0.0229)				0.0394 (0.0311)
Age	0.00186*** (0.000635)	0.00185*** (0.000634)	0.00186*** (0.000643)	0.00186*** (0.000641)	0.00170* (0.000870)	0.00168* (0.000869)	0.00173** (0.000871)	0.00171** (0.000871)
Foreign Capital	0.317*** (0.0411)	0.317*** (0.0414)	0.313*** (0.0411)	0.316*** (0.0413)	0.242*** (0.0566)	0.243*** (0.0565)	0.240*** (0.0565)	0.241*** (0.0566)
Exporting Firms	0.0197 (0.0317)	0.0181 (0.0319)	0.0252 (0.0321)	0.0224 (0.0318)	0.197*** (0.0427)	0.193*** (0.0427)	0.200*** (0.0428)	0.200*** (0.0427)
Ln Sales	0.199*** (0.0158)	0.201*** (0.0159)	0.205*** (0.0156)	0.202*** (0.0159)	-0.146*** (0.0138)	-0.145*** (0.0138)	-0.142*** (0.0136)	-0.144*** (0.0138)
Constant	9.035*** (0.152)	9.024*** (0.153)	9.004*** (0.153)	9.021*** (0.153)	-1.199*** (0.144)	-1.205*** (0.144)	-1.206*** (0.144)	-1.202*** (0.144)
Observations	3,300	3,300	3,300	3,300	5,495	5,495	5,495	5,495
R-squared	0.574	0.573	0.573	0.572	0.322	0.322	0.321	0.321
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.10

Table 2.3: Table Effects of Innovation on employment and skilled workers growth, OLS, whole sample

VARIABLES	Ln Growth in Total Employment				Ln Growth in Skilled Employment			
	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL
Innovation dummy	3.907*** (1.216)				8.197*** (1.988)			
Product Innovation		3.779** (1.598)				5.713** (2.297)		
Process Innovation		0.714 (1.493)				0.679 (2.333)		
Organizational Innovation		3.261** (1.475)				5.241** (2.241)		
Product Only Innovation			0.788 (2.703)				1.469 (3.814)	
Process Only Innovation			-1.179 (2.060)				-0.855 (3.323)	
Organizational Only Innovation			1.306 (2.353)				10.27*** (3.840)	
Enhancing Innovation				3.809*** (1.226)				7.473*** (1.948)
Age	-0.0288 (0.0236)	-0.0291 (0.0238)	-0.0272 (0.0231)	-0.0286 (0.0236)	0.0475 (0.0395)	0.0480 (0.0397)	0.0545 (0.0397)	0.0473 (0.0395)
Foreign Capital	-4.712** (1.912)	-4.663** (1.908)	-4.799** (1.921)	-4.723** (1.912)	-1.074 (2.235)	-1.002 (2.227)	-1.227 (2.251)	-1.122 (2.238)
Exporting Firms	-6.297*** (1.429)	-6.469*** (1.437)	-5.930*** (1.430)	-6.208*** (1.428)	2.320 (2.085)	2.134 (2.102)	2.915 (2.090)	2.406 (2.088)
Ln Sales	6.865*** (0.366)	6.823*** (0.364)	7.152*** (0.355)	6.883*** (0.363)	6.321*** (0.653)	6.423*** (0.651)	6.759*** (0.646)	6.390*** (0.651)
Constant	-76.89*** (3.805)	-77.00*** (3.794)	-78.16*** (3.790)	-76.97*** (3.797)	-61.97*** (8.293)	-63.38*** (8.305)	-62.82*** (8.330)	-62.19*** (8.291)
Observations	8,674	8,674	8,674	8,674	4,065	4,065	4,065	4,065
R-squared	0.095	0.096	0.094	0.095	0.101	0.102	0.099	0.101
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 2.4: Effects of Innovation on total employment and skilled workers, OLS, whole sample

VARIABLES	Ratio Skilled to Unskilled Employment				Ln Growth Share Skilled Employment			
	(1) Skilled to Unskilled	(2) Skilled to Unskilled	(3) Skilled to Unskilled	(4) Skilled to Unskilled	(1) Ln Growth ShSL	(2) Ln Growth ShSL	(3) Ln Growth ShSL	(4) Ln Growth ShSL
Innovation dummy	0.0528 (0.100)				4.566** (1.804)			
Product Innovation		0.0139 (0.188)				2.324 (2.028)		
Process Innovation		0.00372 (0.166)				-1.449 (2.073)		
Organizational Innovation		-0.0428 (0.126)				3.861* (1.994)		
Product Only Innovation			0.505 (0.440)				2.531 (3.913)	
Process Only Innovation			0.165 (0.228)				0.483 (2.707)	
Organizational Only Innovation			0.0306 (0.211)				12.53*** (3.395)	
Enhancing Innovation				-0.0359 (0.105)				4.123** (1.778)
Age	0.00186 (0.00148)	0.00186 (0.00148)	0.00185 (0.00148)	0.00186 (0.00148)	0.0807** (0.0330)	0.0829** (0.0330)	0.0853*** (0.0330)	0.0806** (0.0330)
Foreign Capital	0.273* (0.144)	0.271* (0.144)	0.273* (0.146)	0.271* (0.143)	2.696 (2.038)	2.712 (2.036)	2.627 (2.033)	2.668 (2.038)
Exporting firm	-0.0540 (0.0806)	-0.0508 (0.0833)	-0.0607 (0.0826)	-0.0484 (0.0816)	6.126*** (1.893)	6.188*** (1.902)	6.479*** (1.890)	6.176*** (1.894)
Ln Sales	0.0518 (0.0407)	0.0581 (0.0406)	0.0530 (0.0374)	0.0597 (0.0410)	-1.179** (0.529)	-1.046** (0.528)	-0.989* (0.511)	-1.138** (0.526)
Constant	-0.523 (0.379)	-0.554 (0.381)	-0.526 (0.367)	-0.565 (0.382)	32.34*** (6.767)	31.45*** (6.757)	32.07*** (6.742)	32.22*** (6.763)
Observations	4,720	4,720	4,720	4,720	4,065	4,065	4,065	4,065
R-squared	0.250	0.250	0.251	0.250	0.063	0.063	0.065	0.063
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.1: OLS estimations for Manufactures, dependent variables total employment and skilled workers in natural logarithm

VARIABLES	(1) Employment	(2) Employment	(3) Employment	(4) Employment	(1) Skilled	(2) Skilled	(3) Skilled	(4) Skilled
Innovation dummy	0.178*** (0.0299)				0.270*** (0.0350)			
Product Innovation		0.0517* (0.0313)				0.132*** (0.0402)		
Process Innovation		0.0863*** (0.0317)				0.103*** (0.0382)		
Organizational Innovation		0.132*** (0.0296)				0.168*** (0.0345)		
Product Only Innovation			0.0585 (0.0545)				0.119 (0.0729)	
Process Only Innovation			0.0414 (0.0390)				-1.57e-05 (0.0499)	
Organizational Only Innovation			0.0971* (0.0530)				0.109* (0.0588)	
Enhancing Productivity Innovation				0.176*** (0.0293)				0.248*** (0.0352)
Age	0.00209** (0.000888)	0.00208** (0.000881)	0.00210** (0.000910)	0.00210** (0.000895)	0.00392*** (0.00104)	0.00383*** (0.00103)	0.00405*** (0.00106)	0.00397*** (0.00104)
Foreign Capital	-0.0129 (0.0653)	-0.00811 (0.0648)	-0.0188 (0.0659)	-0.0143 (0.0652)	0.265*** (0.0646)	0.273*** (0.0638)	0.256*** (0.0655)	0.262*** (0.0648)
Exporting Firms	0.108** (0.0431)	0.107** (0.0431)	0.121*** (0.0435)	0.112*** (0.0431)	0.130** (0.0529)	0.122** (0.0527)	0.143*** (0.0542)	0.134** (0.0532)
Ln Sales	0.478*** (0.0157)	0.478*** (0.0156)	0.491*** (0.0154)	0.478*** (0.0156)	0.279*** (0.0175)	0.281*** (0.0173)	0.298*** (0.0176)	0.281*** (0.0174)
Constant	-1.279*** (0.149)	-1.289*** (0.149)	-1.342*** (0.150)	-1.280*** (0.149)	-1.816*** (0.179)	-1.850*** (0.178)	-1.874*** (0.181)	-1.819*** (0.179)
Observations	4,367	4,367	4,367	4,367	2,672	2,672	2,672	2,672
R-squared	0.673	0.673	0.669	0.673	0.490	0.493	0.476	0.488
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.2: OLS estimations for Manufactures, dependent variables average wages and share of skilled workers in natural logarithm

VARIABLES	Ln Avg Wages				Ln Share Skilled Employment			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Avg Wages	Avg Wages	Avg Wages	Avg Wages	Skilled Share Logs	Skilled Share Logs	Skilled Share Logs	Skilled Share Logs
Innovation dummy	0.0523* (0.0272)				0.110*** (0.0389)			
Product Innovation		0.0210 (0.0296)				0.0364 (0.0394)		
Process Innovation		0.0236 (0.0287)				0.0553 (0.0418)		
Organizational Innovation		0.00748 (0.0262)				0.0462 (0.0390)		
Product Only Innovation			0.0981* (0.0539)				0.0722 (0.0732)	
Process Only Innovation			-0.00352 (0.0360)				0.0223 (0.0521)	
Organizational Only Innovation			-0.00983 (0.0554)				0.0622 (0.0724)	
Enhancing Productivity Innovation				0.0248 (0.0264)				0.0953** (0.0379)
Age	0.00155*** (0.000549)	0.00155*** (0.000548)	0.00154*** (0.000551)	0.00155*** (0.000552)	-0.000594 (0.00110)	-0.000611 (0.00110)	-0.000539 (0.00110)	-0.000570 (0.00110)
Foreign Capital	0.275*** (0.0449)	0.275*** (0.0450)	0.273*** (0.0449)	0.274*** (0.0450)	0.258*** (0.0727)	0.260*** (0.0725)	0.254*** (0.0724)	0.257*** (0.0727)
Exporting Firms	-0.0348 (0.0329)	-0.0358 (0.0330)	-0.0331 (0.0330)	-0.0336 (0.0329)	0.0601 (0.0525)	0.0584 (0.0526)	0.0655 (0.0531)	0.0623 (0.0526)
Ln Sales	0.220*** (0.0113)	0.222*** (0.0113)	0.225*** (0.0112)	0.223*** (0.0113)	-0.187*** (0.0196)	-0.186*** (0.0195)	-0.180*** (0.0193)	-0.186*** (0.0195)
Constant	8.861*** (0.112)	8.857*** (0.112)	8.836*** (0.112)	8.849*** (0.112)	-0.601*** (0.193)	-0.611*** (0.193)	-0.621*** (0.193)	-0.603*** (0.192)
Observations	2,081	2,081	2,081	2,081	2,672	2,672	2,672	2,672
R-squared	0.524	0.524	0.524	0.523	0.296	0.296	0.294	0.295
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.3: OLS estimations for Manufactures, dependent variables growth in total employment and growth of skilled workers in natural logarithm

VARIABLES	Ln Growth Total Employment				Ln Growth Skilled Employment			
	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL
Innovation dummy	2.423* (1.418)				4.342* (2.417)			
Product Innovation		3.314* (1.726)				4.371 (2.736)		
Process Innovation		-0.290 (1.668)				-2.082 (2.839)		
Organizational Innovation		1.662 (1.638)				6.296** (2.575)		
Product Only Innovation			2.552 (2.975)				1.329 (4.602)	
Process Only Innovation			-2.231 (2.224)				-1.763 (3.779)	
Organizational Only Innovation			0.228 (2.878)				7.198 (4.554)	
Enhancing Productivity Innovation				1.831 (1.413)				4.475* (2.372)
Age	-0.0149 (0.0225)	-0.0152 (0.0226)	-0.0150 (0.0224)	-0.0148 (0.0224)	0.142*** (0.0433)	0.139*** (0.0432)	0.145*** (0.0431)	0.143*** (0.0432)
Foreign Capital	-4.704** (2.212)	-4.563** (2.213)	-4.711** (2.218)	-4.737** (2.213)	-2.965 (2.321)	-2.644 (2.315)	-2.976 (2.330)	-2.995 (2.323)
Exporting Firms	-3.165* (1.661)	-3.339** (1.674)	-3.040* (1.657)	-3.083* (1.659)	1.665 (2.518)	1.455 (2.530)	1.931 (2.511)	1.681 (2.515)
Ln Sales	5.923*** (0.481)	5.935*** (0.483)	6.161*** (0.464)	5.976*** (0.479)	5.311*** (0.828)	5.408*** (0.833)	5.604*** (0.803)	5.319*** (0.828)
Constant	-67.90*** (4.832)	-68.22*** (4.858)	-69.17*** (4.789)	-68.15*** (4.827)	-49.72*** (10.01)	-51.88*** (10.09)	-50.88*** (9.998)	-49.83*** (10.02)
Observations	4,361	4,361	4,361	4,361	2,002	2,002	2,002	2,002
R-squared	0.088	0.088	0.087	0.087	0.088	0.091	0.087	0.088
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.4: OLS estimations for Manufactures, dependent variables ratio of skilled to unskilled workers and growth of the share of skilled workers

VARIABLES	Ratio Skilled to Unskilled Employment				Ln Growth Share of Skilled Employment			
	(1) Skilled to Unskilled	(2) Skilled to Unskilled	(3) Skilled to Unskilled	(4) Skilled to Unskilled	(1) Growth Sh SL	(2) Growth Sh SL	(3) Growth Sh SL	(4) Growth Sh SL
Innovation dummy	0.0888*** (0.0177)				4.604** (1.934)			
Product Innovation		0.0624* (0.0328)				0.887 (2.147)		
Process Innovation		0.0487** (0.0241)				-1.505 (2.275)		
Organizational Innovation		0.0142 (0.0279)				6.634*** (2.206)		
Product Only Innovation			0.0675 (0.0522)				0.134 (4.115)	
Process Only Innovation			-0.0115 (0.0337)				1.047 (2.639)	
Organizational Only Innovation			-0.00205 (0.0317)				11.58*** (3.975)	
Enhancing Productivity Innovation				0.0771*** (0.0185)				5.127*** (1.954)
Age	-8.47e-05 (0.000187)	-8.69e-05 (0.000188)	-8.94e-05 (0.000186)	-8.11e-05 (0.000186)	0.0534 (0.0353)	0.0528 (0.0352)	0.0581* (0.0350)	0.0539 (0.0353)
Foreign Capital	0.142 (0.0914)	0.143 (0.0913)	0.142 (0.0919)	0.140 (0.0915)	4.360** (2.190)	4.489** (2.194)	4.167* (2.195)	4.357** (2.190)
Exporting Firms	0.00256 (0.0366)	-0.000363 (0.0377)	0.00601 (0.0366)	0.00473 (0.0367)	1.957 (1.937)	2.161 (1.943)	2.373 (1.929)	1.946 (1.928)
Ln Sales	-0.00564 (0.00672)	-0.00513 (0.00664)	0.00274 (0.00662)	-0.00435 (0.00660)	-2.369*** (0.706)	-2.238*** (0.707)	-2.101*** (0.683)	-2.383*** (0.707)
Constant	0.120** (0.0614)	0.118* (0.0611)	0.0752 (0.0607)	0.114* (0.0610)	-29.21*** (9.835)	-31.31*** (9.745)	-30.06*** (9.749)	-29.38*** (9.837)
Observations	3,642	3,642	3,642	3,642	2,099	2,099	2,099	2,099
R-squared	0.109	0.110	0.104	0.107	0.143	0.144	0.144	0.143
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Tables 4.1: OLS estimations for Services, dependent variables total employment and skilled workers in natural logarithm

VARIABLES	Ln Total Employment				Ln Skilled Employment			
	(1) Employment	(2) Employment	(3) Employment	(4) Employment	(1) Skilled	(2) Skilled	(3) Skilled	(4) Skilled
Innovation dummy	0.229*** (0.0384)				0.211*** (0.0504)			
Product Innovation		-0.00534 (0.0469)				0.0752 (0.0592)		
Process Innovation		0.157*** (0.0418)				0.197*** (0.0506)		
Organizational Innovation		0.228*** (0.0420)				0.0969* (0.0514)		
Product Only Innovation			-0.0625 (0.0679)				-0.0115 (0.0838)	
Process Only Innovation			0.0758 (0.0623)				0.0184 (0.0773)	
Organizational Only Innovation			0.0969* (0.0574)				-0.0318 (0.0663)	
Enhancing Productivity Innovation				0.249*** (0.0383)				0.196*** (0.0483)
Age	0.00473*** (0.00145)	0.00463*** (0.00143)	0.00499*** (0.00149)	0.00469*** (0.00146)	0.0103*** (0.00175)	0.0101*** (0.00171)	0.0104*** (0.00177)	0.0102*** (0.00175)
Foreign Capital	-0.147* (0.0889)	-0.149* (0.0887)	-0.150* (0.0902)	-0.146 (0.0888)	0.0894 (0.0838)	0.0918 (0.0835)	0.0846 (0.0851)	0.0885 (0.0841)
Exporting Firms	-0.226*** (0.0613)	-0.230*** (0.0610)	-0.200*** (0.0622)	-0.223*** (0.0612)	0.256*** (0.0726)	0.248*** (0.0721)	0.275*** (0.0732)	0.260*** (0.0727)
Ln Sales	0.518*** (0.0228)	0.516*** (0.0228)	0.531*** (0.0225)	0.518*** (0.0228)	0.429*** (0.0281)	0.427*** (0.0279)	0.442*** (0.0277)	0.431*** (0.0280)
Constant	-1.875** (0.808)	-1.898** (0.803)	-1.967** (0.803)	-1.888** (0.808)	-2.854*** (0.333)	-2.810*** (0.340)	-2.899*** (0.335)	-2.820*** (0.341)
Observations	4,326	4,326	4,326	4,326	2,823	2,823	2,823	2,823
R-squared	0.545	0.548	0.541	0.546	0.596	0.598	0.593	0.596
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes		Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Table 4.2: OLS estimations for Services, dependent variables average wages and share of skilled workers in natural logarithm

VARIABLES	Ln Average Wages				Ln Share Skilled Employment			
	(1) Avg Wages	(2) Avg Wages	(3) Avg Wages	(4) Avg Wages	(1) Skilled Share Logs	(2) Skilled Share Logs	(3) Skilled Share Logs	(4) Skilled Share Logs
Innovation dummy	0.140*** (0.0396)				0.0165 (0.0497)			
Product Innovation		0.103** (0.0508)				0.116** (0.0579)		
Process Innovation		0.0551 (0.0450)				0.0574 (0.0497)		
Organizational Innovation		-0.0154 (0.0444)				-0.128** (0.0556)		
Product Only Innovation			0.251*** (0.0824)				0.116 (0.0867)	
Process Only Innovation			0.0788 (0.0613)				0.0237 (0.0684)	
Organizational Only Innovation			0.0732 (0.0603)				-0.0975 (0.0758)	
Enhancing Productivity Innovation				0.0917** (0.0403)				-0.0148 (0.0474)
Age	0.00414*** (0.00145)	0.00413*** (0.00147)	0.00421*** (0.00146)	0.00418*** (0.00146)	0.00484*** (0.00129)	0.00481*** (0.00130)	0.00484*** (0.00129)	0.00486*** (0.00130)
Foreign Capital	0.395*** (0.0786)	0.398*** (0.0792)	0.390*** (0.0788)	0.395*** (0.0794)	0.268*** (0.0854)	0.273*** (0.0851)	0.270*** (0.0850)	0.267*** (0.0854)
Exporting Firms	0.143** (0.0590)	0.144** (0.0600)	0.154*** (0.0587)	0.150** (0.0592)	0.523*** (0.0692)	0.520*** (0.0692)	0.522*** (0.0689)	0.525*** (0.0692)
Ln Sales	0.167*** (0.0316)	0.171*** (0.0319)	0.174*** (0.0316)	0.171*** (0.0318)	-0.111*** (0.0184)	-0.110*** (0.0184)	-0.109*** (0.0182)	-0.109*** (0.0184)
Constant	8.898*** (0.917)	8.825*** (0.919)	8.926*** (0.922)	8.883*** (0.919)	-0.399 (0.464)	-0.408 (0.469)	-0.435 (0.462)	-0.408 (0.468)
Observations	1,219	1,219	1,219	1,219	2,823	2,823	2,823	2,823
R-squared	0.627	0.625	0.625	0.624	0.305	0.308	0.306	0.305
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4.3: OLS estimations for Services, dependent variables growth in total employment and growth of skilled workers in natural logarithm

VARIABLES	Ln Growth Total Employment				Ln Growth Skilled Employment			
	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL
Innovation dummy	5.597*** (1.983)				11.66*** (3.103)			
Product Innovation		4.428 (2.823)				7.315* (3.882)		
Process Innovation		2.600 (2.578)				4.488 (3.779)		
Organizational Innovation		4.619* (2.437)				3.147 (3.712)		
Product Only Innovation			-0.950 (4.484)				1.033 (6.185)	
Process Only Innovation			0.640 (3.812)				1.234 (5.933)	
Organizational Only Innovation			1.833 (3.398)				11.80** (5.662)	
Enhancing Productivity Innovation				6.087*** (2.033)				10.40*** (3.076)
Age	-0.0751 (0.0495)	-0.0775 (0.0497)	-0.0681 (0.0498)	-0.0760 (0.0496)	-0.0548 (0.0701)	-0.0530 (0.0709)	-0.0452 (0.0719)	-0.0575 (0.0703)
Foreign Capital	-4.909 (3.180)	-5.030 (3.169)	-4.974 (3.202)	-4.885 (3.178)	0.821 (4.061)	0.597 (4.058)	0.473 (4.118)	0.756 (4.070)
Exporting Firms	-9.017*** (2.723)	-9.282*** (2.725)	-8.399*** (2.732)	-8.945*** (2.724)	5.782 (3.701)	5.691 (3.733)	6.726* (3.719)	5.949 (3.719)
Ln Sales	7.685*** (0.561)	7.582*** (0.560)	8.012*** (0.552)	7.677*** (0.556)	7.282*** (0.990)	7.438*** (0.987)	7.859*** (0.993)	7.396*** (0.988)
Constant	-87.14*** (28.53)	-86.74*** (28.58)	-89.24*** (28.36)	-87.46*** (28.56)	-42.10*** (9.826)	-43.57*** (9.822)	-48.85*** (9.796)	-43.36*** (9.806)
Observations	4,313	4,313	4,313	4,313	2,063	2,063	2,063	2,063
R-squared	0.089	0.090	0.087	0.089	0.113	0.112	0.109	0.112
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies		Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4.4: OLS estimations for Services, dependent variables ratio of skilled to unskilled workers and growth of the share of skilled workers

VARIABLES	Ratio Skilled to Unskilled Employment				Ln Growth Share of Skilled Employment			
	(1) Skilled to Unskilled	(2) Skilled to Unskilled	(3) Skilled to Unskilled	(4) Skilled to Unskilled	(1) Growth ShSL	(2) Growth ShSL	(3) Growth ShSL	(4) Growth ShSL
Innovation dummy	-0.105 (0.427)				6.374** (2.856)			
Product Innovation		-0.196 (0.913)				0.0876 (3.440)		
Process Innovation		-0.159 (0.743)				3.484 (3.338)		
Organizational Innovation		-0.316 (0.530)				1.757 (3.183)		
Product Only Innovation			2.523 (2.402)				-3.554 (6.278)	
Process Only Innovation			0.922 (1.232)				6.139 (5.167)	
Organizational Only Innovation			0.0166 (0.642)				12.65*** (4.768)	
Enhancing Productivity Innovation				-0.474 (0.463)				6.780** (2.802)
Age	0.0183 (0.0120)	0.0187 (0.0121)	0.0186 (0.0121)	0.0187 (0.0119)	0.0789 (0.0608)	0.0793 (0.0610)	0.0800 (0.0619)	0.0774 (0.0608)
Foreign Capital	1.103* (0.655)	1.085* (0.644)	1.085* (0.629)	1.091* (0.646)	6.656* (3.694)	6.617* (3.704)	6.536* (3.718)	6.690* (3.704)
Exporting Firms	0.401 (0.356)	0.452 (0.377)	0.329 (0.383)	0.457 (0.378)	10.96*** (3.547)	11.15*** (3.552)	11.53*** (3.544)	11.01*** (3.542)
Ln Sales	0.157 (0.167)	0.184 (0.172)	0.143 (0.155)	0.184 (0.171)	-0.964 (0.722)	-0.814 (0.722)	-0.723 (0.706)	-0.966 (0.722)
Constant	-2.366 (1.526)	-2.511 (1.611)	-2.085 (1.456)	-2.635* (1.581)	7.538 (34.46)	7.940 (35.16)	7.950 (35.64)	9.677 (35.12)
Observations	1,078	1,078	1,078	1,078	2,111	2,111	2,111	2,111
R-squared	0.236	0.237	0.240	0.237	0.063	0.062	0.064	0.063
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firm in parenthesis, observations clustered by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.

Table 5: Summary results

Table 5.1: Summary results for the whole sample (manufacturing and service firms)

OLS	ln EMP	ln SL	Ln wages	Ln Share SL	ln growth	
					EMP	ln growth SL
Innovation	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>
Prod Inn.	ns	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>
Proc. Inn	<b>+sign</b>	<b>+sign</b>	ns	ns	ns	ns
Org. Inn	<b>+sign</b>	<b>+sign</b>	ns	ns	+	+
Prod. Only	ns	ns	<b>+sign</b>	<b>+sign</b>	ns	ns
Proc. Only	ns	ns	ns	ns	ns	ns
Org. Only	<b>+sign</b>	ns	ns	ns	ns	+
Enhancing	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>	<b>+sign</b>

Source: Own elaboration. ln EMP: log of total employment, lnSL: log of Skilled Labor; Ln Share SL: log of Share of Skilled Labor; ln growth EMP: log of growth in total employment; ln growth SL: log of growth in skilled labor.

Table 5.2: Summary results for manufacturing and service firms, OLS

	Growth in Employment		Growth in Skilled Labor		Growth in the Share of Skilled Labor	
	Manufacturing	Services	Manufacturing	Services	Manufacturing	Services
Innovation dummy	ns	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>
Product Innovation	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>	ns	ns
Process Innovation	ns	ns	ns	ns	ns	ns
Organizational Innovation	ns	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>
Product Only Innovation	ns	ns	ns	ns	ns	ns
Process Only Innovation	ns	ns	ns	ns	ns	ns
Organizational Only Innovation	ns	ns	ns	ns	ns	ns
Enhancing Innovation	ns	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>

Table 6: Effects of innovation on total employment and skilled workers, Instrumental variable estimation, 2-Step GMM estimation

VARIABLES	Log Total Employment				Log Skilled Workers			
	(1) Log Emp	(2) Log Emp	(3) Log Emp	(4) Log Emp	(5) Log SL	(6) Log SL	(7) Log SL	(8) Log SL
Innovation dummy	0.0662*** (0.0138)				0.108*** (0.0311)			
Enhancing Productivity Innovation		0.0773*** (0.0161)	0.0704*** (0.0135)			0.124*** (0.0357)	0.121*** (0.0305)	
Product Innovation Only			0.0553 (0.0441)	0.624*** (0.142)			0.0359 (0.0811)	1.086*** (0.343)
Age	0.000122 (0.000200)	9.27e-05 (0.000201)	9.63e-05 (0.000201)	0.000144 (0.000228)	-0.00161 (0.00130)	-0.00166 (0.00129)	-0.00166 (0.00129)	-0.00132 (0.00155)
Foreign Capital	-0.0278 (0.0456)	-0.0269 (0.0456)	-0.0273 (0.0456)	-0.0290 (0.0465)	0.0429 (0.0616)	0.0418 (0.0615)	0.0443 (0.0619)	0.0606 (0.0662)
Exporting Firms	0.0759*** (0.0229)	0.0764*** (0.0230)	0.0758*** (0.0229)	0.0689*** (0.0240)	0.0342 (0.0425)	0.0327 (0.0427)		0.0379 (0.0454)
Ln Sales	0.219*** (0.0254)	0.220*** (0.0252)	0.220*** (0.0254)	0.220*** (0.0272)	0.103*** (0.0237)	0.103*** (0.0231)	0.104*** (0.0233)	0.0974*** (0.0298)
Observations	7,393	7,393	7,393	7,393	4,265	4,265	4,265	4,265
R-squared	0.166	0.165	0.166	0.078	0.023	0.026	0.025	-0.190
Number of firms	2,194	2,194	2,194	2,194	1,290	1,290	1,290	1,290
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underidentification KP rk LM	1249	1061	291.6	126.5	752.6	642.5	214.6	69.42
Chi-sq(3) p-val	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Weak Id	7602	1750	225.9	45.97	3736	1072	168.5	24.74
Hansen J	11.46	11.31	11.42	9.621	2.685	2.707	2.769	1.766
Chi-sq(1)P-val	0.00325	0.00350	0.00332	0.00814	0.261	0.258	0.250	0.414

Standard errors in parenthesis, statistics robust to heteroskedasticity and autocorrelation, fixed effects by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7: Effects of innovation on wages and share of skilled workers, Instrumental variable estimation, Two-Step GMM estimation

VARIABLES	Ln Avg Wages				Share of Skilled Worker in Natural Logarithm			
	(1) Ln Avg Wages	(2) Ln Avg Wages	(3) Ln Avg Wages	(4) Ln Avg Wages	(1) Skilled Share	(2) Skilled Share	(3) Skilled Share	(4) Skilled Share
Innovation dummy	-0.0141 (0.0220)				0.0473 (0.0293)			
Enhancing Productivity Innovation		-0.0157 (0.0245)	-0.0169 (0.0214)			0.0549 (0.0337)	-0.0933 (0.280)	
Product Innovation Only			0.0213 (0.0725)	-0.164 (0.329)			1.331 (2.492)	0.510* (0.308)
Age	-0.000884 (0.000713)	-0.000879 (0.000705)	-0.000875 (0.000699)	-0.000928 (0.000757)	-0.00120 (0.00110)	-0.00123 (0.00109)	-0.000782 (0.00167)	-0.00105 (0.00118)
Foreign Capital	0.0323 (0.0413)	0.0347 (0.0412)	0.0348 (0.0412)	0.0315 (0.0417)	0.0564 (0.0647)	0.0562 (0.0647)	0.0803 (0.0829)	0.0658 (0.0657)
Exporting Firms	0.0297 (0.0265)			0.0296 (0.0266)	-0.00804 (0.0412)	-0.00866 (0.0413)	-0.00215 (0.0487)	-0.00640 (0.0419)
Ln Sales	0.128*** (0.0338)	0.129*** (0.0340)	0.129*** (0.0340)	0.130*** (0.0326)	-0.0791*** (0.0218)	-0.0791*** (0.0221)	-0.0854*** (0.0237)	-0.0815*** (0.0206)
Observations	3,188	3,188	3,188	3,188	4,265	4,265	4,265	4,265
R-squared	0.063	0.063	0.063	0.051	0.010	0.011	-0.359	-0.047
Number of firms	1,091	1,091	1,091	1,091	1,290	1,290	1,290	1,290
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underidentification KP rk LM	499.9	434.8	109.5	29.29	752.6	642.5	0.854	69.42
Chi-sq(2) p-val	0	0	0	0	0	0	0	0
Weak Id	1938	694.8	69.90	10.09	3736	1072	0.281	24.74
Hansen J	0.850	0.844	0.835	0.999	0.556	0.520	0.0459	0.229
Chi-sq(1) p_val	0.654	0.656	0.659	0.607	0.757	0.771	0.830	0.892

Standard errors in parenthesis, statistics robust to heteroskedasticity and autocorrelation, fixed effects by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8: Effect of innovation on total employment growth and skilled labor growth, Two-Step GMM estimation

VARIABLES	Growth in Total Employment				Growth in Skilled Workers in Natural Logarithm			
	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL
Innovation dummy	1.956 (1.817)				6.733* (3.894)			
Enhancing Productivity Innovation		2.320 (2.116)	-25.86 (34.20)			7.621* (4.478)	50.76 (65.74)	
Product Innovation Only			236.1 (285.3)	22.14 (17.70)			-369.3 (570.3)	56.85 (39.77)
Age	0.0350 (0.0251)	0.0341 (0.0252)	0.0579 (0.0517)	0.0359 (0.0250)	-0.110 (0.158)	-0.109 (0.157)	0.000429 (0.425)	-0.134 (0.180)
Foreign Capital	-11.60*** (4.398)	-11.58*** (4.397)	-11.76* (6.232)	-11.60*** (4.414)	2.473 (7.183)	2.549 (7.176)	-0.648 (15.99)	3.084 (7.505)
Exporting Firms	-9.680*** (2.730)	-9.659*** (2.729)	-12.33** (5.295)	-9.924*** (2.756)	4.311 (5.107)	4.233 (5.121)	6.843 (12.02)	4.218 (5.288)
Ln Sales	10.66*** (1.288)	10.65*** (1.285)	10.58*** (2.037)	10.64*** (1.319)	4.778** (2.109)	4.748** (2.111)	3.004 (4.498)	4.993** (2.174)
Observations	7,375	7,375	7,375	7,375	2,959	2,959	2,959	2,959
R-squared	0.027	0.026	0.027	0.019	0.008	0.009	0.008	0.052
Number of firms	2,189	2,189	2,189	2,189	988	988	988	988
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underidentification KP rk LM	1245	1060	0.981	125.4	486.3	415.5	0.582	48.84
Chi-sq(1) p-val	0	0	0.612	0	0	0	0.748	1.41e-10
Weak Id	7579	1756	0.324	45.56	2868	741	0.190	17.44
Hansen J	2.609	2.565	0.0375	2.114	3.029	3.138	0.278	3.540
Chi-sq(1) p_val	0.271	0.277	0.847	0.348	0.220	0.208	0.598	0.170

Standard errors in parenthesis, statistics robust to heteroskedasticity and autocorrelation, fixed effects by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 9: Effect of innovation on the ratio of skilled to unskilled workers and growth of the share of skilled workers, Two-Step GMM estimation

VARIABLES	(1)	(2)	(3)	(4)	(1)	(3)	(6)	(4)
	SL_UL	SL_UL	SL_UL	SL_UL	Growth Sh Skilled	Growth Sh Skilled	Growth Sh Skilled	Growth Sh Skilled
Innovation dummy	0.128 (0.111)				7.004** (3.115)			
Enhancing Innovation		0.148 (0.129)	0.105 (0.102)	0.148 (0.129)		7.898** (3.579)	7.637** (3.068)	
Product Only Innovation			0.348 (0.349)				1.644 (7.978)	66.31** (33.02)
Age	-0.000405 (0.000436)	-0.000460 (0.000441)	-0.000431 (0.000438)	-0.000460 (0.000441)	-0.238* (0.122)	-0.240** (0.121)	-0.239** (0.121)	-0.241* (0.134)
Foreign Capital	0.0838 (0.0874)	0.0788 (0.0885)	0.0902 (0.0896)	0.0788 (0.0885)	4.014 (5.914)	3.953 (5.918)	3.971 (5.924)	4.909 (6.222)
Exporting Firms	-0.0696 (0.0454)	-0.0701 (0.0455)	-0.0690 (0.0454)	-0.0701 (0.0455)	4.803 (4.180)	4.706 (4.189)	4.700 (4.190)	4.495 (4.370)
Ln Sales	-0.0668* (0.0361)	-0.0680* (0.0362)	-0.0660* (0.0361)	-0.0680* (0.0362)	-1.347 (1.810)	-1.368 (1.808)	-1.361 (1.807)	-1.197 (1.880)
Observations	3,713	3,713	3,713	3,713	3,156	3,156	3,156	3,156
R-squared	0.002	0.000	0.003	0.000	0.005	0.006	0.006	-0.087
Number of correlative	1,202	1,202	1,202	1,202	1,019	1,019	1,019	1,019
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underidentification KP rk								
LM	491.1	430	122.7	430	463.6	410.4	152	55.58
Chi-sq(1) p-val	2	2	2	2	2	2	2	2
Weak Id	3138	859.9	97.93	859.9	3023	882.9	136.8	20.33
Hansen J	0.838	0.860	0.944	0.860	2.779	2.964	2.979	3.192
Chi-sq(1) p_val	0.658	0.651	0.624	0.651	0.249	0.227	0.226	0.203

Standard errors in parenthesis, statistics robust to heteroskedasticity and autocorrelation, fixed effects by firm, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Table 10: Endogeneity tests

	Ln EMP	Ln SL	Ln wages	Ln Share SL	Ln growth EMP	Ln growth SL	Ln growth share SL	Ln growth avg wages
<i>Innovation (any type)</i>	not endog	endog	not endog	not endog	not endog	not endog	not endog	not endog
<i>Enhancing Productivity Innovation</i>	not endog	endog	not endog	not endog	not endog	not endog	not endog	not endog
<i>Product Only Inn.</i>	not endog	endog	not endog	endog at 1 %	not endog	not endog	not endog	not endog

Table 11.1: Features of manufacturing firms according to technological intensity

High_tech	Low-tech	High-tech	Total
Any type of innovation	0.3891	0.5141	0.4595
Product innovation	0.2223	0.3071	0.2701
Process innovation	0.2902	0.3876	0.3450
Organizational innovation	0.1988	0.2871	0.2485
Product innovation only	0.0324	0.0430	0.0384
Process innovation only	0.0719	0.0860	0.0798
Organizational innovation only	0.0457	0.0468	0.0463
Enhancing Productivity innovation	0.3496	0.4580	0.4107
Age	28	30	29
Foreign capital	0.0830	0.1568	0.1246
Sales (thousands of constant pesos)	124,490	306,915	227,259
Export Status	0.3404	0.3824	0.3641
Total Employment	63.99	104.36	86.73
Growth in Employment (in Ln)	-4.7769	-2.2052	-3.3273
Growth in Skilled Labor (in Ln)	-3.2577	0.2299	-0.8953
Number of Observations	2,254	2,908	5,162

Source: Own elaboration base on Innovation Surveys, waves 1998-2015

Table 11.2: Features of manufacturing firms according to size

Size	Big Firms	SMEs	Total
Any type of innovation	0.6444	0.3391	0.4595
Product innovation	0.3831	0.1964	0.2701
Process innovation	0.5083	0.2386	0.3450
Organizational innovation	0.3610	0.1753	0.2485
Product innovation only	0.0447	0.0342	0.0384
Process innovation only	0.1135	0.0579	0.0798
Organizational innovation only	0.0589	0.0381	0.0463
Enhancing Productivity innovation	0.5909	0.2933	0.4107
Age	35	25	29
Foreign capital	0.2299	0.056	0.125
Sales (thousands of constant pesos)	526297	32492	227259
Export Status	0.6089	0.2097	0.3641
Total Employment	188	21	87
Growth in Employment (in Ln)	14.782	-15.158	-3.327
Growth in Skilled Labor (in Ln)	5.918	-12.175	-0.895
Number of Observations	2,036	3,126	5,162

Source: Own elaboration base on Innovation Surveys, waves 1998-2015

Table 12.1: Growth in Total Employment, whole Manufacturing sector, High and Low intensive technology sectors

VARIABLES	Whole Manufacturing Sample				High Intensive Tech: Manufactures				Low Tech Firms: Manufacturing			
	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp
Innovation dummy	2.320 (1.418)				2.956 (1.950)				1.719 (2.046)			
Product Innovation		3.384* (1.725)				5.382** (2.178)				-0.412 (2.856)		
Process Innovation		-0.457 (1.671)				-0.702 (2.202)				1.199 (2.555)		
Organizational Innovation		1.735 (1.639)				1.634 (2.057)				1.391 (2.702)		
Product Only Innovation			2.516 (2.976)				5.821* (3.315)				-3.715 (5.838)	
Process Only Innovation			-2.569 (2.238)				-3.533 (3.008)				0.308 (3.292)	
Organizational Only Innovation			0.196 (2.879)				-2.318 (3.685)				3.087 (4.488)	
Enhancing Innovation				1.728 (1.414)				1.553 (1.881)				2.256 (2.136)
Age	-0.0152 (0.0225)	-0.0154 (0.0227)	-0.0153 (0.0224)	-0.0150 (0.0225)	-0.0379 (0.0378)	-0.0387 (0.0379)	-0.0355 (0.0380)	-0.0359 (0.0378)	-0.00496 (0.0254)	-0.00522 (0.0255)	-0.00544 (0.0255)	-0.00484 (0.0254)
Foreign Capital	-4.699** (2.212)	-4.551** (2.213)	-4.695** (2.219)	-4.731** (2.214)	-5.369** (2.643)	-5.048* (2.652)	-5.270** (2.665)	-5.434** (2.648)	-3.593 (4.036)	-3.527 (4.051)	-3.681 (4.046)	-3.566 (4.038)
Exporting Firms	-3.142* (1.662)	-3.322** (1.674)	-3.023* (1.657)	-3.062* (1.659)	-2.838 (2.187)	-3.177 (2.198)	-2.645 (2.172)	-2.678 (2.183)	-3.790 (2.523)	-3.729 (2.542)	-3.557 (2.526)	-3.740 (2.518)
Ln Sales	5.924*** (0.481)	5.934*** (0.483)	6.160*** (0.464)	5.977*** (0.479)	5.745*** (0.646)	5.736*** (0.644)	6.009*** (0.614)	5.860*** (0.637)	6.263*** (0.703)	6.265*** (0.714)	6.377*** (0.695)	6.209*** (0.709)
Constant	-67.87*** (4.833)	-68.18*** (4.859)	-69.15*** (4.790)	-68.11*** (4.827)	-63.94*** (6.356)	-64.15*** (6.385)	-65.14*** (6.269)	-64.49*** (6.319)	-79.05*** (7.067)	-79.09*** (7.124)	-79.65*** (7.078)	-78.74*** (7.091)
Observations	4,366	4,366	4,366	4,366	2,468	2,468	2,468	2,468	1,893	1,893	1,893	1,893
R-squared	0.087	0.088	0.087	0.087	0.085	0.088	0.086	0.085	0.093	0.093	0.093	0.093
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by firms in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 12.2: Growth in Skilled Labor, whole Manufacturing sector, High and Low intensive technology sectors

VARIABLES	Whole Manufacturing				High Tech Manufactures				Low Tech Sectors: Manufactures			
	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL
Innovation dummy	4.342* (2.418)				7.582*** (2.812)				-1.057 (4.464)			
Product Innovation		4.371 (2.736)				10.23*** (3.161)				-6.036 (5.457)		
Process Innovation		-2.082 (2.839)				-2.161 (3.424)				-1.576 (5.134)		
Organizational Innovation		6.296** (2.575)				5.473* (3.014)				5.798 (4.998)		
Product Only Innovation			1.329 (4.603)				7.289 (5.285)				-10.65 (9.300)	
Process Only Innovation			-1.763 (3.780)				-5.079 (4.649)				4.042 (6.556)	
Organizational Only Innovation			7.198 (4.555)				3.693 (5.822)				12.53* (6.972)	
Enhancing Innovation				4.475* (2.373)				5.881** (2.777)				1.501 (4.482)
Age	0.142*** (0.0433)	0.139*** (0.0432)	0.145*** (0.0431)	0.143*** (0.0433)	0.141*** (0.0535)	0.138*** (0.0534)	0.149*** (0.0527)	0.144*** (0.0532)	0.147* (0.0784)	0.144* (0.0806)	0.152* (0.0792)	0.149* (0.0780)
Foreign Capital	-2.965 (2.321)	-2.644 (2.316)	-2.976 (2.331)	-2.995 (2.323)	-0.531 (2.655)	0.128 (2.681)	-0.209 (2.692)	-0.645 (2.668)	-8.315* (4.573)	-7.956* (4.495)	-8.081* (4.517)	-8.113* (4.565)
Exporting Firms	1.665 (2.519)	1.455 (2.530)	1.931 (2.512)	1.681 (2.515)	4.957* (2.898)	4.377 (2.896)	5.270* (2.885)	4.982* (2.897)	-7.060 (4.957)	-6.107 (4.989)	-6.646 (4.843)	-7.249 (4.898)
Ln Sales	5.311*** (0.829)	5.408*** (0.834)	5.604*** (0.803)	5.319*** (0.828)	3.613*** (0.955)	3.710*** (0.961)	4.126*** (0.917)	3.773*** (0.953)	9.220*** (1.548)	9.015*** (1.567)	8.880*** (1.545)	9.060*** (1.561)
Constant	-49.72*** (10.01)	-51.88*** (10.09)	-50.88*** (10.00)	-49.83*** (10.02)	-35.86*** (11.28)	-37.88*** (11.34)	-37.34*** (11.24)	-36.55*** (11.30)	-89.50*** (21.25)	-87.67*** (21.38)	-87.20*** (21.70)	-89.21*** (21.45)
Observations	2,003	2,003	2,003	2,003	1,350	1,350	1,350	1,350	652	652	652	652
R-squared	0.088	0.091	0.087	0.088	0.075	0.083	0.073	0.074	0.134	0.138	0.140	0.134
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 13.1: Growth in Skilled Labor, whole manufacturing sector, big and small firms

VARIABLES	Whole Manufacturing Sample				Small Firms: Manufactures				Big Firms: Manufactures			
	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL
Innovation dummy	4.342* (2.418)				1.21 (4.514)				5.819** (2.633)			
Product Innovation		4.371 (2.736)				10.72 (6.75)				1.918 (2.657)		
Process Innovation		-2.082 (2.839)				-10.42 (6.367)				1.250 (2.984)		
Organizational Innovation		6.296** (2.575)				3.594 (6.060)				7.591*** (2.657)		
Product Only Innovation			1.329 (4.603)				10.37 (7.788)				-2.346 (5.646)	
Process Only Innovation			-1.763 (3.780)				-3.767 (9.106)				-2.047 (3.936)	
Organizational Only Innovation			7.198 (4.555)				13.21 (9.559)				2.610 (4.924)	
Enhancing Innovation				4.475* (2.373)				-0.164 (4.603)				5.944** (2.583)
Age	0.142*** (0.0433)	0.139*** (0.0432)	0.145*** (0.0431)	0.143*** (0.0433)	0.395*** (0.107)	0.393*** (0.108)	0.397*** (0.108)	0.392*** (0.107)	-0.00755 (0.0477)	-0.0119 (0.0470)	-9.85e-05 (0.0467)	-0.00401 (0.0475)
Foreign Capital	-2.965 (2.321)	-2.644 (2.316)	-2.976 (2.331)	-2.995 (2.323)	-3.085 (5.922)	-2.087 (6.063)	-3.817 (5.972)	-3.106 (5.919)	-1.686 (2.440)	-1.521 (2.423)	-1.763 (2.453)	-1.773 (2.444)
Exporting Firms	1.665 (2.519)	1.455 (2.530)	1.931 (2.512)	1.681 (2.515)	-0.789 (5.011)	-1.555 (5.037)	-1.375 (5.015)	-0.726 (5.013)	2.417 (2.811)	2.306 (2.806)	2.609 (2.812)	2.352 (2.807)
Ln Sales	5.311*** (0.829)	5.408*** (0.834)	5.604*** (0.803)	5.319*** (0.828)	5.601*** (1.862)	5.786*** (1.869)	5.748*** (1.830)	5.654*** (1.858)	2.490** (0.968)	2.534** (0.981)	2.835*** (0.941)	2.532*** (0.969)
Constant	-49.72*** (10.01)	-51.88*** (10.09)	-50.88*** (10.00)	-49.83*** (10.02)	-70.33*** (20.25)	-71.66*** (20.35)	-71.57*** (20.22)	-70.25*** (20.22)	-4.182 (13.12)	-6.698 (13.16)	-4.475 (13.03)	-4.709 (13.11)
Observations	2,003	2,003	2,003	2,003	737	737	737	737	1,266	1,266	1,266	1,266
R-squared	0.088	0.091	0.087	0.088	0.090	0.097	0.094	0.089	0.084	0.089	0.081	0.084
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 13.2: Manufacturing sector: growth in the share of skilled labor

VARIABLES	Manufacturing: Whole sample				High-Tech Manufacturing Industries				Low-Tech Manufacturing Industries			
	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH
Innovation dummy	5.304*** (1.915)				6.899*** (2.256)				2.484 (3.463)			
Product Innovation		0.124 (2.162)				1.287 (2.527)				-0.932 (4.304)		
Process Innovation		-0.684 (2.249)				1.017 (2.634)				-4.488 (4.318)		
Organizational Innovation		6.961*** (2.189)				5.595** (2.634)				8.759** (4.090)		
Product Only Innovation			0.562 (4.135)				3.283 (4.953)				-4.641 (7.898)	
Process Only Innovation			1.282 (2.638)				0.156 (2.985)				3.066 (5.083)	
Organizational Only Innovation			13.19*** (3.874)				7.554 (5.067)				21.64*** (5.883)	
Enhancing Innovation				5.755*** (1.938)				6.414*** (2.324)				4.112 (3.424)
Age	0.0545 (0.0358)	0.0550 (0.0358)	0.0600* (0.0355)	0.0555 (0.0359)	0.0360 (0.0425)	0.0396 (0.0425)	0.0447 (0.0421)	0.0382 (0.0425)	0.0864 (0.0683)	0.0789 (0.0683)	0.0914 (0.0678)	0.0871 (0.0682)
Foreign Capital	1.062 (2.196)	1.198 (2.207)	0.851 (2.193)	1.046 (2.194)	3.747 (2.580)	3.894 (2.604)	3.750 (2.587)	3.647 (2.575)	-5.380 (4.171)	-5.316 (4.094)	-5.975 (3.955)	-5.210 (4.165)
Exporting Firms	2.390 (1.939)	2.591 (1.942)	2.839 (1.932)	2.381 (1.929)	2.882 (2.169)	2.879 (2.175)	3.351 (2.162)	2.857 (2.160)	1.460 (4.268)	2.328 (4.291)	2.121 (4.200)	1.453 (4.223)
Ln Sales	-2.216*** (0.720)	-2.054*** (0.720)	-1.891*** (0.694)	-2.224*** (0.721)	-2.743*** (0.851)	-2.558*** (0.858)	-2.283*** (0.812)	-2.657*** (0.849)	-1.138 (1.377)	-1.100 (1.373)	-1.249 (1.344)	-1.270 (1.381)
Constant	51.77*** (8.706)	49.90*** (8.657)	50.30*** (8.650)	51.64*** (8.716)	55.34*** (10.23)	53.54*** (10.24)	53.55*** (10.18)	54.77*** (10.21)	43.83*** (16.88)	43.67*** (16.63)	45.51*** (16.75)	44.38*** (16.89)
Observations	1,985	1,985	1,985	1,985	1,342	1,342	1,342	1,342	642	642	642	642
R-squared	0.087	0.089	0.089	0.088	0.096	0.096	0.092	0.096	0.086	0.093	0.102	0.087
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 13.3: Manufacturing sector: growth in the share of skilled labor, small and big firms

VARIABLES	Manufacturing: Whole sample				Small Firms: Manufacturing				Big Firms: Manufacturing			
	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH
Innovation dummy	5.304*** (1.915)				2.007 (3.300)				7.637*** (2.435)			
Product Innovation		0.124 (2.162)				1.768 (4.672)				-0.198 (2.402)		
Process Innovation		-0.684 (2.249)				-3.991 (4.267)				2.381 (2.688)		
Organizational Innovation		6.961*** (2.189)				5.650 (4.733)				6.403*** (2.334)		
Product Only Innovation			0.562 (4.135)				1.370 (5.414)				-1.838 (5.967)	
Process Only Innovation			1.282 (2.638)				-1.523 (5.351)				2.791 (3.090)	
Organizational Only Innovation			13.19*** (3.874)				17.42** (7.104)				8.676** (4.301)	
Enhancing Innovation				5.755*** (1.938)				3.818 (3.424)				7.645*** (2.441)
Age	0.0545 (0.0358)	0.0550 (0.0358)	0.0600* (0.0355)	0.0555 (0.0359)	-0.0579 (0.0685)	-0.0591 (0.0685)	-0.0590 (0.0676)	-0.0577 (0.0682)	0.130*** (0.0439)	0.131*** (0.0442)	0.143*** (0.0433)	0.135*** (0.0439)
Foreign Capital	1.062 (2.196)	1.198 (2.207)	0.851 (2.193)	1.046 (2.194)	6.771 (5.986)	6.766 (6.104)	5.280 (6.048)	6.879 (5.998)	-0.0643 (2.226)	-0.00193 (2.229)	-0.242 (2.266)	-0.170 (2.230)
Exporting Firms	2.390 (1.939)	2.591 (1.942)	2.839 (1.932)	2.381 (1.929)	6.966* (3.778)	6.858* (3.849)	6.756* (3.818)	6.940* (3.751)	0.829 (2.250)	0.932 (2.232)	1.284 (2.255)	0.739 (2.238)
Ln Sales	-2.216*** (0.720)	-2.054*** (0.720)	-1.891*** (0.694)	-2.224*** (0.721)	-2.149 (1.554)	-2.064 (1.561)	-1.969 (1.541)	-2.209 (1.554)	0.387 (0.936)	0.527 (0.940)	0.746 (0.929)	0.447 (0.944)
Constant	51.77*** (8.706)	49.90*** (8.657)	50.30*** (8.650)	51.64*** (8.716)	51.59*** (16.83)	50.98*** (16.78)	50.40*** (16.91)	51.45*** (16.83)	18.30 (12.70)	16.70 (12.63)	18.34 (12.62)	17.64 (12.72)
Observations	1,985	1,985	1,985	1,985	731	731	731	731	1,254	1,254	1,254	1,254
R-squared	0.087	0.089	0.089	0.088	0.081	0.083	0.088	0.082	0.121	0.121	0.117	0.121
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.10

Table 14.1: Features of Service firms according to knowledge intensity

High Knowledge Intensive Sectors	Low Knowledge Intensive	High Knowledge Intensive	Total
Any type of innovation	0.3375	0.5018	0.3789
Product innovation	0.1464	0.2893	0.1824
Process innovation	0.1899	0.3183	0.2222
Organizational innovation	0.2021	0.2920	0.2247
Product innovation only	0.0359	0.0624	0.0426
Process innovation only	0.0606	0.0651	0.0617
Organizational innovation only	0.0779	0.0723	0.0765
Enhancing Productivity innovation	0.2943	0.4331	0.3292
Age	20	24	21
Foreign capital	0.1211	0.1275	0.1227
Sales (thousands of constant pesos)	171394	396107.8	227981.7
Export Status	0.1409	0.1637	0.1466
Total Employment	120	306	167
Growth in Employment (in ln)	1.6169	11.0502	3.9958
Growth in Skilled Labor (in Ln)	-6.2609	21.7050	3.5312
Number of Observations	3,286	1,106	4,392

Source: Own elaboration base on Innovation Surveys, waves 2003-2015

Table 14.2: Features of Services firms according to size

SME	Big Firms	SMEs	Total
Any type of innovation	0.5081	0.2892	0.3789
Product innovation	0.2396	0.1427	0.1824
Process innovation	0.3102	0.1612	0.2222
Organizational innovation	0.3235	0.1562	0.2247
Product innovation only	0.0406	0.0440	0.0426
Process innovation only	0.0795	0.0494	0.0617
Organizational innovation only	0.0984	0.0613	0.0765
Enhancing Productivity innovation	0.4558	0.2414	0.3292
Age	24	19	21
Foreign capital	0.1556	0.0999	0.1227
Sales (thousands of constant pesos)	466453	62532	227982
Export Status	0.1562	0.1400	0.1466
Total Employment	379	20	167
Growth in Employment (in Ln)	29.378	-13.814	3.996
Growth in Skilled Labor (in Ln)	14.7400	-11.161	3.5312
Number of Observations	1,799	2,593	4,392

Source: Own elaboration base on Innovation Surveys, waves 2003-2015

Table 15.1: Growth in Skilled Labor, whole Service sector, and knowledge intensive sectors (def 1)

VARIABLES	Whole Service Sector				High Knowledge Intensive Service Industries				Low Intensive Knowledge Services Industries			
	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp
Innovation dummy	5.707*** (1.984)				9.011** (4.071)				5.119** (2.259)			
Product Innovation		4.370 (2.825)				14.30*** (4.980)				-0.522 (3.366)		
Process Innovation		2.793 (2.578)				-5.612 (4.767)				6.072** (3.032)		
Organizational Innovation		4.551* (2.438)				8.708** (4.330)				4.048 (2.910)		
Product Only Innovation			-0.916 (4.483)				6.939 (6.961)				-4.551 (5.804)	
Process Only Innovation			1.111 (3.803)				-6.269 (7.983)				3.446 (4.267)	
Organizational Only Innovation			1.865 (3.397)				3.105 (6.674)				2.314 (3.887)	
Enhancing Innovation				6.203*** (2.034)				6.901* (4.052)				6.461*** (2.333)
Age	-0.0747 (0.0495)	-0.0771 (0.0497)	-0.0678 (0.0498)	-0.0755 (0.0496)	0.0316 (0.0998)	0.0240 (0.0994)	0.0385 (0.101)	0.0321 (0.100)	-0.154*** (0.0596)	-0.158*** (0.0597)	-0.148** (0.0595)	-0.157*** (0.0596)
Foreign Capital	-4.914 (3.179)	-5.029 (3.169)	-4.970 (3.202)	-4.890 (3.178)	-3.424 (7.602)	-3.923 (7.590)	-4.880 (7.658)	-3.828 (7.612)	-4.343 (3.400)	-4.318 (3.390)	-4.132 (3.415)	-4.351 (3.391)
Exporting Firms	-9.033*** (2.723)	-9.292*** (2.725)	-8.407*** (2.732)	-8.960*** (2.723)	-4.129 (7.176)	-5.565 (7.165)	-4.105 (7.195)	-3.857 (7.195)	-9.568*** (2.897)	-9.833*** (2.905)	-8.948*** (2.909)	-9.631*** (2.897)
Ln Sales	7.683*** (0.561)	7.584*** (0.560)	8.013*** (0.552)	7.675*** (0.556)	8.196*** (1.335)	8.245*** (1.339)	8.865*** (1.320)	8.323*** (1.329)	7.330*** (0.611)	7.264*** (0.610)	7.609*** (0.604)	7.294*** (0.605)
Constant	-70.10*** (9.503)	-69.35*** (9.372)	-73.48*** (9.486)	-70.28*** (9.455)	-138.4*** (27.78)	-137.6*** (26.93)	-143.4*** (27.34)	-137.8*** (28.43)	-94.53*** (17.72)	-95.43*** (17.29)	-96.18*** (17.98)	-94.12*** (17.59)
Observations	4,308	4,308	4,308	4,308	1,084	1,084	1,084	1,084	3,224	3,224	3,224	3,224
R-squared	0.089	0.090	0.087	0.089	0.150	0.157	0.148	0.149	0.064	0.065	0.063	0.065
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Table 15.2: Growth in Skilled Labor, whole Service sector, and knowledge intensive sectors (def 1)

VARIABLES	Services: Whole sample				High Intensive Knowledge Sectors				Low Intensive Knowledge Service Industries			
	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL
Innovation dummy	11.66*** (3.103)				10.08* (5.713)				13.21*** (3.654)			
Product Innovation		7.315* (3.881)				10.40 (6.750)				6.600 (4.543)		
Process Innovation		4.488 (3.778)				5.727 (6.511)				0.990 (4.490)		
Organizational Innovation		3.147 (3.711)				-1.167 (6.392)				9.087** (4.276)		
Product Only Innovation			1.033 (6.184)				7.112 (9.366)				0.262 (8.305)	
Process Only Innovation			1.234 (5.931)				-3.299 (10.41)				-0.450 (6.978)	
Organizational Only Innovation			11.80** (5.661)				6.896 (9.438)				14.71** (6.666)	
Enhancing Innovation				10.40*** (3.076)				7.858 (5.616)				11.81*** (3.597)
Age	-0.0548 (0.0701)	-0.0530 (0.0709)	-0.0452 (0.0719)	-0.0575 (0.0703)	-0.155 (0.122)	-0.171 (0.123)	-0.159 (0.126)	-0.158 (0.123)	0.0334 (0.0872)	0.0549 (0.0878)	0.0555 (0.0898)	0.0309 (0.0875)
Foreign Capital	0.821 (4.060)	0.597 (4.057)	0.473 (4.117)	0.756 (4.069)	-0.123 (8.915)	-0.863 (8.825)	-1.661 (8.944)	-0.609 (8.899)	0.913 (4.463)	0.838 (4.478)	1.128 (4.528)	0.898 (4.471)
Exporting Firms	5.782 (3.700)	5.691 (3.732)	6.726* (3.718)	5.949 (3.719)	6.340 (9.730)	5.870 (9.861)	6.557 (9.629)	6.449 (9.778)	4.872 (3.914)	5.014 (3.980)	6.004 (3.971)	5.019 (3.923)
Ln Sales	7.282*** (0.990)	7.438*** (0.986)	7.859*** (0.993)	7.396*** (0.988)	7.347*** (1.938)	7.511*** (1.971)	8.161*** (1.978)	7.472*** (1.967)	7.414*** (1.121)	7.477*** (1.108)	7.904*** (1.109)	7.615*** (1.109)
Constant	-42.10*** (9.823)	-43.57*** (9.820)	-48.85*** (9.794)	-43.36*** (9.804)	-42.10** (20.32)	-43.05** (20.75)	-50.28** (20.43)	-43.40** (20.72)	-123.9*** (24.79)	-125.2*** (24.04)	-121.5*** (25.96)	-125.3*** (24.72)
Observations	2,062	2,062	2,062	2,062	720	720	720	720	1,342	1,342	1,342	1,342
R-squared	0.113	0.112	0.109	0.112	0.174	0.175	0.171	0.172	0.072	0.070	0.067	0.070
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 15.3: Growth in the share of skilled labor, knowledge intensive services

VARIABLES	Whole Service Sector				High Intensive Knowledge Service Industries				Low Knowledge Intensive: Service Industries			
	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH
Innovation dummy	6.286** (2.856)				0.986 (4.684)				9.269*** (3.580)			
Product Innovation		0.166 (3.440)				3.252 (5.324)				-1.012 (4.413)		
Process Innovation		3.385 (3.339)				3.763 (5.271)				1.293 (4.250)		
Organizational Innovation		1.667 (3.184)				-1.078 (4.873)				5.847 (4.100)		
Product Only Innovation			-3.551 (6.276)				-4.221 (8.070)				-2.608 (9.006)	
Process Only Innovation			6.129 (5.166)				-3.052 (7.999)				7.851 (6.667)	
Organizational Only Innovation			12.64*** (4.767)				1.851 (6.639)				17.45*** (6.074)	
Enhancing Innovation				6.690** (2.803)				2.045 (4.609)				9.258*** (3.505)
Age	0.0789 (0.0608)	0.0794 (0.0610)	0.0800 (0.0618)	0.0775 (0.0608)	-0.184** (0.0896)	-0.188** (0.0885)	-0.183** (0.0899)	-0.183** (0.0893)	0.297*** (0.0817)	0.309*** (0.0823)	0.296*** (0.0847)	0.295*** (0.0818)
Foreign Capital	6.659* (3.693)	6.618* (3.703)	6.542* (3.717)	6.692* (3.703)	5.722 (7.313)	5.909 (7.281)	5.486 (7.322)	5.853 (7.283)	7.093 (4.358)	7.195 (4.375)	7.174 (4.383)	7.142 (4.379)
Exporting Firms	10.98*** (3.546)	11.17*** (3.551)	11.54*** (3.543)	11.02*** (3.541)	8.902 (8.671)	8.662 (8.735)	9.074 (8.695)	8.890 (8.678)	11.35*** (3.825)	11.84*** (3.836)	11.94*** (3.825)	11.41*** (3.816)
Ln Sales	-0.965 (0.722)	-0.814 (0.722)	-0.730 (0.705)	-0.967 (0.722)	0.0356 (1.035)	-0.181 (1.044)	0.105 (1.018)	-0.0563 (1.040)	-1.117 (0.962)	-0.909 (0.962)	-0.767 (0.940)	-1.027 (0.958)
Constant	7.566 (34.46)	7.905 (35.15)	8.012 (35.63)	9.678 (35.11)	3.898 (35.90)	5.618 (36.03)	4.787 (36.84)	5.182 (36.18)	-20.73 (23.45)	-22.40 (23.47)	-18.77 (22.73)	-21.80 (23.49)
Observations	2,109	2,109	2,109	2,109	746	746	746	746	1,363	1,363	1,363	1,363
R-squared	0.062	0.061	0.064	0.062	0.083	0.085	0.084	0.084	0.052	0.049	0.054	0.052
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 16.1: Growth in Total Employment, whole Service sector, and small and big firms

VARIABLES	Whole Service Sector				Small Firms, Services				Big Firms: Services			
	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp	(1) Growth Emp	(2) Growth Emp	(3) Growth Emp	(4) Growth Emp
Innovation dummy	5.707*** (1.984)				2.380 (2.607)				2.017 (2.831)			
Product Innovation		4.370 (2.825)				7.467* (4.103)				2.120 (3.575)		
Process Innovation		2.793 (2.578)				-1.184 (3.699)				2.572 (3.314)		
Organizational Innovation		4.551* (2.438)				-0.537				1.277 (3.037)		
Product Only Innovation			-0.916 (4.483)				2.562 (5.590)				-0.911 (6.566)	
Process Only Innovation			1.111 (3.803)				-1.371 (5.122)				1.009 (5.290)	
Organizational Only Innovation			1.865 (3.397)				1.545 (4.525)				-1.368 (4.495)	
Enhancing Innovation				6.203*** (2.034)				2.124 (2.749)				2.198 (2.767)
Age	-0.0747 (0.0495)	-0.0771 (0.0497)	-0.0678 (0.0498)	-0.0755 (0.0496)	0.104 (0.0753)	0.109 (0.0757)	0.108 (0.0754)	0.104 (0.0755)	-0.169** (0.0694)	-0.172** (0.0694)	-0.169** (0.0702)	-0.169** (0.0695)
Foreign Capital	-4.914 (3.179)	-5.029 (3.169)	-4.970 (3.202)	-4.890 (3.178)	-8.786* (4.774)	-8.955* (4.765)	-8.919* (4.790)	-8.756* (4.776)	-0.554 (3.981)	-0.514 (3.970)	-0.535 (3.987)	-0.564 (3.980)
Exporting Firms	9.033*** (2.723)	-9.292*** (2.725)	-8.407*** (2.732)	-8.960*** (2.723)	-5.747 (3.630)	-5.864 (3.630)	-5.528 (3.633)	-5.708 (3.634)	-4.157 (3.728)	-4.501 (3.735)	-3.828 (3.710)	-4.110 (3.711)
Ln Sales	7.683*** (0.561)	7.584*** (0.560)	8.013*** (0.552)	7.675*** (0.556)	2.520*** (0.780)	2.494*** (0.782)	2.582*** (0.783)	2.531*** (0.778)	3.979*** (1.043)	3.835*** (1.037)	4.135*** (1.040)	3.983*** (1.034)
Constant	70.10*** (9.503)	-69.35*** (9.372)	-73.48*** (9.486)	-70.28*** (9.455)	-4.893 (12.81)	-3.318 (12.79)	-5.262 (12.83)	-5.099 (12.80)	28.72 (17.50)	29.55* (17.50)	27.54 (17.66)	28.53 (17.44)
Observations	4,308	4,308	4,308	4,308	2,471	2,471	2,471	2,471	1,837	1,837	1,837	1,837
R-squared	0.089	0.090	0.087	0.089	0.041	0.043	0.041	0.041	0.119	0.120	0.119	0.119
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 16.2: Growth in Skilled Labor, whole Service sector, and small and big firms

VARIABLES	Services: Whole sample				Small Firms Services				Big Firms: services			
	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL	(1) Growth SL	(2) Growth SL	(3) Growth SL	(4) Growth SL
Innovation dummy	11.66*** (3.103)				7.047 (4.965)				12.62*** (3.979)			
Product Innovation		7.315* (3.881)				6.162 (7.002)				8.115* (4.641)		
Process Innovation		4.488 (3.778)				1.525 (6.448)				4.667 (4.578)		
Organizational Innovation		3.147 (3.711)				1.946 (6.600)				1.784 (4.454)		
Product Only Innovation			1.033 (6.184)				2.622 (9.792)				-0.619 (8.191)	
Process Only Innovation			1.234 (5.931)				-4.180 (9.611)				5.383 (7.625)	
Organizational Only Innovation			11.80** (5.661)				2.889 (9.924)				15.21** (6.663)	
Enhancing Innovation				10.40*** (3.076)				5.236 (5.162)				11.44*** (3.796)
Age	-0.0548 (0.0701)	-0.0530 (0.0709)	-0.0452 (0.0719)	-0.0575 (0.0703)	-0.0448 (0.148)	-0.0323 (0.149)	-0.0250 (0.150)	-0.0483 (0.149)	-0.0773 (0.0827)	-0.0773 (0.0835)	-0.0729 (0.0856)	-0.0785 (0.0829)
Foreign Capital	0.821 (4.060)	0.597 (4.057)	0.473 (4.117)	0.756 (4.069)	0.726 (7.417)	0.574 (7.409)	0.578 (7.488)	0.821 (7.443)	1.225 (5.139)	1.063 (5.150)	0.977 (5.165)	1.085 (5.141)
Exporting Firms	5.782 (3.700)	5.691 (3.732)	6.726* (3.718)	5.949 (3.719)	2.135 (5.844)	1.959 (5.849)	2.484 (5.831)	1.951 (5.841)	11.44** (5.118)	11.66** (5.187)	12.97** (5.126)	12.01** (5.137)
Ln Sales	7.282*** (0.990)	7.438*** (0.986)	7.859*** (0.993)	7.396*** (0.988)	4.044** (1.619)	4.130** (1.619)	4.185** (1.639)	4.111** (1.621)	6.771*** (1.626)	6.948*** (1.616)	7.478*** (1.669)	6.910*** (1.622)
Constant	-42.10*** (9.823)	-43.57*** (9.820)	-48.85*** (9.794)	-43.36*** (9.804)	-6.728 (15.48)	-7.549 (15.48)	-8.697 (15.64)	-7.161 (15.52)	-49.77* (26.12)	-49.90** (25.13)	-53.71** (25.85)	-51.17* (26.14)
Observations	2,062	2,062	2,062	2,062	858	858	858	858	1,204	1,204	1,204	1,204
R-squared	0.113	0.112	0.109	0.112	0.058	0.058	0.056	0.057	0.148	0.146	0.146	0.147
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 16.3: Growth in the share of skilled labor, whole Service sector, and small and big firms

VARIABLES	Whole Service Sector				Small Firms: Services				Big Firms: Services			
	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH	(1) Growth SLSH	(2) Growth SLSH	(3) Growth SLSH	(4) Growth SLSH
Innovation dummy	6.286** (2.856)				5.868 (4.243)				9.331** (3.802)			
Product Innovation		0.166 (3.440)				-1.014 (5.781)				1.076 (4.343)		
Process Innovation		3.385 (3.339)				3.894 (5.519)				3.480 (4.159)		
Organizational Innovation		1.667 (3.184)				4.573 (5.638)				3.279 (3.995)		
Product Only Innovation			-3.551 (6.276)				-8.230 (8.397)				-3.361 (9.132)	
Process Only Innovation			6.129 (5.166)				3.510 (8.067)				7.900 (6.579)	
Organizational Only Innovation			12.64*** (4.767)				12.07 (8.348)				15.63*** (5.970)	
Enhancing Innovation				6.690** (2.803)				7.600* (4.393)				9.459*** (3.659)
Age	0.0789 (0.0608)	0.0794 (0.0610)	0.0800 (0.0618)	0.0775 (0.0608)	-0.205* (0.123)	-0.207* (0.125)	-0.214* (0.126)	-0.213* (0.123)	0.129* (0.0737)	0.130* (0.0747)	0.133* (0.0752)	0.129* (0.0739)
Foreign Capital	6.659* (3.693)	6.618* (3.703)	6.542* (3.717)	6.692* (3.703)	9.164 (6.543)	9.198 (6.601)	9.685 (6.575)	9.360 (6.551)	1.202 (4.502)	1.090 (4.550)	0.836 (4.546)	1.109 (4.514)
Exporting Firms	10.98*** (3.546)	11.17*** (3.551)	11.54*** (3.543)	11.02*** (3.541)	6.765 (5.672)	6.600 (5.709)	7.055 (5.699)	6.566 (5.680)	13.13*** (4.819)	13.60*** (4.848)	14.24*** (4.817)	13.38*** (4.819)
Ln Sales	-0.965 (0.722)	-0.814 (0.722)	-0.730 (0.705)	-0.967 (0.722)	-0.127 (1.474)	-0.0661 (1.481)	-0.176 (1.482)	-0.170 (1.477)	2.849*** (1.027)	3.064*** (1.036)	3.358*** (1.027)	2.908*** (1.020)
Constant	7.566 (34.46)	7.905 (35.15)	8.012 (35.63)	9.678 (35.11)	5.673 (36.65)	7.477 (37.41)	10.81 (38.39)	8.311 (37.16)	-54.41*** (16.46)	-56.49*** (16.45)	-57.16*** (16.25)	-55.34*** (16.50)
Observations	2,109	2,109	2,109	2,109	895	895	895	895	1,214	1,214	1,214	1,214
R-squared	0.062	0.061	0.064	0.062	0.096	0.096	0.097	0.097	0.097	0.094	0.098	0.097
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard error clustered by firm in parenthesis, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 17: Summary of results for manufacturing and service firms

Table 17.1: Summary results for Manufactures

	Growth in Employment			Growth in Skilled Labor			Growth in the Share of Skilled Labor		
	Whole sample	High-Tech	Low-Tech	Whole sample	High-Tech	Low-Tech	Whole sample	High-Tech	Low-Tech
Innovation dummy	ns	ns	ns	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>	<b>+sign</b>	ns
Product Innovation	<b>+sign</b>	<b>+sign</b>	ns	ns	ns	ns	ns	ns	ns
Process Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Innovation	ns	ns	ns	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>
Product Only Innovation	ns	<b>+sign</b>	ns	ns	ns	ns	ns	ns	ns
Process Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Enhancing Innovation	ns	ns	ns	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>

Table 17.2: Summary results for Services

	Growth in Employment			Growth in Skilled Labor			Growth in the Share of Skilled Labor		
	Whole sample	High-Kis	Low-Kis	Whole sample	High-Kis	Low-Kis	Whole sample	High-Tech	Low-Tech
Innovation dummy	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>	ns	<b>+sign</b>
Product Innovation	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>	ns	ns	ns	ns	ns
Process Innovation	ns	ns	<b>+sign</b>	ns	ns	ns	ns	ns	ns
Organizational Innovation	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>	ns	ns	<b>+sign</b>	ns	<b>+sign</b>
Product Only Innovation	ns	<b>+sign</b>	ns	ns	ns	ns	ns	ns	ns
Process Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Enhancing Innovation	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>	<b>+sign</b>	ns	<b>+sign</b>

Table 17.3.1: Summary results for manufacturing firms according to technology intensity

	Growth in Employment			Growth in Skilled Labor			Growth in the Share of Skilled Labor		
	Whole sample	High-Tech	Low-Tech	Whole sample	High-Tech	Low-Tech	Whole sample	High-Tech	Low-Tech
Innovation dummy	ns	ns	ns	4.34	7.58	ns	5.3	6.9	ns
Product Innovation	3.38	5.38	ns	ns	ns	ns	ns	ns	ns
Process Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Innovation	ns	ns	ns	6.3	5.47	ns	6.96	5.955	8.759
Product Only Innovation	ns	5.82	ns	ns	ns	ns	ns	ns	ns
Process Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Enhancing Innovation	ns	ns	ns	4.45	5.88	12.53	5.76	6.41	21.64

Table 17.3.2: Summary results for manufacturing firms according to size

	Growth in Employment			Growth in Skilled Labor			Growth in the Share of Skilled Labor		
	Whole sample	Small	Big	Whole sample	Small	Big	Whole sample	Small	Big
Innovation dummy	ns	ns	ns	4.34	ns	5.819	5.3	ns	7.637
Product Innovation	3.38	ns	3.215	ns	ns	ns	ns	ns	ns
Process Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Innovation	ns	ns	ns	6.3	ns	7.59	6.96	ns	ns
Product Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Process Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Only Innovation	ns	ns	ns	ns	ns	ns	13.19	ns	8.676
Enhancing Innovation	ns	ns	ns	4.45	ns	5.94	5.755	17.42	7.645



Table 17.4.1. Summary results for services firms according to knowledge intensity

	Growth in Employment			Growth in Skilled Labor			Growth in the Share of Skilled Labor		
	Whole sample	High-Kis	Low-Kis	Whole sample	High-Kis	Low-Kis	Whole sample	High-Tech	Low-Tech
Innovation dummy	5.707	9.011	5.119	11.66	10.08	ns	6.286	ns	9.269
Product Innovation	3.38	5.38	ns	7.315	ns	ns	ns	ns	ns
Process Innovation	ns	ns	6.072	ns	ns	ns	ns	ns	ns
Organizational Innovation	4.551	8.708	ns	11.8	ns	ns	12.64	ns	17.45
Product Only Innovation	ns	14.3	ns	ns	ns	ns	ns	ns	ns

Process Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Enhancing Innovation	6.203	6.901	6.901	10.4	ns	12.53	6.69	ns	9.258

Table 17.4.2: Summary results for service firms according to size

	Growth in Employment			Growth in Skilled Labor			Growth in the Share of Skilled Labor		
	Whole sample	Small	Big	Whole sample	Small	Big	Whole sample	Small	Big
Innovation dummy	5.707	ns	ns	11.66	ns	12.62	6.286	ns	9331
Product Innovation	3.38	7.467	ns	7.315	ns	8.115	ns	ns	ns
Process Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Innovation	4.551	ns	ns	ns	ns	ns	ns	ns	ns

Product Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Process Only Innovation	ns	ns	ns	ns	ns	ns	ns	ns	ns
Organizational Only Innovation	ns	ns	ns	11.8	ns	15.21	12.64	ns	15.63
Enhancing Innovation	6.203	ns	ns	10.4	ns	11.44	6.69	7.6	9.456

## Appendix

Table A.1: Manufacturing sector

ISIC rev 3	Description	No. Obs.	Percent
15	Manufacture of food products and beverages	1,577	30.55
16	Manufacture of tobacco products	14	0.27
17	Manufacture of textiles	344	6.66
18	Manufacture of wearing apparel; dressing and dyeing of fur	280	5.42
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	178	3.45
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	179	3.47
21	Manufacture of paper and paper products	108	2.09
22	Publishing, printing and reproduction of recorded media	335	6.49
23	Manufacture of coke, refined petroleum products and nuclear fuel	6	0.12
24	Manufacture of chemicals and chemical products	575	11.14
25	Manufacture of rubber and plastics products	247	4.78
26	Manufacture of other non-metallic mineral products	205	3.97
27	Manufacture of basic metals	62	1.2
28	Manufacture of fabricated metal products, except machinery and equipment	289	5.6
29	Manufacture of machinery and equipment n.e.c.	148	2.87
30	Manufacture of office, accounting and computing machinery	17	0.33
31	Manufacture of electrical machinery and apparatus n.e.c.	115	2.23
32	Manufacture of electrical machinery and apparatus n.e.c.	27	0.52
33	Manufacture of medical, precision and optical instruments, watches and clocks	110	2.13
34	Manufacture of motor vehicles, trailers and semi-trailers	123	2.38
35	Manufacture of other transport equipment	74	1.43
36	Manufacture of furniture; manufacturing n.e.c.	144	2.79
37	Recycling	5	0.1
Total		5,162	100

Table A.2: Services Sector

ISIC rev 3	Description	No. Obs.	Percent
40	Electricity, gas, steam and hot water supply	26	0.59
41	Collection, purification and distribution of water	13	0.30
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	1	0.02
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	5	0.11
55	Hotels and restaurants	462	10.52
60	Land transport; transport via pipelines	485	11.04
61	Water transport	62	1.41
62	Air transport	55	1.25
63	Supporting and auxiliary transport activities; activities of travel agencies	331	7.54
64	Post and telecommunications	212	4.83
65	Financial intermediation, except insurance and pension funding	68	1.55
66	Insurance and pension funding, except compulsory social security	25	0.57
67	Activities auxiliary to financial intermediation	57	1.30
71	Renting of machinery and equipment without operator and of personal and household goods	44	1.00
72	Computer and related activities	213	4.85
73	Research and development	57	1.30
74	Other business activities	1,450	33.01
85	Health and social work	593	13.50
90	Sewage and refuse disposal, sanitation and similar activities	84	1.91
92	Recreational, cultural and sporting activities	149	3.39
Total		4,392	100

Table A.3: Classification of High-tech and low-tech sectors (manufacturing)

ISIC	High-Tech	ISIC	Low-Tech
15	Food products and beverages	17	Manufacture of textiles
16	Tobacco products	18	Manufacture of wearing apparel; dressing and dyeing of fur
22	Publishing, printing and reproduction of recorded media	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
23	Coke, refined petroleum products and nuclear fuel	20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
24	Chemicals and chemical products	21	Manufacture of paper and paper products
27	Manufacture of basic metals	25	Manufacture of rubber and plastics products
31	Manufacture of electrical machinery and apparatus n.e.c.	26	Manufacture of other non-metallic mineral products
32	Manufacture of electrical machinery and apparatus n.e.c.	28	Manufacture of fabricated metal products, except machinery and equipment
34	Manufacture of motor vehicles, trailers and semi-trailers	29	Manufacture of machinery and equipment n.e.c.
35	Manufacture of other transport equipment	30	Manufacture of office, accounting and computing machinery
		33	Manufacture of medical, precision and optical instruments, watches and clocks
		36	Manufacture of furniture; manufacturing n.e.c.
n.e.c.: not elsewhere classified			

Table A. 4: Knowledge intensive and low intensive knowledge sectors (services)

ISIC	High intensive	ISIC	Low intensive
40	Electricity, gas, steam and hot water supply	41	Collection, purification and distribution of water
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
61	Water transport	55	Hotels and restaurants
65	Financial intermediation, except insurance and pension funding	60	Land transport; transport via pipelines
66	Insurance and pension funding, except compulsory social security	62	Air transport
67	Activities auxiliary to financial intermediation	63	Supporting and auxiliary transport activities; activities of travel agencies
72	Computer and related activities	64	Post and telecommunications
73	Research and development	71	Renting of machinery and equipment without operator and of personal and household goods
85	Health and social work	74	Other business activities
		90	Sewage and refuse disposal, sanitation and similar activities
		92	Recreational, cultural and sporting activities

Note: High intensive knowledge sectors when it is above the median of professional and technicians in total employment.