EFFECTS OF NON-TANGIBLE CAPITAL IN SPANISH LABOR DYNAMICS

ROBERTO DOPESO-FERNÁNDEZ*
Department of Applied Economics
Universitat Autonoma de Barcelona
roberto.dopeso@uab.cat
Tel. (+34) 93581-1153 Fax. (+34) 93581-2292

The aim of this paper is analyze the effect of non-tangible capital in the Spanish labor market. The importance of alternatives form of capital have been studied in the tradition of economic growth, as determinants of Total Factor Productivity (TFP), but the connection with the labor market is not so clear. To model the labor market this study will use the chain reaction theory (CRT) developed by Karanassou and Snower (1996, 1998). The CRT is a multi-equation approach to the labor market, that focuses in three main equation: labor demand, wage setting and labor supply. The modelling of non-physical capital is based in the augmented Cobb-Douglas production function developed by Audretsch and Keilbach (2004a). This functional form is augmented to include knowledge capital and entrepreneurial capital, and here we also add human capital. Because of the exploratory nature of this work, different variables were used to model the three forms of non-physical capital and also at different levels of regional aggregation (NUTS-I, NUTS-II and NUTS-III). The results show a positive impact of entrepreneurial capital in labor demand, wage setting and labor force participation equations. Human capital affects positively labor demand and labor force participation and negatively in wage determination. Finally, it is important to notice the negative effect of knowledge capital for the three labor market equations as a special feature of the Spanish case.

JEL Classification: E24, J21, J23, J31, J64, L26, O32, R23.

Key Words: Unemployment, Labor Markets, Wage, Employment, Labor Force, Entrepreneurship, Aggregate Human Capital, Innovation, Regional Economics.

1. INTRODUCTION

It is common practice among politicians and policy makers to use phrases like: "Entrepreneureurs will take us out of this crisis" – Mariano Rajoy, Spanish president (El Confidencial, November 30 2011), "Innovation is the clue word to change the productive model" – Alfredo P. Rubalcaba, PSOE president (Ticpymes.es, November 4 2011) or "A world-class education is the single most important factor in determining not

* The author is grateful to Jose Luis Roig for his valuable comments and advice as thesis supervisor. This research is supported by the Secretary of Universities and Research (SUR) of the Department of Economics and Scientific Knowledge of the Generalitat de Catalunya and the European Social Fund. Support given by the grant ECO2009-10003 of the Spanish Ministry of Science and Innovation and the grant SGR2009-600 of the Catalonian Government is also acknowledged.

just whether our kids can compete for the best jobs but whether America can out-compete countries around the world [...]" – Barack Obama, USA president (White House; July 18, 2011). Innovation, entrepreneurship and education seem to be the recipe for success but the exact mechanism through they operate are not yet totally understood.

The objective of this paper is try to measure the impact of innovation, entrepreneurship and education as forms of non-tangible capital that enhance the productive capacity. Different proxy variables will be tested. Knowledge capital is aproximated as R&D expenditure, patents and number of dedicated personal to R&D activities. Human capital is measured as proportions of the population with certain degree of school attainmet and mainly with a synthetic index. Finally entrepreneurship is proxied as firm biths, total establishments, trade mark registrarion.

There are different aproaches to model the labor market. This paper will use the chain reaction theory (CRT) developed by Karanassou and Snower (1996, 1998) but extending it to include alternative forms of capital using the production function proposed by Audretsch and Keilbach (2004a). This modelling of labor is ideal for the exploratory nature of this work, because it allows entering different specifications and checking both short and long run relations. The model is based in three main equations describing the employment level, the wage setting mechanism and the labor force participation so the effects of alternative capital can be measured specifically in each of these three equations and also the global effect over unemployment. The econometric methodology is based in an ARDL (Auto-reggresive Distributed Lag) specification because it permits to model long run relations without making any a priori assumptions about the integration order of the series.

To extend the analysis one step further the three labor market equations were calculated at different levels of greogaphical aggregation. First a time series aproach for the hole Spanish economy covering more than 30 years. Then a regional aproach was performed at the Autonomus Communities (NUTS-II) and Provinces (NUTS-III) level using a panel with data covering more than 10 years. Finally a panel using european nations (including Spain) was calculated for comparative reasons.

The rest of this paper will be organized as follows; in section 2 the review of the literature is presented. Section 3 presents the variables description and the sources of information. In Section 4 the theoretical model and the econometric specificaction are presented. The main results are presented in section 5. Finally section 6 concludes with a summary of the main findings ans suggests new lines of research.

2. REVIEW OF LITERATURE

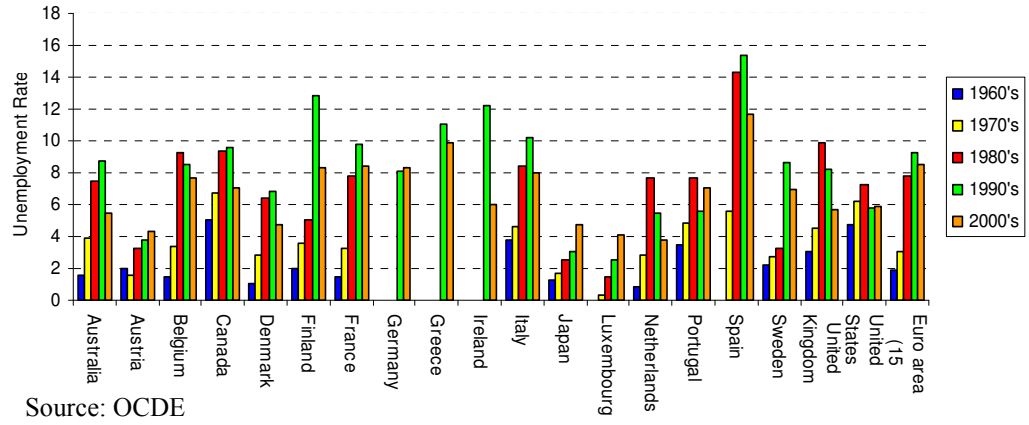
The study of labor market had been aproched in very different ways in the literature depending on the researcher objective. Some of them focus on the unemployment level and the natural rate of unemployment (Layard et. al., 1991), others center their attention on the influence of money in labor markets (Galí y Gertler, 1999; Galí, Smets y Wouters, 2011) or even in the hiring mechanism as in the Search and Matching models in the tradition of Pissarides. Because of the exploratory nature of this work the CRT will be used because it allows to analyze different aspects of labor market and then summary all the influences to calculate unemployment. This flexible aproach is justified on the specific characteristics of the Spanish Labor market, some of the most important are higligthed next.

2.1 PECULIARITIES OF THE SPANISH LABOR MARKET

This section is devoted to explain five important and relatively particular characteristics of Spanish Labor market. This serves as motivation to study the unemployment phenomena and how the alternative capital can affect it because both have become important part of the political and economical agenda in Spain.

The first striking fact is the high level of the unemployment rate. This is an historical and actual problem. In Figure 1 we can observe the average unemployment rate by decades in different nations. As we can see the unemployment rate in Spain had been growing constantly and its level had been the higher among developed countries. In the first decade of the XXI century the unemployment rate was reduced but most of the effect was lost in the recent recession as the unemployment is at is worst levels since the begginig of the nineties.

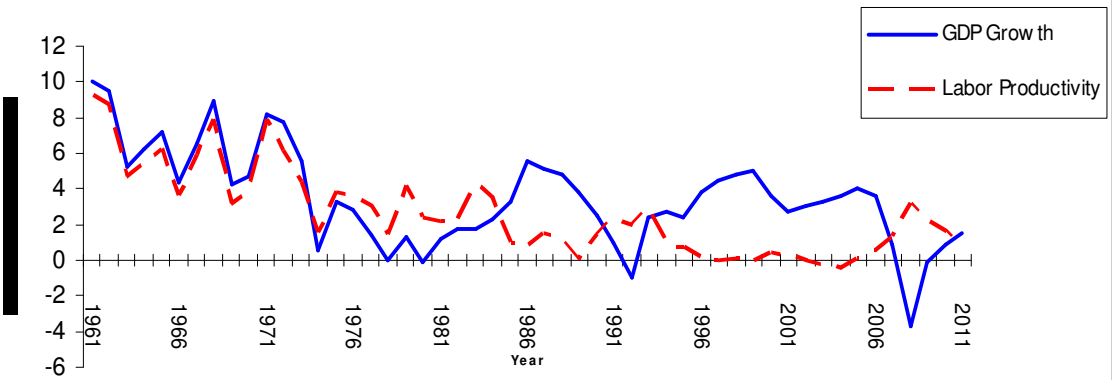
Figure 1: Unemployment rate by Decades



Source: OCDE

The second fact is the counter-cyclical productivity of labor. Figure 2 shows the historical evolution of economic growth and labor produdctivity in Spain. As we can observe before the eigthies the behavior was strongly pro-cyclical but changes in labor market (labor market reforms, Moncloa pacts) and in the country (democratic transition, entering in the NATO or EEC) had reversed this trend.

Figure 2: GDP Growth vs Labor Productivity



Source: Spanish Statistics Institute (INE)

The third fact is the relative importance of temporary jobs. This can explian, in part, the counter-cyclical labor productivity. In Spain 33% of the jobs are temporary, this represent more than double the average of the European Union (BIMA, 2009). This temporary nature of jobs causes a great number of firings during recessions which causes an artifical increase of labor productivity in this periods. In other words the Spanish labor market is adjusted in quantities and not in prices (wages). This causes the existence of two labor markets related with the tradition of the Insider-Outsider theory developed by Lindbeck and Snower (1994). This can rise some particular mechanisms like the "recessionary cleansing" (Caballero and Hammour, 1994) that can cause the counter-cyclical behaviour in productivity. To put this in perspective in 2010 the temporary job market destroyed employment at the 4% level, while the full time jobs were growing at 1.5% (Banco de España).

A fourth fact is related with constant increasing labor force participation. Spain had been characterized by smaller labor supply relative to working age population in comparison with other developed countries. But in the last 20 years this differences had been dissapearing because of the increasing femenine labor force and great waves of inmigration. This causes a constantly increasing labor force that accentuates the persistence of high unemployment.

Finally the fifth fact is related with wage rigidities. The Spanish labor market is highly regulated with labor unions as a very important agent in wage determination. In general highly regulated markets lead to higher levels of unemployment and lower levels of labor force participation (Botero et. al., 2004) and Spain is not the exception. Altough some of these rigidities can be explained trough institutions (Layard et. al., 2005) the aim of this work is focused on the productivity of these institutions more than their existence and should be captured in some extent by the non-physical capital.

2.2 MEASURING LABOR DYNAMICS

Several aproaches exist to model labor market both conceptually and methodologically. Mainstream economics (both Neo-Classical and Neo-Keynesian) had been constructed over general equilibrium frameworks based on some general assumptions like perfect rationallity, market clearing conditions or pro-cyclical productivities that not always hold in reallity. Methodologically the most common functional forms include Cobb-Douglas, Constant Elasticity of Substitution (CES) or Trans-Log (Hamermesh, 1986). Depending on the alternative the conclusions can change because the assumptions about competence (perfect or imperfect), substitution between imputs (unitary, constant or variable) or rigidities (in mobility and prices) condition the model choosen. One example can be the case of imperfect competition that can cause lower levels of employment or production in comparision with walrasian equilibrium (Dixon and Rakin, 1993).

Because flexibility is very relevant to model the Spanish labor market the chain reaction theory (CRT) to model labor dynamics seems like the correct aproach. The CRT was developed by Karanassou and Snower (1996) as a critic to the existence of a natural rate of unemployment (NRU) difficult to prove empirically. The CRT approach have three main advantages (Henry et. al., 2000):

i) Allows for feedback mechanism between labor demand, wage setting and labor force participation. This causes that some transitory effects can be long lasting.

ii) The majority of effects that influence labor markets (oli prices, tax changes, labor reforms, among others) are not permanent.

iii) The model can track not only the persistence of endogenous variables (using shocks) but also the persistence of exogenous variables trough their lags in each of the labor market equations.

One inconvinient is that the production function used to calculate output demand is Cobb-Douglas implying unitary rate of substitution between imput factors. Rowthorn (1999) using a NAIRU framework with a sample of 33 countries proved that the real ealsticity of substitution is lower than unity in real data. Altought it is important to notice these drawback of the model, this can change the magnitude of the effects but very hardly their direction.

Other alternatives can be used to model labor markets including non-tangible forms of capital. One alternative can be explicitly modelling the bargaining process between employers and employees (Cahuc et. al., 2008) that can help to distinguish different outcomes for different job types instead a hole effect for all the jobs that can be misleading, the inconvinient of this approach is the need of good micro-data to make empirical conclusions. The need to include different measures for the alternative forms of capital leads us to rely in macro data and for this reason in macroeconomic models.

Some empirical evidence has shown indirectly the relative importance of alternative forms of capital in labor markets. The relation between growth and employment can be positive based on the "capitalization effect" (Pisarides, 1990) or negative based on the "creative destruction effect" (Aghion and Howitt, 1998) this last effect could be mitigated in some sense with a correct mix of innovation, entrepreneurship and education. Also there exist some evidence that the age of the enterprise is more relevant than its size for de destruction of employment (Haltiwanger, 1999) an that small enterprises show less volatitlity in employment creation and destruction over the cycle[1] (Davidson et. al., 1999) suggesting the positive influence of entrepreneurship on unemployment.

Finally the technical change literature (Solow, 1957; Romer, 1990; Barro and Sala-i-Martin, 1995; Acemoglu 2002) developed in the last 50 years have been worried about how to introduce innovation in production and how to endogenize it. This line of reseach created room for different modelling of TFP. It is, based on some of these empirical models on TFP, that the measures of intangible capital are taken from. The rest of this section will touch some of the research did in relation with this forms of non-physical capital how to measure it and what are the expected effects for the hole economy and labor markets.

[1] Altough they destroy more employment in relative terms in recession

2.3 HUMAN CAPITAL

This is the most traditional form of non-physical capital or at least the one that had been treated for a long time in economic literature. Human capital should be understood as all the set of characteristics that enhance human performance. These include education, nutrition, health or expirience (Becker, 1962). Despite this general definition the econocmic literature had been more concentrated in education as the determinant. This solve an empirical problem about the measuring but the hole effect of human capital is not captured.

Empirically there are two main aproaches to model human capital the micro and the macro. The micro aproach is based in the tradition of Mincer (1974), trying to explian differences in earnings by differences in educational levels. In this studies the emphasis is the private direct returns to human capital. In general, this studies find a positive effect of education on earnings (e. g. in Spain; Raymond and Roig, 2003) with decreasing marginal returns. The macro aproach is more related with the growth literature, and try to capture also an indirect effect of human capital in the form of externalities (e. g. Lucas[2], 1988). The macro evidence is more heterogeneous in its modelling and conclusions', finding positive effects in time series regressions but the evidence is not so clear using panel data[3] (De la Fuente, 2011).

The main variables used as proxy of human capital are the years of schooling, educational attainment, number of graduates, evaluations of knowledge, proportions of the population with certain school level (Hyun, 2010). These measures are related with the investment in human capital (in years, persons or money) but not necessarily with the real stock of human capital. The quality of educaction is also relevant because one extra year of schooling is not equally productive in all regions, for all persons and productive purposes. Some research have been done on education quality (Harmon and Walker, 2005; Cooray, 2010; Castelló-Climent and Hidalgo-Cabrillana, 2011), the problem is that the little information disposable restringe this type of research to very specific samples. Other aproach to measure human capital can be using indexes on education like the work of Mulligan and Sala-i-Martin[4] (2000) that combine several relevant

[2] In the Lucas (1988) model this externality effect is captured in the household. The younger members of the family start with a human capital that is some proportion of the level of the older ones.
[3] Some authors specially Pritchet (2001) postulate a negative effect of human capital on economic growth
[4] This study is highlited over others because is the base for the construction of the Spanish Human Capital Index of IVIE (Valencian Institute for Economic Research) that is used in this research.

dimensions like years invested, earnings or labor status[5]. Other human capital indexes exist (e. g. Human Development Index, Combined Enrollment Ratio, Education Index or Life Expectancy Index), some of them measure more dimensions than education, like health or inequality. The problem with these general indexes is that the empiric reseach show relative different results on economic growth depending on the index used because they use different information (Taban and Kar, 2006).

The main empirical results show a positive influence of human capital on labor demand (Mahy and Vonral, 2008) and labor force participation (Keane, 2011). The effect on wages is more ambiguous because the private return is positive but this can increase firms labor cost and create negative presure over the wages of other people (Sanromá and Ramos, 2007). Also many studies ignore the negative slope of human capital adquisition (Ciccone and Peri, 2007) overestimating the size of externalities. Convining all these effects cause that the overall effect on unemployment can be misleading if it is calculated directly regressing unemployment on human capital.

2.4 KNOWLEDGE CAPITAL

This form of capital includes not only all information disposable for the society but also its accesibility and protecion (intellectual property rights). Other form to define it it is using a functional form like Jones (1995). The problem with the functional aproach is that we do not know the exact technollogy of production can not measure the output directly or know the value of some relevant variables like the depreciation rate (Griliches, 1998). This measurement problem goes from the individual firms[6] to the aggregate level (Chin et. al., 2006) so using micro data or specific samples can not solve the problem.

This measurement complexity causes that the majority of empirical research uses inputs of knowledge (e. g. Expenditure or number of researchers) or intermediate production (e. g. patents or industrial designs). There is also data in product and process innovation but here the problem will be distinguish the quality of innovation. The empirical literature focus in the use of this proxy variables as determinants of TFP. Coe and Helpman (1995) found a positive effect of private R&D on TFP and also argue a scale and spill-over effects suggesting increasing returns to knowledge. Engelbretch

[5] The problem using indexes is that we know the overall effect but not the specific effect of each variable used to construct the index or the complementarities and substitutability between this variables.
[6] Chin et. al. 2006 arguments that enterprises reflect the cost of innovation in their financial statements but not the direct value of innovation as one of their assets, underestimating the value of knowledge.

(1997) use the same methodology but added human capital, finding a complementarity with R&D. Griffith et. al. (2004) add a catching-up mechanism to the model measured as the distance to the World leader in patents (USA), the variable is not significant unless it is interacted with the own country R&D intensity suggesting that the knowledge capital have a high mantainance cost. The role of the public expenditure in R&D activities is addes by Guellec and Van Pottelsberghe de la Potterie (2004), the effect is negative which implies some sort of crowding-out[7]. Belorgey et. al. (2006) extended the model to add labor market conditions like productivity or hours worked, this reduce the magnitude of the R&D effect but not its sign or significance.

More related with the labor market is the set of articles exploring the relation between R&D and employment. Bogliacino and Vivarelli (2010) used a panel of 15 OCDE countries over 10 years, R&D expenditure have a positive and significative effect on employment. More specific evidence can be found in the research by Bogliacino and Pianta (2010). They regress employment (hours and persons) on R&D but distinguish if the expenditure is related with product innovation or cost reduction, been the first effect positive and the second negative or non signficant. For the Spanish case Harrison et. al. (2008) finds a positive effect of employment growth on product innovation but a negative one in process innovation. Finally Alonso-Borrego y Collado (2002) using micro-data of a set of Spanish firms find that the enterprises that engage in innovative process and R&D expenditure have more probability to hire and less probability to fire, or in other words, less volatitility on unemployment.

2.5 ENTREPRENEURSHIP CAPITAL

The concept of entrepreneurial capital is relatively new and can be related to the work of Audretsch and Keilbach (2004a, 2004b, 2005). Previous indexes trying to measure the entrepreneurial activity like the Ease of Doing Business (EOD), the Index of Economics Freedom (IEF) or the Global Competitive Index (GCI) capture part of the essence of the concept but they are also recent measures.

The research done by Evans and Jovanovic (1989) is considered one of the seminal papers of entrepreneurial economics. Ironically this paper is closely related with the labor market, more specifically with the decision between employment and self-employment. In this model the entrepreneurs have liquidity constraints implying that the

[7] This crowding-out can be caused by the high correlation between both types of R&D, so maybe it is an statistical effect than isnstead of a crowding-out mechanism.

decision to start a business involves risk management[8]. The model is formed by to main equations that determine the earnings of employment ($w = \mu x_1^{\gamma_1} x_2^{\gamma_2} \xi$)[9] and self-employment ($y = \theta k^{\alpha} \varepsilon$)[10]. They test their model with an empirical application for the US, and prove that liquidity constraints are relevant prohibiting the people with high "entrepreneurial hability" and low resources to start a business. Posterior research have confirmed this finding, recieve an inheritance augment significantly the probability of been an entrepreneur (Blanchflower and Oswald,1998) or liquidity constraints can reduce entrepreneurial activity seven times (Van Prag and Van Ophen, 1995).

Entrepreneurship is closely related with human capital. Specifically, the endowments of human capital of entrepreneurs are more diverse than the employed (Lazear, 2005) because they need more habilities to perform different activities although less specialized. Also the decision to become entrepreneur can be influenced by the depreciation of human capital if the person can not find a job related with her education level (Bhattacharjee et. al., 2006). Also some evidence exist of the complementarity between entrepreneurship and R&D expenditure. Erken et. al. (2008) reproduce various models[11] of the effect of R&D on TFP adding a measure of entrepreneurship, the results are mantained and the entrepreneurial variable have a positive effect on TFP.

Apart from the economic value added of the new business generated, entrepreneurship can have also an aditional social value. This positive externality is related with the higher self-motivation and self-satisfaction of entrepreneurs in comparison with employees in job satisfaction surveys (Blancflower, et. al., 2001). In contrast the self-employment is negatively correlated with economic growth (Congregado and Millán, 2008). This create a duality in the entrepreneurship phenomena between "refuge effect", people that become entrepreneurs by need, and the "entrepreneur effect", people that become entrepreneur to exploit a market opportunity. In an empirical study with 23 OCDE countries for the periodo 1970 – 2002 Audretsch

[8] The trade-off between risk and liquidity constraints is important. In previous models like Johnson (1978), Jovanovic (1979) or Miller (1984) they assume that the young people were the more likely to engage in risky activities (like start a business). This was because the liquidity constraint was not added and been self-employed was better for the young because they had lower salaries.

[9] Where μ is the average wage, x_1 measure expirience, x_2 measure education, ξ is the error term and γ_1 y γ_2 are the elasticities of expirience and education respectively.

[10] Where θ measures "entrepreneurial hability", k is the capital invested, ε is the error term, and α take values [0,1], and measure the elasticity of self-employment earnings with respect to investment.

[11] In concrete the five studies of the influence of R&D on TFP presented in the Knowledge Capital section of this document.

et. al. (2008) show that the "entrepreneur effect" more than compensate for the "refugee efect" so the total effect of entrepreneurship on unemployment is positive. The empirical evidence show also that there is not a significant effect for the success of new firms if the founder was previosly unemployed (Kitson, 1995). This show that the two types of entrepreneurship (need and opportunity) are so mixed that there is not an effective way to discriminate between them.

As with the other forms non-tangible capital presented, there have been attempts to capture the entrepreneurial culture with indexes. The ones presented at the begining os this section (EOD, IEF, CGI) are good examples, but their original purpose was measuring general economic conditions not entrepreneurship. The most complete and recent index of entrepreneurship is the Global Entrepreneurship Index (GEINDEX) constructed by Acs y Szerb (2009). The GEINDEX is intensive in information using 31 variables organized in three main areas (attitudes, activity and aspirations). So the index is so complete that can give us an idea for comparison purposes but two countries can have the same index value with a different mix of characteristics. For the Spanish case the most similar to an entrepreneurial index is the social capital elaborated by Pérez et. al. (2008). The entrepreneurship capital is part of the more general social capital so in this sense can be used to aproximate it, but is a very indirect and broad measure.

3. DATA

To estimate the labor market equations Spanish data at the national and regional level were used. The purpose of using three different levels of geogrpahical aggregation serves two purposes. First it allows comparing the effect of the interest parameters to make comparisons and analysis and use different proxies to capture the non-physical capital. Second, because the data have different range and setructure two different estimation techniques were used. The national estimations use time series while the regional ones use panel data. Finally, a panel was constructed using national data of some European nations[12] (including Spain) to compare the basic results for Spain.

The national case is the reference because it is a general average of the total economy over a relative long period of time. For this estimation the range includes 49 observations (1960 – 2008) but has to be reduced to 32 (1977-2008) to add alternative forms of capital. The regional estimates include 14 periods (1995-2008) and 17 regions

[12] Euro-15 excluding Luxemburg and Greece because of missing data

for the Autonomus Communities (NUT-II) and 50 regions for the provinces Provinces (NUT-III) for a total of 238 and 700 observations respectively. The European panel include 11 periods (1998-2008) for 13 countries or 143 observations.

Table 1 present the variables description and the sources of information. The basic sources of information are INE[13] (Spanish Statistic Institute), OCDE (Organization for the Cooperation and Economic Development), FBBVA-IVIE (Cooperation between the Fundation of the BVA Bank and the Valencian Institute for Economic Research). The rest of the information sources FUNCAS (Fundación de Cajas de Ahorro) , BD-Mores (Regional Database elaborated by Spanish Ministry of Finance and Public Administration), and WIPO (World Intellectual Property Organization) were used to obtain data on regional wages and trademark statistics respectively.

Table 1: Variables and Data Sources

Variable	Definition	Sources
n	Total number of employees or Labor Demand	INE, OCDE
l	Active Population or Labor Supply	INE, OCDE
ω	Real Wage	Funcas, BD-Mores, INE(EACL),OCDE
k	Real Capital Stock	FBBVA-IVIE, OCDE
r	Knowledge Capital: Measured as R&D expenditure, patent applications and number of dedicated persons	INE, OCDE, WIPO-database
h	Human Capital: Measured as equivalent workers, educative staff, number of graduates and proportion of schooling level	FBBVA-IVIE, OCDE
e	Entrepreneurship Capital: Measured as firm births, total number of establishments, trademarks registered, social capital and value added	DIRCE(INE), WIPO-database, OCDE, FBBVA-IVIE
u	Unemployment Rate	INE, OCDE
z	Working Age Population	INE, OCDE
$prod$	Real Productivity of Labor	INE, OCDE

[13] Including DIRCE (Central Directory of Spanish Enterprises)

4. MODEL

First the theoretical model will be presented. This will include the main assumptions and equilibrium condtitions from which the labor demand, labor supply and wage setting equations are constructed. Second the econometric specification will be presented higligthing some of the advantages of the model and estimation technique.

4.1 THEORETICAL FRAMEWORK

The model represents a market with f identical number of firms facing monopolic competition. The market supply is characterizaed by an extented Cobb-Douglas production function to include alternative forms o capital. The supply of the i-th firm will be represented by equation (1).

$$q_{it}^{S} = A\ K_{it}^{\beta_1} N_{it}^{1-\beta_1} R_t^{\beta_2} H_t^{\beta_3} E_t^{\beta_4} \quad (1)$$

Where q_{it}^{S} represents total production, A is a constant representing the average level of TFP, K_{it} is the stock of physical capital, N_{it} represents total employment, R_t, H_t and E_t measure the knowledge capital, human capital and entrepreneurship capital respectively. The coeficients β_n are positive constants representing elasticities.

The product demand is characterized by equation (2).

$$q_{it}^{D} = \left(\frac{P_{it}}{P_t}\right)^{-\eta} \frac{Y_t}{f} \quad (2)$$

Where q_{it}^{D} represent the product demand of the i-th firm, P_{it} is the price of the firm, P_t is the price level, Y_t is agrégate output and f is the total number of firms in the market. The parameter η is a positive constant representing the price elasticity.

Multiplying product demand by its price and derivating the expression with respect to quantity equation (3) or the marginal revenue IMg_{it} can be obtained.

$$IMg_{it} = P_{it}(1-(1/\eta)) \quad (3)$$

Multiplying labor supply by its costs (lets assume that only the labor costs are relevant, where W_{it} is the nominal wage) an derivating with respect to quantity equation (4) or marginal cost is obtained

$$CMg_{it} = W_{it}\left(\frac{N_{it}^{\beta_1}}{(1-\beta_1)A\ K_{it}^{\beta_1} R_t^{\beta_2} H_t^{\beta_3} E_t^{\beta_4}}\right)\xi_{it} = W_{it}\left(\frac{N_{it}^{\beta_1}}{(1-\beta_1)A\ K_{it}^{\beta_1} R_t^{\beta_2} H_t^{\beta_3} E_t^{\beta_4}}\right)\left(\frac{N_{it}}{\sigma N_{it-1}}\right)^{\lambda} \quad (4)$$

The expression $\xi_{it} = \left(N_{it} / \sigma N_{it-1}\right)^{\lambda}$ represents the adjusting costs (e. g. training costs of the new employees) where λ represent the magnitude of this adjustment costs and σ is the job survival rate.

Equating expression (3) and (4) and solving for the total number of employees ($fN_{it} = N_t$) equation (5) or the labor demanda is obtained.

$$n_t = \gamma_0 + \gamma_1 n_{t-1} + \gamma_2 k_t + \gamma_3 r_t + \gamma_4 h_t + \gamma_5 e_t - \gamma_6 \omega_t \tag{5}$$

The lower case represent the log of the variable and the parameters represent

$$\gamma_0 = \frac{1}{\beta_1 + \lambda}\left(\ln\left(1 - \frac{1}{\eta}\right) + \ln\left(1 - \beta_1\right) + \ln\left(A\right) + \lambda \ln(\sigma)\right); \gamma_1 = \frac{\lambda}{\beta_1 + \lambda}; \gamma_2 = \frac{\beta_1}{\beta_1 + \lambda};$$

$$\gamma_3 = \frac{\beta_2}{\beta_1 + \lambda}; \gamma_4 = \frac{\beta_3}{\beta_1 + \lambda}; \gamma_5 = \frac{\beta_4}{\beta_1 + \lambda}; \gamma_6 = \frac{1}{\beta_1 + \lambda}$$

For the wage equation we need first an equation of the price level, that is obtained solving (6) for the price level that is hide in the denominator of the real wage variable. Expression (7) is this price level equation

$$p_t = -\frac{\gamma_0}{\gamma_6} + w_t + \frac{1}{\gamma_6} n_t - \frac{\gamma_1}{\gamma_6} n_{t-1} - \frac{\gamma_2}{\gamma_6} k_t - \frac{\gamma_3}{\gamma_6} r_t - \frac{\gamma_4}{\gamma_6} h_t - \frac{\gamma_5}{\gamma_6} e_t \tag{6}$$

From equation (6) we can take out the labor demand using a market clearing condition (market demand equal to production) and obtain the expresion (7).

$$p_t = \eta_0 + w_t + \eta_1 y_t - \eta_2 k_t - \eta_3 r_t - \eta_4 h_t - \eta_5 e_t - \eta_6 y_{t-1} + \eta_7 k_{t-1} + \eta_8 r_{t-1} + \eta_9 h_{t-1} + \eta_{10} e_{t-1} \tag{7}$$

The wage equation is constructed in the tradition of Taylor (1979) with rigidities. Where Ω_t represent the bargained wage[14] for this and the next period, so the nominal wage today is equal to expresión (8).

$$w_t = \frac{1}{2}\left(\Omega_t + \Omega_{t-1}\right) \tag{8}$$

Using an expression of the aggregate demand dependant on money balances ($y_t = m_t - w_t + \nu_t$)[15] and defining a policy rule for money supply like $m_t = (1 - \phi) w_t$, where $\phi[0,1]$ measure how the policy accomodates one can obtain interacting with equation (8) the expresion (9).

---

[14] $\Omega_t = (1 - b_1)\Omega_{t-1} + b_1 \hat{\Omega}_{t+1} + \theta\left[(1 - b_1)\hat{y}_t + b_1 \hat{y}_{t+1}\right] + \varepsilon_t$, the variables with hat represent expectation of the real value. θ the sensibility of wages to aggregate demand, b_1 measure the quality of expectations and ε_t is White noise

[15] Where m_t represent Money balances and ν_t possible shocks

$$w_t = d_1 w_{t-1} + \frac{1}{2}\left(\varepsilon_t + \varepsilon_{t-1}\right) \tag{9}$$

Substracting equation (9) from equation (6) the real wage can be obtained. The real wage equation is represented by (10).

$$\omega_t = d_1 \omega_{t-1} + (1-\varphi_1)\varsigma_t - \varphi_2 \varsigma_{t-1} - \mu_t + d_1 \mu_{t-1} \tag{10}$$

Where the parameter d_1 measures the persistence of wages, ς_t are shocks emerging from the wage bargaining process, and the other two paramters represent.

$$\varphi_1 = (1-\eta_1\phi); \varphi_2 = \eta_6\phi;$$

$$\mu_t = \eta_0 - \eta_2 k_t - \eta_3 r_t - \eta_4 h_t - \eta_5 e_t + \eta_7 k_{t-1} + \eta_8 r_{t-1} + \eta_9 h_{t-1} + \eta_{10} e_{t-1} + \eta_1 \nu_t - \eta_6 \nu_{t-1}$$

Finally the labor supply equation is also constructed from an equilibrium condition. This condition equates expressions (11) and (12) that represent marginal revenue and marginal cost of being in the labor force respectively.

$$RM_t = g_1 + g_2(n_t - l_t) + g_3\omega_t - g_4(l_t - z_t) + g_5 r_t + g_6 h_t + g_7 e_t \tag{11}$$

$$CM_t = \vartheta_1 + \vartheta_2(l_t - l_{t-1}) + \vartheta_3 r_t + \vartheta_4 h_t + \vartheta_5 e_t \tag{12}$$

Where l_t stands for the logaritm of labor supply and z_t is the logaritm of the working age population. The forms of intagible capital are included in both expression in order to avoid a priori judgments of their effect. Equating both expression and solving for l_t the equation (13) or labor supply is obtained.

$$l_t = \rho_0 + \rho_1 l_{t-1} + \rho_2 \omega_t + \rho_3 z_t - \rho_4 u_t + \rho_5 r_t + \rho_6 h_t + \rho_7 e_t \tag{13}$$

And the parameters represent

$$\rho_0 = \frac{g_1 - \vartheta_1}{(\vartheta_2 + g_4)}; \rho_1 = \frac{\vartheta_2}{(q_2 + g_4)}; \rho_2 = \frac{g_3}{(\vartheta_2 + g_4)}; \rho_3 = \frac{g_4}{(\vartheta_2 + g_4)};$$

$$\rho_4 = \frac{g_2}{(\vartheta_2 + g_4)}; \rho_5 = \frac{(g_5 - \vartheta_3)}{(\vartheta_2 + g_4)}; \rho_6 = \frac{(g_6 - \vartheta_4)}{(\vartheta_2 + g_4)}; \rho_7 = \frac{(g_7 - \vartheta_5)}{(\vartheta_2 + g_4)}$$

The equations (5), (10) and (13) represent the labor market dynamics. From this expressions we can obtain a reduced form of the unemployment rate (u_t) that is the only lower case in the model that do not represent logaritm.

$$u_t = \frac{L_t - N_t}{L_t} = 1 - \frac{N_t}{L_t} \rightarrow \ln(U_t) = \ln(1) - \ln(\frac{N_t}{L_t}) \rightarrow u_t = l_t - n_t \tag{14}$$

4.2 ECONOMETRIC ESTIMATION

The Auto-Regressive Distributed Lag (ARDL) is the technique that will be used to calculate the parameters in the model. The ARDL was developed by the work of Pesaran (1997), Pesaran and Shin (1999) and Pesaran et. al. (2001); and its an alternative to cointegration techniques. This technique is desirable because, in contrast with cointegration, none a priori assumption about the order of integration of the variables had to be done. The econometric specification is represented in vectorial form in equation (15).

$$A_0 y_{i,t} = A_1 y_{i,t-1} + A_2 y_{i,t-2} + B_1 x_{i,t} + B_2 x_{i,t-1} + C_1 s_{i,t} + C_2 s_{i,t-1} + e_{i,t} \quad (15)$$

Where $y_{i,t}$ represents the vector of endogenous variables, $x_{i,t}$ represent exogenous regional variables and $s_{i,t}$ represent exogenous national variables. A_n, B_n and C_n represent matrix of coeficients and $e_{i,t}$ [16] is a vector of errors i.i.d.

Equations (16), (17) and (18) are the empirical counterparts of equations (5), (10) and (13) including an error term.

$$n_t = \gamma_0 + \gamma_1 n_{t-1} + \gamma_2 k_t + \gamma_3 r_t + \gamma_4 h_t + \gamma_5 e_t - \gamma_6 \omega_t + \varepsilon_t^n \quad (16)$$

$$\omega_t = d_0 + d_1 \omega_{t-1} + d_2 prod_t - d_3 u_t + d_4 r_t + d_5 h_t + d_6 e_t + \varepsilon_t^\omega \quad (17)$$

$$l_t = \rho_0 + \rho_1 l_{t-1} + \rho_2 \omega_t + \rho_3 z_t - \rho_4 u_t + \rho_5 r_t + \rho_6 h_t + \rho_7 e_t + \varepsilon_t^l \quad (18)$$

Using equation (15) one can obtain a uni-equational representation of unemployment given by equation (19). This representation summarizes very well the laged adjustments that play a role on unemployment. This helps to understand how past shocks can have long lasting effects on unemployment. This is allows to observe directly the short-run effects on unemployment in the parameters and construct the assumed long run relations assuming a stable unemployment rate in the steady state. For the extended representation of the coefficients ψ_i you can consult the Annex.

$$\begin{aligned} u_t = {} & \psi_0 + \psi_1 u_{t-1} - \psi_2 u_{t-2} + \psi_3 u_{t-3} + \psi_4 z_t - \psi_5 z_{t-1} + \psi_6 z_{t-2} - \psi_7 k_t + \psi_8 k_{t-1} - \psi_9 k_{t-2} \\ & + \psi_{10} prod_t - \psi_{11} prod_{t-1} + \psi_{12} r_t - \psi_{13} r_{t-1} + \psi_{14} r_{t-2} + \psi_{15} h_t - \psi_{16} h_{t-1} + \psi_{17} h_{t-2} \\ & + \psi_{18} e_t - \psi_{19} e_{t-1} + \psi_{20} e_{t-2} + \psi_{21} \varepsilon_t^l - \psi_{22} \varepsilon_{t-1}^l + \psi_{23} \varepsilon_{t-2}^l + \psi_{24} \varepsilon_t^n - \psi_{25} \varepsilon_{t-1}^n + \psi_{26} \varepsilon_{t-2}^n \\ & + \psi_{27} \varepsilon_t^\omega - \psi_{28} \varepsilon_{t-1}^\omega \end{aligned} \quad (19)$$

[16] In the Panel estimations the error follows a one-way distribution $e_{i,t} = \kappa_i + v_{it}$, where $v_{it} - (0, \sigma_v^2)$ and κ_i represent the regional effects that are assumed to remain fixed over time.

5. RESULTS

The general results show positive evidence on the influence of the non-tangible forms of capital in the labor dynamics. Human capital affects positively the labor demand and the labor supply and negatively the wage setting equation (with some exceptions). Knowledge capital enters negatively in the three equations of labor market at the three levels of Spanish aggregation (except for the wage setting equation of the Autonomus Communities) but its effect is positive in all the specifications for Europe. Entrepreneurship capital have a positice effect in all the equations for all the specificactions or is not significative.

Table 2 show the results for the Spanish time series data. Tables A2.1, A2.2 and A2.3 in the Annex show the step by step estimations of the labor demand, wage setting and labor force equations respectively. Different proxy variables were tested to measure non-physical capital so the measures included in the complete estimation (Table 2) were selected based on the minimum values of the information criterions[17] (Akaike, Schwarz y Hannan-Quinn). Let's analize the labor demanda first. In the complete estimation human capital is measured as proportion of the population with at least medium secondary education. The knowledge capital was proxied with the number of patents lagged for years and with a negative effect suggesting labor reducing forms of innovation. Entrepreneurship capital was measured with the social capital variable lagged two periods and enters with positive sign.

Table 2: Spanish Time Series

	Labor Demand			Wage Setting			Labor Force	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
n_{t-1}	0.934 ***	0.000	ω_{t-1}	0.953 ***	0.000	l_{t-1}	0.817 ***	0.000
n_{t-2}	-0.220 **	0.014	ω_{t-2}	-0.386 ***	0.001	l_{t-2}	-0.283 **	0.044
k_t	0.397	0.129	$prod_t$	0.312 ***	0.000	$\Delta\omega_t$	-0.063	0.403
k_{t-1}	-0.457 **	0.024	u_t	-0.281 ***	0.001	z_t	0.243 *	0.087
ω_t	-0.549 ***	0.000	d89	-0.027 ***	0.001	u_t	0.260 *	0.063
ω_{t-1}	0.406 **	0.035	d96	0.023 ***	0.003	d87	0.018 ***	0.001
d_84_93	-0.018 ***	0.002	h_{t-2}	-0.106 *	0.100	h_t	0.133 **	0.019
h_t	0.169 **	0.013	r_t	-0.007 **	0.045	r_t	-0.015 *	0.078
r_{t-4}	-0.029 *	0.067	e_{t-1}	0.014 *	0.071	e_t	0.056 ***	0.009
e_{t-2}	0.036 **	0.033						
Adj. R^2	0.998			0.992			0.999	
S.E.	0.006			0.007			0.004	
MLL	137.881			111.1881			117.8202	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

[17] In some cases because of problems of collinearity other variable were picked in order to show the three effects on the complete estimation.

The wage setting equation show the expected signs for the traditional variables. Wages show high persistence, a positive effect of productivity and a negative effect of the unemployment rate. In this equation the human capital was estimated using the synthetic index with a positive but only significative. Knowledge capital was estimated using the number of patents granted with a negative effect implying that more practical knowledge reduce the value of labor. Entrepreneurship capital is measured as the number of trademark applications by residents showing a positive effect that suggest complementarities between entrepreneurship and employment.

The labor supply equation present some interesting characteristics. First, the wages have no effect on the complete estimation. The rest of the typical coefficients enter with a significative coefficient and the expected sign. An exception is the unemployment rate that enters with a positive. The theoretical model predicts that entry in the labor force will be negatively affected by unemployment because reduces the probability of being hired. The Spanish case can be different for the high temporary job rate and in some degree a "refugee effect" of many self-employed. Human capital was calculated using the synthetic index and influence positively labor supply. Knowledge capital is proxied with the R&D expenditures in the educative sector that is logical can create incentives for students to remain out of the labor force. Again social capital is the most efficient variable to calculate entrepreneurship capital and its influence is positive.

Finally it is important to notice that some dummy variables were added to each of the three labor demand equations to correct for some important institutional changes. This specific dummy variables were used in previous research of Spanish labor markets (Karanassou et. al., 2008). In the labor demand equation a dummy was added in the period 1984 and in 1993 consistent with the first and second waves of labor reforms. In the wage setting dummies for 1989 and 1996 were introduced to capture the effect of the entrance in the European Monetary Space and the third wave of labor reforms. The labor force participation was affected by the inclussion of the Moncloa Pacts in 1987 with a positive effect.

Another striking fact is how the intangible capital take out significance of physical capital. This effect should be explored with more detail because can be simply an statistical effect result of multicollinearity. But can also be a true effect that captures the importance of the other forms of capital as the real measure of the stock of productive capital in the economy.

Now lets analyze the three specifications that use panel data. These estimations have a clear drawback because do not include long enough periods to make more accurate conclusions. This worry comes from the fact that the period analyzed was mainly expansionary so the conclusions can be different over more economic cycles.

Table 3 show the labor market equations for the panel of Autonomus Communities. Again Table A3.1, Table A3.2 and Table A3.3 complement the information presented here with other aditional proxies of intangible capital.

Labor demand for the NUTS-II level show in general lower presistence than the national estimates. It is also important to notice that the physical capital enter with three lags showing evidence that its effect was very retarded mainly because of over investment. Wages enter with the expected negative sign but its magnitud is very reduced. The proxy for human capital was again the synthetic index measured as equivalent[18] workers that affect in a positive way the employment. Knowledge capital was measured as total R&D expenditure as a percentage of GDP and enter again with a negative sign and low but significative impact. The total number of establishments was used as the main variable to capture entrepreneurship capital an its effect on employment is positive. The measuring of the total number of locals instead of firm births reflect more clearly the stock concept of this variable.

Table 3: Panel Data Autonomus Communities (NUTS-II)

	Labor Demand			Wage Setting			Labor Force	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
n_{it-1}	0.563 ***	0.000	ω_{lt-1}	0.244 ***	0.000	l_{it-1}	0.627 ***	0.000
k_{it-3}	0.089 **	0.000	u_{it}	-0.059	0.740	l_{it-2}	-0.152 **	0.018
$\Delta\omega_{lt}$	-0.048 **	0.046	$prod_{it-1}$	-0.151 *	0.077	ω_{lt}	-0.147 ***	0.001
h_{it}	0.089 ***	0.004	h_{it-1}	0.135 ***	0.002	z_{it}	1.032 ***	0.006
r_{it}	-0.015 **	0.019	$r(ht)_{it}$	0.015 **	0.020	z_{it-1}	-0.639 *	0.077
e_{it-1}	0.043 ***	0.002	$r(kis)_{it-1}$	0.040	0.103	Δu_{it-2}	0.356 **	0.049
			$r(exp)_{it-1}$	-0.008 **	0.037	h_{it}	0.506 ***	0.003
			e_{it-1}	-0.023	0.247	h_{it-1}	-0.567 ***	0.001
						$r(exp)_{it-1}$	-0.010 ***	0.008
						$r(pat)_{it-1}$	0.008 ***	0.008
						e_{it-1}	0.027 ***	0.001
Adj. R^2	0.9999			0.9948			0.99983	
S.E.	0.0077			0.0122			0.012	
MLL	603.3778			472.3303			584.9557	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

[18] Number of workers equivalent to a person with 20 years or less and no studies or incomplete primary education.

The wage setting equation is characterized by a very low persistence reflecting the volatitlity of salaries during the expansion. It is also important to notice that unemployment is no significative and the productivity enter with a negative sign. This negative sign can be explianed based on the counter-cyclical behavior of the productivity in Spain and its underlying causes. Human Capital is captured in this specification with the percentage of people with primary education with a strong positive effect. Knowledge capital is captured with three variables two of them with positive effect (people engaged in high-tech and knowledge intensive services) and a negative effect of the public R&D expenditure. In this case entrepreneurship capital can no enter in the complete specification. It is interesting to notice that in the last two columns of Table A3.2 entrepreneurship capital enters with a positive sign for the total entry of new firms, but it enters negatively if it is measured as the total number of establishments with more than 50 employees. This not only highlight the importance of small entrepreneurs as a wage push factor.

Table 4 show the labor market equations at the Province level. Again Table A4.1, Table A4.2 and Table A4.3 complement the information presented here with other aditional proxies of intangible capital. Special emphasis should be made about physical capital that is significative in all the specification of Table A4.1 but is not significative even at the 10% level. This suggest again the complementarity of physical and non physical capital.

Table 4: Panel Data Provinces (NUTS-III)

	Labor Demand			Wage Setting			Labor Force		
	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value
n_{it-1}	0.425	***	0.000	ω_{it-1}	0.550	***	0.000	l_{it-1}	0.573	***	0.000
n_{it-3}	0.117	***	0.000	u_{it-4}	-0.062	**	0.021	$\Delta\omega_{it}$	-0.090		0.247
k_{it}	0.155		0.163	$prod_{it}$	-0.055	***	0.003	z_{it}	1.649	***	0.000
k_{it-1}	-0.128		0.254	h_{it-1}	0.015		0.242	z_{it-1}	-1.402	***	0.000
$\Delta\omega_{it}$	-0.030		0.307	r_{it-1}	-0.007	**	0.016	Δz_{it-1}	-0.668	**	0.021
h_{it}	0.210	***	0.000	$e(+50)_{it}$	-0.014	**	0.026	u_{it}	0.547	***	0.000
h_{it-2}	0.052	*	0.080	$e(-50)_{it-1}$	0.017	*	0.052	u_{it-1}	-0.320	***	0.000
r_{it-1}	-0.008	***	0.000					h_{it}	0.388	***	0.000
e_{it}	0.062	***	0.005					h_{it-1}	-0.291	***	0.002
								r_{it}	-0.005	*	0.051
								$e(10\text{-}19)_{it}$	0.043	*	0.074
								$e(6\text{-}9)_{it-1}$	0.051	**	0.039
Adj. R^2	0.999463			0.985693				0.999388			
S.E.	0.0201			0.0109				0.021874			
MLL	1278.1300			1587.5830				1481.019			

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

The wage is also non significative in the labor demand equation but was not in any of the previous specifications. This can be caused by the nature of the Provinces as a geographical unit with low political and economic influence. In this sense the wages are result of a bargaining processes in bigger geographical areas. Human capital

The wage setting equation again shows a negative sign for productivity and in this case a signifcantive and negative effect on unemployment. The labor supply equation enter with the expected signs and again wage is not relevant at this aggregation level. Also noting the lower persistence of the dependant variables in the more specific geographical areas.

In Table 4 human capital is proxied as equivalent workers in the three equations and its effect is positive for demand and supply, and it has no effect on wages. Knowledge capital is proxied as the number of patents and enter the three equations with a negative sign but with low magnitude. The number of locals was used as the proxy for entrepreneurship capital, it enters positive in all the three equations. It is important to notice that the negative effect on wage setting caused by entrepreneurial capital is related again with locals of more than 50 employees.

As a warning is important to take the effects at the provincial level carefully. The panel data estimation is more efficient with a balanced number between the two dimensions (time and space). In this case 50 regions and only 14 years can create serious problems with the estimation.

Table 5: Panel Data European Nations

	Labor Demand			Wage Setting			Labor Force		
	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value
n_{it-1}	1.070	***	0.000	ω_{it-1}	0.722	***	0.000	l_{it-1}	0.977	***	0.000
n_{it-2}	-0.209	**	0.022	$prod_{it}$	0.354	***	0.001	l_{it-2}	-0.226	***	0.012
Δk_{it}	0.265	**	0.024	Δu_{it-2}	-0.009	***	0.001	ω_{it-1}	-0.050	*	0.074
$\Delta\omega_{it}$	-0.209	***	0.000	$h(kt)_{it-1}$	-0.003	**	0.044	z_{it}	1.205	***	0.000
$r(herd)_{it}$	0.034	***	0.000	r_{it}	0.025	***	0.003	z_{it-1}	-0.953	***	0.000
$r(nano)_{it}$	0.004	**	0.012	e_{it}	0.031	**	0.032	Δu_{it-1}	-0.002		0.125
$r(per)_{it}$	0.034	**	0.028					r_{it-1}	0.023	*	0.002
$e(man)_{it}$	0.032	*	0.056								
Adj. R^2	0.999975			0.928062				0.999984			
S.E.	0.005228			0.007852				0.004119			
Log Likelihood	384.7011			302.7910				468.2688			

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

Finally Table 5 present the European panel data at the national level. The complementary tables can be found in the Annex as Table A5.1 for labor demand, Table A5.2 for wage setting and Table A5.3 for labor supply.

Three important facts can be taken from this last table. First the negative effect of real productivity on wages is characteristic of Spain no matter the level os spatial aggregation. Second the negative effect of wages on labor force participation is consistent in the three estimations. And finally disaggregating the spatial level seems to reduce persistence and it is not an effect of the panel data methodology.

6. CONCLUSIONS

This paper presented a revision of the dynamics of labor market in Spain making special emphasis on the influence of non-physical capital. Although the total effect on unemployment is ambiguos the methodology of the CRT allows for an specific measure of this effects on unemployment rate, and distinguish between the short and long run effects of the endogenous and exogenous variables.

The results show a positive influence of the human capital in the three equations except for the wage setting equation at the national level. The knowledge capital entered negatively in all the equations, except when is measured as the proportion of persons engaged in high-tech and knowledge intensive sectors. Finally the entrepreneurship capital have a positive effect in the three labor market equations, except when is measured as the stock of establishments with more than 50 employees.

Future lines of research should include micro-data on enterprises to see the external effects at the firm level of these alternative forms of capital. Also will be interesting revise the results when more temporal extension can be added to the panel estimations. This last point specially for the Provincial level that can highligth some hidden characteristics of the influence of certain variables and the no influence of the more traditional ones.

The different specifications at different geographical levels and with different proxies capturing the non-physical forms of capital had shown the importance of this form of capital, specially the entrepreneurial one.

REFERENCES

Acemoglu, D. (2002). "Technical Change, Inequality, and the Labor Market," Journal of Economic Literature, American Economic Association, vol. 40(1), pages 7-72

Acs, Z. J. y Audretsch, D. B (2003). "Innovation and Technological Change". En Z.J. Acs and D.B. Audretsch (eds.), Handbook of Entrepreneurship Research, 55-79. Kluwer Academic Publishers, Gran Bretaña.

Acs, Z. J. y Szerb L. (2009). "The global entrepreneurship index (GEINDEX)", Jena Economics Research Papers N° 2009-28.

Alonso-Borrego, C. y Collado, D. (2002). "Innovation and Job Creation and Destruction : Evidence from Spain," Discussion Papers (REL - Recherches Economiques de Louvain) 2002024, Université catholique de Louvain, Institut de Recherches Economiques et Sociales (IRES).

Ashenfelter, O., Doran, K., y Schaller, B. (2010). "A shred of credible evidence on the long-run elasticity of labour supply". Economica, 77(308), 637-650.

Audretsch, D. y Keilbach, M. (2004a). "Entrepreneurship Capital and Economic Performance," Regional Studies, Taylor and Francis Journals, vol. 38(8), pages 949-959

Audretsch, D.B. y Keilbach, M. (2004b): "Does entrepreneurship capital matter?", Entrepreneurship:Theory and Practice, 28(5): 419-429.

Audretsch, D.B. y Keilbach, M. (2005): "Entrepreneurship capital and regional growth", Annals of Regional Science, 39(3): 457-469.

Audretsch, D.B.; Carreed, M.A.; A. Roy Thurik, A.R.; Van Stel, A. (2008). "Does self-employment reduce unemployment?" Journal of Business Venturing, Volumen 23 (6), 673-686

Bande, R.; Fernández, M.; y Montuenga, V. (2007). "Regional Disparities in the Unemployment Rate: The Role of the Wage-setting Mechanism in Spain, 1987-92," Regional Studies, Taylor and Francis Journals, vol. 41(2), pages 235-251.

Bande, R.; Fernández, M.; y Montuenga, V. (2008). "Regional unemployment in Spain: Disparities, business cycle and wage setting," Labour Economics, Elsevier, vol. 15(5), pages 885-914

Bande, R. y Karanassou, M. (2009). "Labour market flexibility and regional unemployment rate dynamics: Spain 1980-1995," Papers in Regional Science, Wiley Blackwell, vol. 88(1), pages 181-207, 03.

Barro, R., Mankiw, G. y Sala-i-Martin, X. (1995). "Capital Mobility in Neoclassical Models of Economic Growth", American Economic Review, vol. 85, 1, pp.103-115

Belorgey, N.; Lecat, R.; y Maury, T.-P. (2006), “Determinants of productivity per employee: an empirical estimation using panel data”, Economics Letters, 91(2), 153-157.

Bhattacharjee, A., Bonnet, J.,Le Pape, N. y Renault, R. (2006). "Inferring the unobserved human capital of entrepreneurs," Economics Working Paper Archive (University of Rennes 1 & University of Caen) 200603, Center for Research in Economics and Management (CREM), University of Rennes 1, University of Caen and CNRS.

Blanchflower, D. y Oswald, A., (1998). "What Makes an Entrepreneur?," Journal of Labor Economics, University of Chicago Press, vol. 16(1), pages 26-60,

Blanchflower, D.; Oswald, A.; y Stutzer, A., (2001). "Latent entrepreneurship across nations," European Economic Review, Elsevier, vol. 45(4-6), pages 680-691.

Blanchflower, D.; y Oswald, A, (2005). "Regional Wages and the Need for a Better Area Cost Adjustment," Public Money & Management, Chartered Institute of Public Finance and Accountancy, vol. 25(2), pages 86-88, 04.

Blanchard, O.J. (2006): “European Unemployment: the Evolution of Facts and Ideas”, Economic Policy, vol. 21 (45), pp. 6-59.

Blundell, R. y Macurdy, T. (1999). "Labor supply: A review of alternative approaches", Handbook of Labor Economics, in: O. Ashenfelter & D. Card (ed.), Handbook of Labor Economics, edition 1, volume 3, chapter 27, pages 1559-1695

Bogliacino, F.; Pianta, M. (2010). “Innovation and Employment: a Reinvestigation using Revised Pavitt classes”, Research Policy, doi:10.1016/j.respol.2010.02.01.7

Bogliacino F.; y Vivarelli, M. (2010). “The Job Creation Effect of R&D Expenditures”, IZA Discussion Papers 4728, Institute for the Study of Labor (IZA).

Bosworth, B., y Collins, S. (2003). “The Empirics of Growth: An Update.” Brookings Papers on Economic Activity, 2, 113–207.

Caballero, R. y Hammour, M. (1994): “The cleansing effects of recessions”, American Economic Review, 84, 1350-68

Cahuc, P., Marque, F., Wasmer E. (2008) “A theory of wages and labor demand with intra-firm bargaining and matching frictions”, International Economic Review, (49) 3, pp 943-972

Ciccone, A. y Peri, G. (2007). "Identifying Human Capital Externalities. Theory with Applications", Working Papers 201098, Fundacion BBVA / BBVA Foundation.

Coe, D.T. y Helpman, E. (1995), “International R&D spillovers”, European Economic Review, 39(5), 859-887.

Congregado, E.; y Millán J.M. (2008). “Capital humano y transiciones al autoempleo”, en Congregado et al. *El capital humano y los emprendedores en España*, pp. 101-130. IVIE- Bancaja, Instituto Valenciano de Investigaciones Económicas, Valencia, 226 p.

Castelló-Climent, A. e Hidalgo-Cabrillana, A. (2011). "The Role of Educational Quality and Quantity in the Process of Economic Development," CEP Discussion Papers dp1087, Centre for Economic Performance, LSE.

Chin, C.L.; Lee, P.; Kleinman, G.; y Chen, P.Y. (2006). "IPO anomalies and innovation capital," Review of Quantitative Finance and Accounting, Springer, vol. 27(1), pages 67-91,

Davidson, P.; Lindmark, L. Y Olofsson, C.(1999). “SMEs and Job Creation During Recession and Recovery”, en Entrepreneurship, Small & Medium Enterprises and the Macroeconomy, Acs, Z.; Carlsson, B. y Karlsson, C. (eds.), Cambridge University Press.

De la Fuente, A. (2011)."Human capital and productivity," Working Papers 1103, BBVA Bank, Economic Research Department.

Director (2009). BIMA. Nª 177. UC3M

Dixon, H. y Rankin, N. (1993). “Imperfect competition and macroeconomics: a survey”, Oxford Economic Papers New Series, Vol. 46, No. 2, pp. 171-199

Engelbrecht, H.J. (1997), “International R&D spillovers, human capital and productivity in OECD economies: an empirical investigation”, European Economic Review, 41(8), 1479-1488.

Erken, H.; Donselaar, P.; y & Thurik, R. (2008). "Total factor productivity and the role of entrepreneurship," Jena Economic Research Papers 2008-019, Friedrich-Schiller-University Jena, Max-Planck-Institute of Economics

Evans, D. y Jovanovic, B. (1989). “Estimates of a model of entrepreneurial choice under liquidity constraints”, Journal of Political Economy, 97, 808-827.

Gali, J. y Gertler, M. (1999). "Inflation dynamics: A structural econometric analysis," Journal of Monetary Economics, Elsevier, vol. 44(2), 195-222.

Galí, J.; Smets, F.; y Wouters, R. (2011). "Unemployment in an Estimated New Keynesian Model," NBER Working Papers 17084, National Bureau of Economic Research, Inc.

Glyn, A. (2001). " Inequalities of Employment and Wages in OECD Countries," Oxford Bulletin of Economics and Statistics, Department of Economics, University of Oxford, vol. 63(0), pages 697-713, Special I.

Griffith, R., Redding, S. y Van Reenen, J. (2004). “Mapping the two faces of R&D. Productivity growth in a panel of OECD industries”, Review of Economics and Statistics, 86(4), 883-895.

Griliches, Z. (1998). "R&D and productivity: the unfinished business," Estudios de Economia, University of Chile, Department of Economics, vol. 25(2 Year 19), pages 145-160.

Guellec, D. and B.P. Van Pottelsberghe de la Potterie (2004), "From R&D to productivity growth: do the institutional settings and the source of funds of R&D matter?" Oxford Bulletin of Economics and Statistics, 66(3), 353-378.

Haltiwanger, J. (1999). "Job Creation and Destruction by Employer Size and Age: Cyclical Dynamics", en Entrepreneurship, Small & Medium Enterprises and the Macroeconomy, Acs, Z.; Carlsson, B. y Karlsson, C. (eds.), Cambridge University Press.

Hamermesh, D.S. (1986): "The Demand for Labor in the Long Run", en Handbook of Labor Economics, Vol. I, Ashenfelter, O. y R. Layard (eds.), Editorial North-Holland.

Harmon, C. y Walker, I. (2000). "The Returns to the Quantity and Quality of Education: Evidence for Men in England and Wales," Economica, London School of Economics and Political Science, vol. 67(265), pages 19-35.

Harrison, R.; & Jaumandreu-Balanzo, J.; Mairesse, J. y Peters, B. (2008). "Does Innovation Stimulate Employment? A Firm-Level Analysis Using Comparable Micro-Data From Four European Countries," ZEW Discussion Papers 08-111, ZEW - Zentrum für Europäische Wirtschaftsforschung / Center for European Economic Research.

Henry, S.G.B., Karanassou, M., and D. J. Snower (2000). "Adjustment Dynamics and the Natural Rate: An Account of the UK Unemployment", Oxford Economic Papers, 52, 178-203.

Hernández, L. y Serrano, L. (2003). "Las dotaciones de capital humano de los emprendedores", en Congregado et al. *El capital humano y los emprendedores en España*, pp. 43-99. IVIE- Bancaja, Instituto Valenciano de Investigaciones Económicas, Valencia, 226 p.

Holzer, H.J. (1991). "Employment, Unemployment and Demand Shifts in Local Labor Markets", The Review of Economics and Statistics, Vol. 73, No. 1 (Feb., 1991), pp. 25-32

Hyun, H.S. (2010). "Human Capital Development", ADB Economics Working Paper Series, 225, Asian Development Bank.

Iyer, S.; Kitson, M.; y Toh, B. (2005). "Social capital, economic growth and regional development," Regional Studies, Taylor and Francis Journals, vol. 39(8), pages 1015-1040

Jones, C. I. (1995). "R&D-Based Models of Economic Growth," Journal of Political Economy, University of Chicago Press, vol. 103(4), pages 759-84,

Karanassou, M. and D. J. Snower (1996), "Explaining Disparities in Unemployment Dynamics", in Baldassari M., L. Paganetto, and E.S. Phelps (eds), The 1990's Slump: Causes and Cures, Macmillan Press and Rivista di Politica Economica.

Karanassou, M., and D. J. Snower (1997), "Is the Natural Rate a Reference Point?", European Economic Review 41, 559-569.

Karanassou, M., and D. J. Snower (1998), "How Labour Market Flexibility Affects Unemployment: Long-Term Implications of the Chain Reaction Theory", Economic Journal 108, 832-849.

Karanassou, M.; Sala, H. y Snower, D. (2003). "Unemployment in the European Union: a dynamic reappraisal," Economic Modelling, Elsevier, vol. 20(2), pages 237-273.

Karanassou, M.; Sala, H.; y Salvador, P. (2008a). "Capital accumulation and unemployment: new insights on the Nordic experience," Cambridge Journal of Economics, Oxford University Press, vol. 32(6), pages 977-1001, November.

Karanassou, M.; Sala, H.; y Salvador, P. (2008b). "The (Ir)Relevance Of The Nru For Policy Making: The Case Of Denmark," Scottish Journal of Political Economy, Scottish Economic Society, vol. 55(3), pages 369-392, 07.

Karanassou, M., y Sala, H. (2010a). "Labour Market Dynamics in Australia: What Drives Unemployment?," The Economic Record, The Economic Society of Australia, vol. 86(273), pages 185-209, 06

Karanassou, M. y Sala, H. (2010b). "The US inflation-unemployment trade-off revisited: New evidence for policy-making," Journal of Policy Modeling, Elsevier, vol. 32(6), pages 758-777.

Keane, M. (2011). "Labor Supply and Taxes: A Survey," Journal of Economic Literature, American Economic Association, vol. 49(4), pages 961-1075

Kerimoglu, E. y Karahasan, C. (2011). "Role of Spatial Dispersion of Creative Capital for Understanding Regional Differences in Spain," ERSA conference papers ersa11p697, European Regional Science Association.

Kitson, M. (1995) "Seedcorn or Chaff? Unemployment and Small Firm Performance ". CBR Working Papers, University of Cambridge, WP02.

Killingsworth, M. R. y Heckman, J. J. (1987). "Female labor supply: A survey," Handbook of Labor Economics, in: O. Ashenfelter & R. Layard (ed.), Handbook of Labor Economics, edition 1, volume 1, chapter 2, pages 103-204 Elsevier.

Kolko, J. y Neumark, D., (2010). "Does local business ownership insulate cities from economic shocks?," Journal of Urban Economics, Elsevier, vol. 67(1), pages 103-115

Ladu, M.G. (2005). "Growth and Employment: A survey on the Demand Side of the Labour Market," Working Paper CRENoS 200507, Centre for North South Economic Research, University of Cagliari and Sassari, Sardinia.

Layard, R.; Nickell, S.; & Jackman, R. (1991). "Unemployment: Macroeconomic Performance and the Labour Market," OUP Catalogue, Oxford University Press.

Lazear, Edward P. (2005). “Entrepreneurship”, Journal of Labor Economics, Vol. 23, No. 4 (Oct.), pp. 649-680

Lindbeck, A. y Snower, D. J., (1994). "Patterns of Unemployment: An Insider-Outsider Analysis," CEPR Discussion Papers 960.

Lindbeck, A., y & Snower, D.J. (2001). "Insiders versus Outsiders," Journal of Economic Perspectives, American Economic Association, vol. 15(1), pages 165-188

Lucas, R. (1988). "On the mechanics of economic development," Journal of Monetary Economics, Elsevier, vol. 22(1), pages 3-42.

Mahy, B., y Volral, M. (2008). "The effect of quantitative and qualitative training on labour demand in Belgium: a monopolistic competition approach", Economics of Education Working Paper Series 0021, University of Zurich, Institute for Strategy and Business Economics (ISU).

Maroto-Sánchez, A. (2008) "Labour productivity and cyclical dynamics in the service sector", Universidad de Alcalá, Instituto Universitario de Análisis Económico y Social.

Maza, A. y Villaverde, J. (2009) "Provincial wages in Spain: Convergence and flexibility", Urban Studies, vol. 46, nº 9, pp. 1969-1993

Mincer, J. (1974): Schooling, Experience, and Earnings, New York: NBER Press.

Nickell, S.; Nunziata, L.; y Ochel, W. (2005). "Unemployment in the OECD Since the 1960s. What Do We Know?," Economic Journal, Royal Economic Society, vol. 115(500), pages 1-27, 01.

Pencavel, J. (1987). "Labor supply of men: A survey," Handbook of Labor Economics, in: O. Ashenfelter & R. Layard (ed.), Handbook of Labor Economics, edition 1, volume 1, chapter 1, pages 3-102 Elsevier.

Pérez, F.; Serrano, L. & Fernández de Guevara, J. (2008). "Estimación del capital social en España: series temporales por territorios," Working Papers 201077, Fundacion BBVA / BBVA Foundation.

Pesaran, M. H. (1997). "The Role of Economic Theory in Modelling the Long Run," Economic Journal, Royal Economic Society, vol. 107(440), pages 178-91.

Pesaran, M.H. and Shin, Y. (1999), "An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis", en Strom, S. (ed.), Econometrics and Economic Theory in the Twentieth Century: The Ragnar Frisch Centennial Symposium, Cambridge University Press, Cambridge; 371–413.

Pesaran, M.H.; Shin, Y. y & Smith, R.J. (2001). "Bounds testing approaches to the analysis of level relationships," Journal of Applied Econometrics, John Wiley & Sons, Ltd., vol. 16(3), pages 289-326.

Pilat, D. (2005). "Growth differentials in OECD countries: some reflections," International Economics and Economic Policy, Springer, vol. 2(1), pages 1-6

Pisarides, C. (2000). "*Equilibrium Unemployment Theory"*, second edition, Cambridge, MA: MIT Press, 2000

Pritchett, L. (2001). "Where has all the education gone?", World Bank Economic Review 15(3), pp. 367-91.

Raymond, J.L. y Roig, J.L. (2003). “Los emprendedores y el rendimiento del capital humano en España”, en Congregado et al. *El capital humano y los emprendedores en España*, pp. 135-162. IVIE- Bancaja, Instituto Valenciano de Investigaciones Económicas, Valencia, 226 p.

Romer, P. (1990). "Endogenous Technological Change," Journal of Political Economy, University of Chicago Press, vol. 98(5), pages S71-102,

Rowthorn, R. (1995). “Capital formation and unemployment”. *Oxford Review of Economic Policy, 11*(1), 26-39

Rowthorn, R. (1999). “Unemployment, wage bargaining and capital-labor substitution”, Cambridge Journal of Economics, (23), pp 413-425.

Solow, R. (1957). “Technical Change and the Aggregate Production Function”, The Review of Economics and Statistics, Vol. 39, No. 3 (Aug., 1957), pp. 312-320, The MIT Press

Sanroma, E. y Ramos, R. (2007)."Local Human Capital and Productivity: An Analysis for the Spanish Regions," Regional Studies, Taylor and Francis Journals, vol. 41(3), pages 349-359.

Sanromá, E. Ramos, R., y Simón, H. (2009). "Immigrant Wages in the Spanish Labour Market: Does the Origin of Human Capital Matter?," IZA Discussion Papers 4157, Institute for the Study of Labor (IZA).

Taban, S. y Kar, M. (2006). "Human Capital and Economic Growth: Causality Analysis, 1969-2001," Anadolu University Journal of Social Sciences, Anadolu University, vol. 6(1), pages 159-182.

Van Praag, C.M. y H. van Ophem (1995). “Determinants of willingness and opportunity to start as an entrepreneur”. Kyklos, 48, 513-540.

Van Praag, C. M. y Cramer, J. S. (2001). “The Roots of Entrepreneurship and Labour Demand: Individual Ability and Low Risk”. Economica. Vol. 68, No. 269, 45-62.

Zhang, L. y Ehrenberg, R. G., (2010). "Faculty employment and R&D expenditures at Research universities," Economics of Education Review, Elsevier, vol. 29(3), pages 329-337

ANNEX

$$\psi_0 = \frac{(1-d_1)(1-\gamma_1)\rho_0 + (1-\gamma_1)\rho_2 d_0 - (1-d_1)(1-\rho_1)\gamma_0 + (1-\rho_1 L)d_0\gamma_6}{[1+\rho_4 + d_3(\rho_2+\gamma_6)]};$$

$$\psi_1 = \frac{[\rho_4(\gamma_1+d_1)+\gamma_1+d_1+\rho_1+d_3(\rho_2\gamma_1+\rho_1\gamma_6)]}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_2 = \frac{[\gamma_1(d_1(\rho_4+1)+\rho_1(1+d_1)]}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_3 = \frac{\rho_1 d_1\gamma_1}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_4 = \frac{\rho_3}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_5 = \frac{\rho_3(d_1+\gamma_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_6 = \frac{\rho_1 d_1\gamma_1}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_7 = \frac{\gamma_2}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_8 = \frac{\gamma_2(d_1+\rho_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_9 = \frac{\gamma_2 d_1\rho_1}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{10} = \frac{d_2(\rho_2+\gamma_6)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{11} = \frac{d_2(\rho_2\gamma_1+\gamma_6\rho_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_{12} = \frac{(\rho_5+\rho_2 d_4-\gamma_3+\gamma_6 d_4)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{13} = \frac{(\rho_5(\gamma_1+d_1)+\rho_2 d_4\gamma_1-\rho_1(\gamma_3-\gamma_6 d_4)-\gamma_3 d_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_{14} = \frac{d_1(\rho_5\gamma_1-\gamma_3\rho_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{15} = \frac{(\rho_6+\rho_2 d_5-\gamma_4+\gamma_6 d_5)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_{16} = \frac{(\rho_6(\gamma_1+d_1)+\rho_2 d_5\gamma_1-\rho_1(\gamma_4-\gamma_6 d_5)-\gamma_4 d_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{17} = \frac{d_1(\rho_6\gamma_1-\gamma_4\rho_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_{18} = \frac{(\rho_7+\rho_2 d_6-\gamma_5+\gamma_6 d_6)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{19} = \frac{(\rho_7(\gamma_1+d_1)+\rho_2 d_6\gamma_1-\rho_1(\gamma_5-\gamma_6 d_6)-\gamma_5 d_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_{20} = \frac{d_1(\rho_7\gamma_1-\gamma_5\rho_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{21} = \frac{1}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{22} = \frac{(d_1+\gamma_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_{23} = \frac{d_1\gamma_1}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{24} = \frac{1}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{25} = \frac{(d_1+\rho_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

$$\psi_{26} = \frac{d_1\rho_1}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{27} = \frac{(\rho_2+\gamma_6)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]}; \psi_{28} = \frac{(\rho_2\gamma_1+\gamma_6\rho_1)}{[1+\rho_4+d_3(\rho_2+\gamma_6)]};$$

Table A2.1: Labor Demand (Spain Time Series)

	Base Estimation			+ Hum. Cap. (1)			+ Hum. Cap. (2)			+ Knowledge Cap. (1)		
	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value
n_{t-1}	1.129	***	0.000	n_{t-1}	1.053	***	0.000	n_{t-1}	1.174 ***	0.000	n_{t-1}	0.874 *** 0.000
n_{t-2}	-0.396	**	0.015	n_{t-2}	-0.472	**	0.023	n_{t-2}	-0.360 **	0.016	n_{t-2}	-0.240 * 0.089
k_t	0.933	**	0.013	k_t	0.851	**	0.013	k_t	0.637 *	0.082	k_t	1.101 *** 0.001
k_{t-1}	-0.790	**	0.024	k_{t-1}	-0.779	**	0.015	k_{t-1}	-0.615 **	0.042	k_{t-1}	-0.865 *** 0.003
ω_t	-0.611	***	0.000	ω_t	-0.321	***	0.008	ω_t	-0.611 **	0.000	ω_t	-0.450 *** 0.001
ω_{t-1}	0.333	**	0.020	ω_{t-1}	0.042		0.753	ω_{t-1}	0.396 ***	0.005	ω_{t-1}	0.108 0.407
d_84_93	-0.021	***	0.010	d_84_93	-0.013	*	0.052	d_84_93	-0.022 ***	0.003	d_84_93	-0.016 ** 0.013
				h_t	0.305	**	0.028	h_t	0.211 **	0.016	r_{t-3}	-0.041 ** 0.027
				h_{t-1}	-0.462	**	0.039	h_{t-1}	-0.111 **	0.018		
				h_{t-2}	0.412	**	0.017					
Adj. R^2	0.998			0.999			0.999			0.999		
S.E.	0.008			0.006			0.007			0.006		
MLL	106.537			117.081			113.532			111.893		
AIC	-6.569			-7.072			-6.902			-7.096		
SIC	-6.195			-6.558			-6.435			-6.672		
HQIC	-6.450			-6.908			-6.753			-6.963		

	+ Knowledge Cap. (2)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)			+ Entrepreneurial Cap. (3)		
	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value
n_{t-1}	1.150	***	0.000	n_{t-1}	0.476	***	0.005	n_{t-1}	1.086 ***	0.000	n_{t-1}	0.902 *** 0.000
n_{t-2}	-0.406	***	0.002	n_{t-2}	-0.405	***	0.007	n_{t-2}	-0.408 ***	0.009	n_{t-2}	-0.304 ** 0.030
k_t	0.800	***	0.008	k_t	1.339	***	0.000	k_t	0.919 **	0.011	k_t	1.408 *** 0.001
k_{t-1}	-0.642	**	0.020	k_{t-1}	-1.101	***	0.000	k_{t-1}	-0.740 **	0.026	k_{t-1}	-1.211 *** 0.001
ω_t	-0.775	***	0.000	ω_t	-0.188	*	0.059	ω_t	-0.771 ***	0.000	ω_t	-0.650 *** 0.000
ω_{t-1}	0.503	***	0.001	ω_{t-1}	-0.190		0.117	ω_{t-1}	0.305 **	0.025	ω_{t-1}	0.189 0.126
d_84_93	-0.020	***	0.003	d_84_93	-0.007		0.169	d_84_93	-0.015 *	0.059	d_84_93	-0.010 0.166
r_{t-4}	-0.049	**	0.029	e_t	0.054	***	0.010	e_t	0.015 *	0.071	e_t	0.017 ** 0.030
				e_{t-2}	0.059	**	0.022				$e(nr)_t$	-0.019 ** 0.013
Adj. R^2	0.999			0.999			0.998			0.999		
S.E.	0.006			0.005			0.008			0.007		
MLL	107.999			112.975			108.926			113.689		
AIC	-7.071			-7.628			-6.662			-6.913		
SIC	-6.643			-7.148			-6.241			-6.446		
HQIC	-6.940			-7.485			-6.527			-6.763		

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

Table A2.2: Wage Setting (Spain Time Series)

	Base Estimation			+ Hum. Cap. (1)			+ Knowledge Cap. (1)			+ Knowledge Cap. (2)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
ω_{t-1}	1.257 ***	0.000	ω_{t-1}	1.105 ***	0.000	ω_{t-1}	0.997 ***	0.000	ω_{t-1}	1.007 ***	0.000
ω_{t-2}	-0.662 ***	0.000	ω_{t-2}	-0.446 ***	0.003	ω_{t-2}	-0.573 ***	0.000	ω_{t-2}	-0.534 ***	0.000
$prod_t$	0.324 ***	0.000	$prod_t$	0.395 ***	0.000	$prod_t$	0.309 ***	0.000	$prod_t$	0.341 ***	0.000
u_t	-0.251 ***	0.001	u_t	-0.364 ***	0.000	u_t	-0.220 ***	0.002	u_t	-0.317 ***	0.000
d89	-0.026 **	0.014	d89	-0.027 ***	0.005	d89	-0.036 ***	0.001	d89	-0.023 **	0.016
d96	0.032 ***	0.003	d96	0.028 ***	0.005	d96	0.025 **	0.013	d96	0.027 ***	0.007
			h_{t-2}	-0.194 **	0.015	r_{t-2}	-0.028 **	0.021	r_t	-0.011 **	0.011
Adj. R^2	0.989			0.991			0.991			0.991	
S.E.	0.009			0.008			0.008			0.008	
MLL	103.008			107.150			106.718			107.512	
AIC	-6.401			-6.610			-6.581			-6.634	
SIC	-6.074			-6.236			-6.208			-6.260	
HQIC	-6.296			-6.490			-6.462			-6.515	

	+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)			+ Entrepreneurial Cap. (3)			+ Entrepreneurial Cap. (4)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
ω_{t-1}	1.113 ***	0.000	ω_{t-1}	1.053 ***	0.000	ω_{t-1}	1.166 ***	0.000	ω_{t-1}	1.310 ***	0.000
ω_{t-2}	-0.606 ***	0.000	ω_{t-2}	-0.465 ***	0.003	ω_{t-2}	-0.546 ***	0.000	ω_{t-2}	-0.622 ***	0.000
$prod_t$	0.308 ***	0.000	$prod_t$	0.303 ***	0.000	$prod_t$	0.229 ***	0.005	$prod_t$	0.534 ***	0.000
u_t	-0.187 **	0.025	u_t	-0.317 ***	0.000	u_t	-0.136 *	0.109	u_t	-0.502 ***	0.001
d89	-0.029 ***	0.005	d89	-0.026 ***	0.008	d89	-0.030 ***	0.004	d89	-0.018 *	0.074
d96	0.033 ***	0.003	d96	0.026 **	0.011	d96	0.028 ***	0.006	d96	0.037 ***	0.001
e_{t-3}	0.022 **	0.048	e_{t-2}	0.014 **	0.032	e_{t-1}	0.021 **	0.035	e_t	-0.032 *	0.051
Adj. R^2	0.989			0.990			0.990			0.990	
S.E.	0.008			0.008			0.008			0.008	
MLL	102.212			106.216			106.095			105.663	
AIC	-6.497			-6.548			-6.540			-6.511	
SIC	-6.120			-6.174			-6.166			-6.137	
HQIC	-6.379			-6.428			-6.420			-6.391	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

Table A2.3: Labor Force (Spanish Time Series)

	Base Estimation			+ Hum. Cap. (1)			+ Knowledge Cap. (1)			+ Knowledge Cap. (2)		
	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value
l_{t-1}	1.255	***	0.000	l_{t-1}	1.253	***	0.000	l_{t-1}	1.088	***	0.000	l_{t-1}	1.135	***	0.000
l_{t-2}	-0.343	**	0.024	l_{t-2}	-0.290	**	0.045	l_{t-2}	-0.245		0.109	l_{t-2}	-0.262	*	0.088
$\Delta\omega_t$	-0.234	***	0.007	$\Delta\omega_t$	-0.160	*	0.069	$\Delta\omega_t$	-0.241	***	0.004	$\Delta\omega_t$	-0.204	**	0.017
z_t	0.181	**	0.018	z_t	-0.044		0.746	z_t	0.402	**	0.010	z_t	0.349	***	0.005
u_t	-0.100		0.115	u_t	-0.052		0.424	u_t	-0.137	**	0.039	u_t	-0.104		0.103
d87	0.025	***	0.000	d87	0.027	***	0.000	d87	0.021	***	0.003	d87	0.022	***	0.001
				h_t	0.097	*	0.068	r_t	-0.016	*	0.092	r_{t-3}	-0.016	*	0.083
Adj. R^2	0.999			0.999			0.999					0.999			
S.E.	0.006			0.005			0.005					0.005			
MLL	116.379			118.696			118.364					114.497			
AIC	-7.292			-7.380			-7.358					-7.345			
SIC	-6.965			-7.006			-6.984					-6.967			
HQIC	-7.187			-7.260			-7.238					-7.226			

	+ Knowledge Cap. (3)			+ Knowledge Cap. (4)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)		
	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value	Coefficient		p-value
l_{t-1}	1.080	***	0.000	l_{t-1}	1.121	***	0.000	l_{t-1}	0.866	***	0.000	l_{t-1}	1.132	***	0.000
l_{t-2}	-0.241		0.110	l_{t-2}	-0.309	**	0.032	l_{t-2}	-0.447	***	0.001	l_{t-2}	-0.330	**	0.025
$\Delta\omega_t$	-0.149	*	0.100	$\Delta\omega_t$	-0.193	**	0.019	$\Delta\omega_t$	-0.118		0.159	$\Delta\omega_t$	-0.239	***	0.004
z_t	0.476	**	0.011	z_t	0.363	***	0.004	z_t	0.368	***	0.000	z_t	0.347	***	0.004
u_t	-0.153	**	0.027	u_t	-0.162	**	0.022	u_t	0.362	**	0.015	u_t	-0.121	*	0.066
d87	0.024	***	0.000	d87	0.026	***	0.000	d87	0.018	***	0.002	d87	0.020	***	0.004
r_{t-1}	-0.030	*	0.073	r_t	0.009	*	0.060	e_t	0.076	***	0.001	e_t	-0.009	*	0.069
Adj. R^2	0.999			0.999			0.999					0.999			
S.E.	0.005			0.005			0.004					0.005			
MLL	118.618			118.852			112.560					114.709			
AIC	-7.375			-7.390			-7.745					-7.359			
SIC	-7.001			-7.017			-7.361					-6.982			
HQIC	-7.255			-7.271			-7.631					-7.241			

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

Table A3.1: Labor Demand (Panel Data A.C. NUTS-II)

	Base Estimation			+ Hum. Cap. (1)			+ Hum. Cap. (2)			+ Knowledge Cap. (1)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
n_{it-1}	0.686 ***	0.000	n_{it-1}	0.606 ***	0.000	n_{it-1}	0.603 ***	0.000	n_{it-1}	0.646 ***	0.000
k_{it-3}	0.062 ***	0.002	k_{it-3}	0.048 ***	0.008	k_{it-3}	0.071 ***	0.004	k_{it-3}	0.112 ***	0.000
$\Delta\omega_{it}$	-0.051 **	0.050	$\Delta\omega_{it}$	-0.044	0.106	$\Delta\omega_{it}$	-0.023	0.524	$\Delta\omega_{it}$	-0.055 **	0.023
			h_{it}	0.111 **	0.018	h_{it}	0.036 *	0.083	r_{it}	-0.015 **	0.040
Adj. R^2	0.9999			0.9999			0.9999			0.9999	
S.E.	0.0085			0.0082			0.0080			0.0082	
MLL	642.4251			650.1706			596.3040			591.3201	
AIC	-6.5500			-6.6221			-6.6624			-6.6038	
SIC	-6.0316			-6.0865			-6.1090			-6.0504	
HQIC	-6.3400			-6.4051			-6.4378			-6.3792	

	+ Knowledge Cap. (2)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)			+ Entrepreneurial Cap. (3)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
n_{it-1}	0.568 ***	0.000	n_{it-1}	0.693 ***	0.000	n_{it-1}	0.689 ***	0.000	n_{it-1}	0.651 ***	0.000
k_{it-3}	0.125 ***	0.000	k_{it-3}	0.065 ***	0.001	k_{it-3}	0.062 ***	0.002	k_{it-3}	0.052 **	0.038
$\Delta\omega_{it}$	-0.018	0.558	$\Delta\omega_{it}$	-0.041	0.110	$\Delta\omega_{it}$	-0.058 **	0.022	$\Delta\omega_{it}$	-0.042 **	0.081
r_{it}	-0.019 ***	0.010	e_{it}	-0.004 ***	0.000	e_{it-2}	0.005 *	0.100	e_{it-1}	0.039 ***	0.007
			e_{it-1}	-0.002 ***	0.007				e_{it-2}	0.028 **	0.025
Adj. R^2	0.9999			0.9999			0.9984			0.9999	
S.E.	0.0077			0.0084			0.0077			0.0082	
MLL	542.7694			646.5181			108.9257			650.0364	
AIC	-6.7159			-6.5724			-6.6617			-6.6100	
SIC	-6.1415			-6.0195			-6.2414			-6.0571	
HQIC	-6.4826			-6.3483			-6.5272			-6.3860	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

Table A3.2: Wage Setting (Panel Data A.C. NUTS-II)

	Base Estimation			+ Hum. Cap. (1)			+ Hum. Cap. (2)			+ Knowledge Cap. (1)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
ω_{it-1}	0.759 ***	0.000	ω_{it-1}	0.741 ***	0.000	ω_{it-1}	0.226 ***	0.000	ω_{it-1}	0.766 ***	0.000
u_{it}	-0.280 **	0.028	u_{it}	-0.313 ***	0.008	u_{it}	-0.048	0.784	u_{it}	-0.293 **	0.021
$prod_{it-1}$	-0.110 **	0.048	$prod_{it-1}$	-0.134 ***	0.009	$prod_{it-1}$	-0.182 **	0.029	$prod_{it-1}$	-0.119 **	0.032
			h_{it}	-0.047	0.137	h_{it-1}	0.119 ***	0.002	r_{it-1}	-0.009 **	0.037
Adj. R^2	0.991			0.991			0.993			0.991	
S.E.	0.016			0.016			0.013			0.016	
MLL	615.334			616.392			468.528			617.897	
AIC	-5.279			-5.280			-5.745			-5.293	
SIC	-4.787			-4.772			-5.171			-4.786	
HQIC	-5.080			-5.075			-5.512			-5.088	

	+ Knowledge Cap. (2)			+ Knowledge Cap. (3)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
ω_{it-1}	0.736 ***	0.000	ω_{it-1}	0.779 ***	0.000	ω_{it-1}	0.753 ***	0.000	ω_{it-1}	0.750 ***	0.000
u_{it}	-0.255 **	0.049	u_{it}	-0.271 **	0.031	u_{it}	-0.278 **	0.028	u_{it}	-0.399 ***	0.003
$prod_{it-1}$	-0.127 **	0.025	$prod_{it-1}$	-0.128 **	0.022	$prod_{it-1}$	-0.096 *	0.087	$prod_{it-1}$	-0.102 *	0.065
$r(ht)_{it}$	0.018 **	0.012	r_{it}	-0.006 **	0.019	e_{it-1}	0.010 *	0.054	e_{it-1}	-0.045 **	0.012
$r(kis)_{it-1}$	0.041 *	0.061									
Adj. R^2	0.990			0.991			0.991			0.991	
S.E.	0.016			0.016			0.016			0.016	
MLL	605.410			618.606			617.532			619.023	
AIC	-5.315			-5.300			-5.290			-5.303	
SIC	-4.782			-4.792			-4.782			-4.796	
HQIC	-5.100			-5.095			-5.085			-5.098	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

TablaA3.3: Labor Supply (Panel Data A.C. NUTS-II)

	Base Estimation			+ Hum. Cap. (1)			+ Hum. Cap. (2)			+ Knowledge Cap. (1)		
	Coeficiente		p-value	Coeficiente		p-value	Coeficiente		p-value	Coeficiente		p-value
l_{it-1}	0.649	***	0.000	l_{it-1}	0.683	***	0.000	l_{it-1}	0.615	***	0.000	l_{it-1}	0.633	***	0.000
l_{it-2}	-0.156	**	0.030	l_{it-2}	-0.165	**	0.017	l_{it-2}	-0.160	**	0.037	l_{it-2}	-0.136	*	0.053
ω_{it}	-0.127	***	0.005	ω_{it}	-0.110	**	0.012	ω_{it}	-0.108	*	0.067	ω_{it}	-0.141	***	0.002
z_{it}	1.808	***	0.000	z_{it}	1.025	***	0.010	z_{it}	1.764	***	0.000	z_{it}	1.662	***	0.000
z_{it-1}	-1.496	***	0.000	z_{it-1}	-0.923	**	0.016	z_{it-1}	-1.440	***	0.000	z_{it-1}	-1.331	***	0.000
Δu_{it-2}	0.458	**	0.020	Δu_{it-2}	0.522	***	0.006	Δu_{it-2}	0.463	**	0.028	Δu_{it-2}	0.338	*	0.086
				h_{it}	0.705	***	0.000	h_{it}	0.046	**	0.034	r_{it-1}	-0.011	***	0.005
				h_{it-1}	-0.516	***	0.004								
Adj. R^2	0.9998			0.9998			0.9998			0.9998		
S.E.	0.0134			0.0128			0.0137			0.0131		
MLL	559.6089			569.6857			506.1842			564.5094		
AIC	-5.6322			-5.7186			-5.5669			-5.6739		
SIC	-5.0620			-5.1138			-4.9582			-5.0864		
HQIC	-5.4011			-5.4735			-5.3199			-5.4359		

	+ Knowledge Cap. (1)			+ Knowledge Cap. (1)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (1)		
	Coeficiente		p-value	Coeficiente		p-value	Coeficiente		p-value	Coeficiente		p-value
l_{it-1}	0.542	***	0.000	l_{it-1}	0.636	***	0.000	l_{it-1}	0.608	***	0.000	l_{it-1}	0.685	***	0.000
l_{it-2}	-0.157	**	0.047	l_{it-2}	-0.157	**	0.025	l_{it-2}	-0.155	**	0.025	l_{it-2}	-0.197	***	0.006
ω_{it}	-0.118	**	0.049	ω_{it}	-0.111	**	0.013	ω_{it}	-0.159	***	0.000	ω_{it}	-0.129	***	0.004
z_{it}	1.992	***	0.000	z_{it}	1.700	***	0.000	z_{it}	1.811	***	0.000	z_{it}	1.628	***	0.000
z_{it-1}	-1.511	***	0.001	z_{it-1}	-1.369	***	0.000	z_{it-1}	-1.477	***	0.000	z_{it-1}	-1.402	***	0.000
Δu_{it-2}	0.426	**	0.045	Δu_{it-2}	0.428	**	0.027	Δu_{it-2}	0.432	**	0.023	Δu_{it-2}	0.456	**	0.019
$r(kis)_{it}$	0.054	**	0.035	r_{it-1}	0.009	***	0.005	e_{it-1}	0.030	***	0.001	$e(3\text{-}5)_{t-1}$	0.055	**	0.050
$r(he)_{it}$	-0.035	***	0.002									$e(1\text{-}2)e_{t-3}$	0.053	*	0.094
Adj. R^2	0.9998			0.9998			0.9998			0.9998		
S.E.	0.0135			0.0131			0.0129			0.0131		
MLL	459.8726			564.4213			566.9722			565.0369		
AIC	-5.5800			-5.6730			-5.7002			-5.6688		
SIC	-4.9264			-5.0855			-5.1128			-5.0641		
HQIC	-5.3145			-5.4349			-5.4622			-5.4238		

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

Table A4.1: Labor Demand (Panel Data Provinces NUTS-II)

	Base Estimation			+ Hum. Cap. (1)			+ Knowledge Cap. (1)			+ Knowledge Cap. (2)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
n_{it-1}	0.564 ***	0.000	n_{it-1}	0.424 ***	0.000	n_{it-1}	0.564 ***	0.000	n_{it-1}	0.562 ***	0.000
n_{it-3}	0.095 ***	0.001	n_{it-3}	0.120 ***	0.000	n_{it-3}	0.092 ***	0.001	n_{it-3}	0.095 ***	0.001
k_{it}	0.365 ***	0.002	k_{it}	0.247 **	0.024	k_{it}	0.368 ***	0.002	k_{it}	0.380 ***	0.001
k_{it-1}	-0.230 *	0.053	k_{it-1}	-0.221 **	0.044	k_{it-1}	-0.231 **	0.049	k_{it-1}	-0.249 **	0.036
$\Delta\omega_{it}$	-0.043	0.188	$\Delta\omega_{it}$	-0.036	0.232	$\Delta\omega_{it}$	-0.038	0.246	$\Delta\omega_{it}$	-0.038	0.239
			h_{it}	0.226 ***	0.000	r_{it-1}	-0.008 ***	0.001	r_{it-1}	-0.014 **	0.029
			h_{it-2}	0.059 *	0.054						
Adj. R^2	0.9993			0.9994			0.9994			0.9993	
S.E.	0.0223			0.0206			0.0220			0.0222	
MLL	1226.7960			1268.0780			1230.3160			1229.5530	
AIC	-4.6512			-4.8083			-4.6706			-4.6582	
SIC	-4.1117			-4.2520			-4.1219			-4.1103	
HQIC	-4.4395			-4.5900			-4.4553			-4.4432	

	+ Knowledge Cap. (3)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)			+ Entrepreneurial Cap. (3)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
n_{it-1}	0.567 ***	0.000	n_{it-1}	0.556 ***	0.000	n_{it-1}	0.539 ***	0.000	n_{it-1}	0.544 ***	0.000
n_{it-3}	0.094 ***	0.001	n_{it-3}	0.100 ***	0.001	n_{it-3}	0.095 ***	0.001	n_{it-3}	0.099 ***	0.001
k_{it}	0.343 ***	0.004	k_{it}	0.337 ***	0.004	k_{it}	0.316 ***	0.007	k_{it}	0.186	0.123
k_{it-1}	-0.200 *	0.092	k_{it-1}	-0.211 *	0.073	k_{it-1}	-0.198 *	0.092	k_{it-1}	-0.065	0.592
$\Delta\omega_{it}$	-0.042	0.199	$\Delta\omega_{it}$	-0.045	0.168	$\Delta\omega_{it}$	-0.042	0.196	$\Delta\omega_{it}$	-0.042	0.189
r_{it-1}	-0.006 **	0.019	e_{it}	0.024 **	0.013	e_{it}	0.074 ***	0.003	e_{it}	0.108 ***	0.000
Adj. R^2	0.9993			0.9994			0.9994			0.9994	
S.E.	0.0222			0.0221			0.0221			0.0218	
MLL	1229.9830			1230.3780			1232.0530			1239.2870	
AIC	-4.6599			-4.6615			-4.6682			-4.6971	
SIC	-4.1120			-4.1136			-4.1203			-4.1492	
HQIC	-4.4449			-4.4465			-4.4532			-4.4822	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

Table A4.2: Wage Setting (Panel Data Provinces NUTS-II)

	Base Estimation			+ Hum. Cap. (1)			+ Knowledge Cap. (1)			+ Knowledge Cap. (2)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
ω_{it-1}	0.545 ***	0.000	ω_{it-1}	0.544 ***	0.000	ω_{it-1}	0.546 ***	0.000	ω_{it-1}	0.539 ***	0.000
u_{it-4}	-0.064 **	0.026	u_{it-4}	-0.056 **	0.047	u_{it-4}	-0.067 **	0.011	u_{it-4}	-0.070 ***	0.007
$prod_{it}$	-0.064 ***	0.001	$prod_{it}$	-0.053 ***	0.007	$prod_{it}$	-0.064 ***	0.000	$prod_{it}$	-0.067 ***	0.000
			h_{it-1}	0.020	0.110	r_{it-1}	-0.003 **	0.018	r_{it-1}	-0.008 ***	0.008
Adj. R^2	0.9853			0.9853			0.9854			0.9855	
S.E.	0.0110			0.0110			0.0110			0.0109	
MLL	1577.8200			1579.3570			1577.4140			1581.8300	
AIC	-6.0633			-6.0654			-6.0698			-6.0753	
SIC	-5.5407			-5.5344			-5.5379			-5.5443	
HQIC	-5.8582			-5.8570			-5.8611			-5.8669	

	+ Knowledge Cap. (3)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)			+ Entrepreneurial Cap. (3)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
ω_{it-1}	0.543 ***	0.000	ω_{it-1}	0.543 ***	0.000	ω_{it-1}	0.549 ***	0.000	ω_{it-1}	0.557 ***	0.000
u_{it-4}	-0.068 **	0.010	u_{it-4}	-0.054 **	0.042	u_{it-4}	-0.064 **	0.015	u_{it-4}	-0.061 **	0.021
$prod_{it}$	-0.063 **	0.000	$prod_{it}$	-0.057 ***	0.001	$prod_{it}$	-0.067 ***	0.000	$prod_{it}$	-0.061 ***	0.000
r_{it-3}	-0.003 **	0.018	e_{it-1}	0.018 *	0.075	e_{it}	-0.009 *	0.062	$e(+50)_{it}$	-0.016 **	0.014
									$e(-50)_{it-1}$	0.021 **	0.013
Adj. R^2	0.9854			0.9853			0.9853			0.9855	
S.E.	0.0110			0.0110			0.0110			0.0109	
MLL	1581.0470			1579.6420			1579.8120			1583.5620	
AIC	-6.0722			-6.0666			-6.0672			-6.0782	
SIC	-5.5411			-5.5355			-5.5362			-5.5388	
HQIC	-5.8638			-5.8582			-5.8589			-5.8666	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

TablaA4.3: Labor Supply (Panel Data Provinces NUTS-III)

	Base Estimation			+ Hum. Cap. (1)			+ Knowledge Cap. (1)			+ Knowledge Cap. (2)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
l_{it-1}	0.581 ***	0.000	l_{it-1}	0.591 ***	0.000	l_{it-1}	0.587 ***	0.000	l_{it-1}	0.568 ***	0.000
$\Delta\omega_{it}$	-0.090	0.258	$\Delta\omega_{it}$	-0.078	0.324	$\Delta\omega_{it}$	-0.103	0.197	$\Delta\omega_{it}$	-0.097	0.221
z_{it}	2.316 ***	0.000	z_{it}	1.946 ***	0.000	z_{it}	2.330 ***	0.000	z_{it}	2.192 ***	0.000
z_{it-1}	-1.924 ***	0.000	z_{it-1}	-1.611 ***	0.000	z_{it-1}	-1.940 ***	0.000	z_{it-1}	-1.803 ***	0.000
Δz_{it-1}	-0.751 ***	0.010	Δz_{it-1}	-0.656 **	0.025	Δz_{it-1}	-0.807 ***	0.006	Δz_{it-1}	-0.748 ***	0.010
u_{it}	0.480 ***	0.000	u_{it}	0.503 ***	0.000	u_{it}	0.473 ***	0.000	u_{it}	0.489 ***	0.000
u_{it-1}	-0.372 ***	0.000	u_{it-1}	-0.391 ***	0.000	u_{it-1}	-0.375 ***	0.000	u_{it-1}	-0.347 ***	0.000
			h_{it}	0.376 ***	0.000	r_{it}	-0.007 **	0.015	e_{it-1}	0.019 ***	0.005
			h_{it-1}	-0.334 ***	0.001						
Adj. R^2	0.9993			0.9994			0.9994			0.9994	
S.E.	0.0226			0.0222			0.0225			0.0224	
MLL	1459.2770			1469.6330			1462.6580			1463.7260	
AIC	-4.6376			-4.6654			-4.6455			-4.6491	
SIC	-4.1393			-4.1525			-4.1399			-4.1434	
HQIC	-4.4436			-4.4658			-4.4487			-4.4523	

	+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)			+ Entrepreneurial Cap. (3)			+ Entrepreneurial Cap. (4)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
l_{it-1}	0.580 ***	0.000	l_{it-1}	0.567 ***	0.000	l_{it-1}	0.563 ***	0.000	l_{it-1}	0.559 ***	0.000
$\Delta\omega_{it}$	-0.101	0.207	$\Delta\omega_{it}$	-0.101	0.202	$\Delta\omega_{it}$	-0.080	0.309	$\Delta\omega_{it}$	-0.091	0.249
z_{it}	2.287 ***	0.000	z_{it}	2.128 ***	0.000	z_{it}	2.007 ***	0.000	z_{it}	1.983 ***	0.000
z_{it-1}	-1.936 ***	0.000	z_{it-1}	-1.776 ***	0.000	z_{it-1}	-1.625 ***	0.000	z_{it-1}	-1.625 ***	0.000
Δz_{it-1}	-0.707 **	0.016	Δz_{it-1}	-0.797 ***	0.006	Δz_{it-1}	-0.686 **	0.018	Δz_{it-1}	-0.741 **	0.011
u_{it}	0.484 ***	0.000	u_{it}	0.510 ***	0.000	u_{it}	0.525 ***	0.000	u_{it}	0.530 ***	0.000
u_{it-1}	-0.334 ***	0.000	u_{it-1}	-0.301 ***	0.000	u_{it-1}	-0.337 ***	0.000	u_{it-1}	-0.300 ***	0.000
e_{it-1}	0.051 **	0.023	$e(6\text{-}9)_{it-1}$	0.078 ***	0.000	$e(10\text{-}19)_{it}$	0.072 ***	0.001	$e(10\text{-}19)_{it}$	0.047 **	0.049
									$e(6\text{-}9)_{it-1}$	0.055 **	0.028
Adj. R^2	0.9994			0.9994			0.9994			0.9994	
S.E.	0.0225			0.0223			0.0223			0.0223	
MLL	1462.2090			1466.3900			1465.8660			1468.5900	
AIC	-4.6440			-4.6580			-4.6562			-4.6620	
SIC	-4.1384			-4.1523			-4.1506			-4.1490	
HQIC	-4.4472			-4.4611			-4.4594			-4.4623	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

TablaA5.1: Labor Demand (European Nations)

	Base Estimation			+ Hum. Cap. (1)			+ Hum. Cap. (2)			+ Knowledge Cap. (1)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
n_{it-1}	1.161 ***	0.000	n_{it-1}	1.133 ***	0.000	n_{it-1}	1.112 ***	0.000	n_{it-1}	1.133 ***	0.000
n_{it-2}	-0.252 ***	0.010	n_{it-2}	-0.201 **	0.046	n_{it-2}	-0.138	0.181	n_{it-2}	-0.236 ***	0.018
Δk_{it}	0.359 ***	0.002	Δk_{it}	0.318 ***	0.009	Δk_{it}	0.425 ***	0.002	Δk_{it}	0.315 ***	0.005
$\Delta \omega_t$	-0.231 ***	0.000	$\Delta \omega_t$	-0.277 ***	0.000	$\Delta \omega_t$	-0.353 ***	0.000	$\Delta \omega_t$	-0.283 ***	0.000
			h_{it}	0.013 **	0.047	$h(eng)_{it}$	0.010 **	0.049	r_{it}	0.028 ***	0.001
						$h(sci)_{it-1}$	0.015 ***	0.010			
Adj. R^2	0.99996			0.99996			0.99996			0.99996	
S.E.	0.0068			0.0068			0.0067			0.0063	
MLL	431.5643			418.1135			403.5056			423.0472	
AIC	-6.9498			-6.9401			-6.9723			-7.0901	
SIC	-6.3596			-6.3125			-6.3018			-6.4590	
HQIC	-6.7102			-6.6854			-6.7005			-6.8341	

	+ Knowledge Cap. (2)			+ Knowledge Cap. (3)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
n_{it-1}	1.132 ***	0.000	n_{it-1}	1.069 ***	0.000	n_{it-1}	1.102 ***	0.000	n_{it-1}	1.028 ***	0.000
n_{it-2}	-0.188 *	0.053	n_{it-2}	-0.196 **	0.034	n_{it-2}	-0.241 ***	0.010	n_{it-2}	-0.176 *	0.061
Δk_{it}	0.394 ***	0.002	Δk_{it}	0.297 **	0.013	Δk_{it}	0.350 ***	0.002	Δk_{it}	0.388 ***	0.001
$\Delta \omega_t$	-0.188 ***	0.006	$\Delta \omega_t$	-0.213 ***	0.000	$\Delta \omega_t$	-0.287 ***	0.000	$\Delta \omega_t$	-0.247 ***	0.000
$r(nano)_{it}$	0.005 ***	0.004	$r(herd)_{it}$	0.029 ***	0.001	$e(con)_{it-2}$	-0.017 *	0.056	$e(con)_{it}$	0.020 **	0.019
			$r(nano)_{it}$	0.004 ***	0.009	$e(man)_{it-2}$	0.025 **	0.026	$e(man)_{it}$	0.042 **	0.016
			$r(per)_{it}$	0.036 **	0.025						
Adj. R^2	0.99996			0.99997			0.99996			0.99997	
S.E.	0.006			0.005			0.006			0.006	
MLL	383.496			382.109			417.091			388.648	
AIC	-7.099			-7.398			-7.158			-7.253	
SIC	-6.452			-6.677			-6.491			-6.576	
HQIC	-6.837			-7.107			-6.887			-6.979	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

TablaA5.2: Wage Setting (European Nations)

	Base Estimation			+ Hum. Cap. (1)			+ Hum. Cap. (2)			+ Knowledge Cap. (1)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
ω_{it-1}	0.776 ***	0.000	ω_{it-1}	0.716 ***	0.000	ω_{it-1}	0.718 ***	0.000	ω_{it-1}	0.680 ***	0.000
$prod_{it}$	0.163 **	0.021	$prod_{it}$	0.218 ***	0.001	$prod_{it}$	0.205 ***	0.004	$prod_{it}$	0.176 ***	0.009
Δu_{it-2}	-0.006 **	0.036	Δu_{it-2}	-0.007 ***	0.008	Δu_{it-2}	-0.007 ***	0.008	Δu_{it-2}	-0.006 **	0.012
			h_{it}	0.074 ***	0.000	$h(exp)_{it}$	0.074 ***	0.000	r_{it}	0.064 ***	0.000
						$h(kt)_{it-1}$	-0.004 *	0.075			
Adj. R^2	0.8797			0.8970			0.8902			0.8952	
S.E.	0.0109			0.0101			0.0101			0.0100	
MLL	335.0910			343.7805			329.2751			328.7364	
AIC	-6.0017			-6.1496			-6.1470			-6.1563	
SIC	-5.4169			-5.5394			-5.4916			-5.5272	
HQIC	-5.7648			-5.9024			-5.8818			-5.9017	

	+ Knowledge Cap. (2)			+ Knowledge Cap. (3)			+ Entrepreneurial Cap. (1)			+ Entrepreneurial Cap. (2)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
ω_{it-1}	0.809 ***	0.000	ω_{it-1}	0.761 ***	0.000	ω_{it-1}	0.694 ***	0.000	ω_{it-1}	0.697 ***	0.000
$prod_{it}$	0.273 ***	0.001	$prod_{it}$	0.288 ***	0.001	$prod_{it}$	0.250 ***	0.000	$prod_{it}$	0.331 ***	0.001
Δu_{it-2}	-0.008 ***	0.005	Δu_{it-2}	-0.007 **	0.011	Δu_{it-2}	-0.008 ***	0.002	Δu_{it-2}	-0.007 ***	0.009
r_{it}	0.029 ***	0.003	r_{it}	0.053 ***	0.002	e_{it-1}	0.025 **	0.042	e_{it}	0.043 ***	0.005
Adj. R^2	0.908			0.887			0.904			0.921	
S.E.	0.009			0.011			0.009			0.009	
MLL	308.911			330.225			340.705			310.618	
AIC	-6.284			-6.064			-6.271			-6.463	
SIC	-5.649			-5.442			-5.650			-5.820	
HQIC	-6.028			-5.812			-6.020			-6.204	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively

TablaA5.3: Labor Force (European Nations)

	Base Estimation			+ Hum. Cap. (1)			+ Knowledge Cap. (1)			+ Knowledge Cap. (1)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
l_{it-1}	1.009 ***	0.000	l_{it-1}	1.003 ***	0.000	l_{it-1}	0.981 ***	0.000	l_{it-1}	0.977 ***	0.000
l_{it-2}	-0.239 **	0.013	l_{it-2}	-0.206 **	0.037	l_{it-2}	-0.251 ***	0.009	l_{it-2}	-0.226 ***	0.012
ω_{it-1}	-0.032	0.276	ω_{it-1}	-0.026	0.397	ω_{it-1}	-0.023	0.430	ω_{it-1}	-0.050 *	0.074
z_{it}	0.947 ***	0.000	z_{it}	0.915 ***	0.000	z_{it}	1.101 ***	0.000	z_{it}	1.205 ***	0.000
z_{it-1}	-0.668 ***	0.009	z_{it-1}	-0.669 ***	0.010	z_{it-1}	-0.798 ***	0.002	z_{it-1}	-0.953 ***	0.000
Δu_{it-1}	-0.003 **	0.035	Δu_{it-1}	-0.003 *	0.059	Δu_{it-1}	-0.002 ***	0.064	Δu_{it-1}	-0.002	0.125
			h_{it-1}	0.000 *	0.052	r_{it-1}	0.020 ***	0.033	r_{it-1}	0.023 *	0.002
Adj. R^2	0.99997			0.99997			0.99997			0.99998	
S.E.	0.005			0.005			0.005			0.004	
MLL	458.729			448.440			450.655			468.269	
AIC	-7.380			-7.376			-7.415			-7.933	
SIC	-6.743			-6.704			-6.743			-7.249	
HQIC	-7.121			-7.103			-7.142			-7.656	

	+ Knowledge Cap. (2)			+ Knowledge Cap. (3)			+ Entrepreneurial Cap. (1)	
	Coefficient	p-value		Coefficient	p-value		Coefficient	p-value
l_{it-1}	1.028 ***	0.000	l_{it-1}	1.075 ***	0.000	l_{it-1}	0.995 ***	0.000
l_{it-2}	-0.214 ***	0.025	l_{it-2}	-0.291 ***	0.004	l_{it-2}	-0.231 **	0.015
ω_{it-1}	-0.026	0.388	ω_{it-1}	-0.032	0.327	ω_{it-1}	-0.019	0.522
z_{it}	0.834 ***	0.001	z_{it}	0.944 ***	0.000	z_{it}	0.868 ***	0.000
z_{it-1}	-0.606 **	0.017	z_{it-1}	-0.755 ***	0.004	z_{it-1}	-0.590 **	0.021
Δu_{it-1}	-0.003 **	0.025	Δu_{it-1}	-0.002 *	0.098	Δu_{it-1}	-0.003 **	0.025
r_{it-1}	-0.004 *	0.076	r_{it-2}	0.020 **	0.015	e_{it-1}	0.025 *	0.075
Adj. R^2	0.99997			0.99998			0.99997	
S.E.	0.005			0.005			0.005	
MLL	460.808			413.869			460.832	
AIC	-7.398			-7.493			-7.399	
SIC	-6.737			-6.776			-6.738	
HQIC	-7.130			-7.203			-7.130	

Note: ***, ** and * indicate significance at p<0.01, p<0.05 p<0.1 respectively