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"Firms' Investment in the Presence of Labor and Financial Market Imperfections"

- Giorgio Calcagnini, (U. Urbino)
- Germana Giombini, (U. Urbino)
- Enrico Saltari (U. di Roma "La Sapienza")

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Firms' Investment in the Presence of Labor and Financial Market Imperfections[♣]

Giorgio Calcagnini[*]
Department of Economics, University of Urbino, Italy
(*giorgio.calcagnini@uniurb.it*)

Germana Giombini
Department of Economics, University of Urbino, Italy
(*germana.giombini@uniurb.it*)

Enrico Saltari
Department of Public Economics, University of Rome "La Sapienza"
(*enrico.saltari@uniroma1.it)*

Abstract

This paper analyses how financial and labor market imperfections jointly influence investment. The contemporaneous presence of imperfections in both markets gives rise to a negative correlation between EPL and investment: firms facing negative shocks see their financial constraints worsen in countries with greater labor market rigidities. Internal funds have an overall positive impact on investment, notwithstanding the presence of labor market rigidities acts as a disincentive to the use internal funds for financing new projects. If capital is sunk and the legal environment favors ex-post profit appropriation by workers, firms use internal funds for ends alternative to fixed investment. Our results support the effort put forward by European institutions to reform both markets.

Keywords: Investment Models, Financing Constraints, Labor Protection Legislation, Panel Data Models.
JEL Classification: E2, G31, J50, C33.

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Firms' Investment in the Presence of Labor and Financial Markets Imperfections

1. Introduction

This paper aims at analysing how financial and labor market imperfections jointly influence investment decisions. To our knowledge economic literature on this specific aspect is scarce. Exceptions are Wasmer and Weil (2004), Rendon (2004), Belke and Fehn (2000), and a previous paper of Calcagnini and Saltari (2003). Indeed, notwithstanding the ongoing massive production of papers concerning the relationship between investment and firm access to financial resources, on one hand, and the more recent increasing number of papers analyzing the consequences of labor market institutions and regulation of employment and investment (in training and fixed capital), on the other, the effects of labor and financial market imperfections on investment have not yet been fully explored in the economic literature.

The analysis of how investment reacts to different conditions prevailing in financial and labor markets makes the traditional set-up of firms' capital adjustment richer and closer to real-world situations. Moreover, it sheds light on the implications for economic growth due to policy moves towards more liberalised financial and labor markets recently carried out in Europe.

As for the first of the two aforementioned strands of the economic literature, nowadays it is widely accepted that investment decisions are affected by firms' liquidity conditions in the presence of imperfect capital markets. Some scholars argued about the correct size of the coefficient of this relationship (i.e., the sensitiveness of investment to internal funds) (Fazzari et al., 2000 and 1988; Kaplan and Zingales, 1997 and 2000), but recent contributions to the debate seem to have reconciled the two opposite views by developing a model in which the cost of borrowing is determined endogenously and a firm's internal funds are allowed to be negative. This model produces a non-monotonic relationship between the firm's internal funds and its investment: investment is increasing in internal funds when firms have positive internal funds; in contrast, if the level of internal

funds is sufficiently negative, investment is decreasing in the level of internal funds (Cleary et al., 2004).

As for the other strand of the literature, sometimes dubbed the Employment Protection Legislation (EPL) theory, the disagreement among economists is even greater, thus making it difficult to draw general conclusions. In fact, differences in national EPLs - empirically - have an ambiguous effect on unemployment, employment, or productivity (Young, 2003; OECD, 1999; Aidt and Tzannatos, 2002); the clearest result is that EPL mainly has real effects on labor market dynamics, that is, on inflows and outflows from unemployment (Bentolila and Bertola, 1990).[1] EPL may positively affect incentives to invest in training, as long as the employment relationship is stable. However, this result is again dubious, given that EPL does not prevent employees from leaving the firm, regardless of whether employers have invested in training them (Young, 2003). But recent empirical contributions have found that EPL does matter for employers in deciding to invest in new technologies, develop new products, diversify and take risks (Gaëlle and Scarpetta, 2004; Eustace, 2000). Specifically, strict EPL reduces incentives to invest by increasing the costs of adjusting the workforce along the business cycle and in the event of innovations. This result is consistent with the more traditional result of trade union impact on aspects of economic performance, according to which price-cost ratios, Tobin's q, and subjective profitability assessments - and therefore investment - tend to be lower in unionized firms than in similar non-unionized firms (Aidt and Tzannatos, 2002).

A point worth noting is that the size effect of EPL on investment might depend upon firms' liquidity conditions in the presence of inefficient capital markets. Indeed, when a negative shock occurs, firms may face the following trade-off: keep losing money on unproductive workers, or fire them and pay the dismissal costs (Rendon, 2004; Saint-Paul, 2002). The choice made by firms will depend upon the nature of the shock. Temporary shocks will likely determine fewer layoffs, as opposed to the case of permanent shocks. Indifferently from the type of shocks, firms will need to

generate either additional internal funds or cut (or delay) their investment plans. In other words, firms with better liquidity conditions are in a position to determine their optimal investment policy, even in the presence of stringent employment protection regulations, than those facing financial constraints.[2]

This paper innovates our previous work in two main areas: the use of firm level data for seven European countries, and the use of explicit measures of EPL as an explanatory variable of our model.

Our results show that both financial and labor market imperfections influence investment as expected. Moreover, whenever these imperfections are jointly present, investment becomes more sensitive to conditions prevailing in both markets.[3]

As for financial market imperfections alone, we find that investment is positively affected by firms' ability to generate internal funds and, therefore, to overcome the increasing costs of accessing external financial resources, or the presence of finance rationing.

As for the effect of EPL alone on investment, the economic literature provides examples according which it might be negative or positive. On the one hand, as pointed out by Alesina et al. (2005), regulation increases the cost the firm faces in expanding its productive capacity, and limits its capacity to respond to changes in fundamentals. Therefore, a higher EPL should result in a negative impact on extension investment, by increasing firm adjustment costs over time. Figure 1 and Figure 3 show the negative relationship between EPL and the share of extension investment over the period 1991-2003 for the countries in our sample.[4] On the other hand, higher Employment Protection Legislation values also mean higher firing costs and, therefore, higher labor costs. The latter imply a substitution effect of labor with capital, with the consequence of likely higher capital accumulation growth rates. The substitution effect means that firms find it convenient to move towards more capital-intensive technologies wherever labor market institutions make the organization of production less responsive to the business cycle. This alternative interpretation draws support from the

positive relationship that exists between the EPL levels and the share of investments devoted to rationalisation, as shown in Figure 2 and in Figure 4, as well as by the slower increase in the capital stock per worker available in Europe, compared to the U.S. economy (see Figure 5). The latter phenomenon started around the mid-nineties**,** following an easing of the EPL levels in most European countries (see also European Commission, 2001, Graph 9, p. 111; OECD, 2004).

Which of the two effects of EPL on investment prevails is mostly an empirical matter and the issue is addressed in Section 3. Our empirical analysis shows that the negative effect is larger than the substitution effect, i.e. overall firms investments are negatively affected by higher degree of employment protection.

When we consider firms operating in economies characterized by the simultaneous presence of financial and labor market imperfections, we find that the coefficient of the interaction variable is negative: firms facing negative shocks see their financial constraints worsen in countries with more rigid labor market. In other words, the presence of labor market rigidities represents a disincentive to the use of internal funds for financing new investments. If capital is largely sunk after being invested, and the legal environment favors ex-post profit appropriation by workers (as claimed by hold-up theories), firms may find it convenient to use internal funds for any ends alternative to fixed investment: i.e., paying back their debts, acquiring financial assets, etc.. However, the overall effect of internal funds is positive, confirming the traditional role that this type of variable plays in investment decision models with capital market imperfections.

On the policy side our results provide a clear-cut message concerning the type of interventions national governments and European institutions should design to improve economic growth perspectives. Indeed, investment is at the core of any economic growth process. In the short-run it is an important component of aggregate demand; in the long-run, it determines an expansion of productive capacities, and allows the embodiment of technological innovations in existing production processes. The result is therefore the improvement of an economy's international competitiveness.

The latter, in turn, also means more job opportunities. However, labor market reforms alone are not sufficient to stimulate investment; they should be necessarily accompanied by reforms in other markets. In this paper we show that policy decisions aimed at improving capital market efficiency and reducing labor market rigidities are expected to act as an incentive to fixed investment.[5] Indeed, much effort has been made by European institutions to stimulate reforms in both markets in recent years. Therefore, we might expect more favorable conditions for economic growth in Europe in the not-too-distant future.

The rest of the paper is organized as follows. Section 2 addresses the empirical aspects of the paper (data sources, variables definitions and our model specification) and discusses the econometric results. Section 3 summarizes the main findings of the paper and its policy implications.

2. Data Sources

The data used in this paper come from several sources. Annual firm-level observations over the period 1995-2003 are taken from AMADEUS, a comprehensive, pan-European database containing financial information on seven million public and private companies in 38 European countries. The data set covers all sectors, with the exception of the financial sector. It is produced by Bureau van Dijk (BvD), whose local providers collect balance sheet information, sectors of operation, and number of employees from the national Chambers of Commerce. There are several versions of AMADEUS, depending on the number of firms included in the dataset. In this paper we use the "7 million" database, but we base our analysis on a random sample extracted from the original database of seven of the largest European Countries: Belgium, France, Germany, United Kingdom, Italy, the Netherlands, and Spain.

To transform nominal into real variables we used price deflators obtained from the Annual macro-economic (AMECO) database provided by the European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN).[6]

Information on EPL is the well-known time series of the OECD EPL Index. Time series of the EPL index are available for total, regular and temporary workers, respectively. Since most of the literature on employment protection emphasizes the analogy of EPL to an employer-borne tax on employment adjustment, the overall intent is to reflect the cost implications of various regulatory provisions for employers (i.e. stricter is interpreted as more costly). The overall summary measure of EPL strictness relies on three main components related to protection of regular workers against (individual) dismissal, specific requirements for collective dismissals and regulation of temporary forms of employment. Protection of regular contracts against (individual) dismissal constitutes the core component of the overall summary index of EPL strictness. Indeed, although temporary forms of employment have grown in many OECD countries over the past two decades, regular contracts are still the most common employment arrangement Temporary work is sometimes regarded as a way to circumvent rules governing regular contracts. For the component related to collective dismissals, the story is quite different: by construction, it includes only regulation applicable in addition to that applied in cases of individual dismissals and cannot therefore be considered as a stand-alone component of EPL. However, some potentially important aspects of employment protection are difficult to take into account in the EPL indicator such as trial or probationary periods and notice periods and/or severance pay. In this paper we used the EPL index for total workers, Version 1, that excludes regulations on collective dismissals.[7]

Data have been filtered in many ways. First of all, to avoid double counting, we only considered unconsolidated accounts. Second, we controlled for outliers with respect to the median on original variables: Fixed assets (FIAS), Depreciation (DEPR), Cash Flow (CF), Sales (OPRE), Cash and Cash Equivalent (CASH).[8]

Finally, we restricted our data set to firms and variables for which we had at least observations for five years. This step allowed us to work with a less unbalanced panel and to have enough time series observations for each variable to robustly estimate our dynamic panel data models.

Eventually, we constructed the variables for our regressions as follows:

- $(I/K)_t = I_t / K_{t-1} = (FIAS_t – FIAS_{t-1} + DEPR_t)/FIAS_{t-1}$ is the investment ratio, i.e. the current gross investment divided by the beginning-of-period capital stock;
- $(\Delta SALES/K)_t = \Delta SALES_t / K_{t-1} = (OPRE_t – OPRE_{t-1}) / FIAS_{t-1}$ is the accelerator variable, i.e. the sales change divided by the beginning-of-period capital stock;
- $(CF/K)_t = CF_t / K_{t-1} = (CF_t)/ FIAS_{t-1}$ current cash flow divided by the beginning-of-period capital stock;
- $(LIQ/K)_t = LIQ_t / K_{t-1} = (CF_t + CASH_{t-1})/ FIAS_{t-1}$ is the liquidity variable, i.e. the sum of the current cash flow and the beginning-of-period cash in hand divided by the beginning-of-period capital stock.

Table 1 shows some descriptive statistics of our panel-data sample. Belgian firms show the highest (median) investment ratio, while the Spanish and Dutch firms have the lowest. French firms show the highest investment ratio variability. French firms also show the largest (median) increase in sales (with respect to their capital stock), with Italian and U.K. firms coming in last. As for the liquidity variables, French firms show the largest (median) proportion of cash flow and cash in hand with respect to their capital stock. Diversely, U.K. and Italian firms have the lowest. Finally, the Spanish labor market shows the highest EPL strictness as opposed to the U.K. labor market, that appears to be the most flexible one among the countries herein. France is the only country where EPL did not change during the period 1995-2003.

3. Model Specification

As for the choice of model specification, we were unable to make use of the Tobin's q model, given that most of the companies in our sample are not listed. Therefore, we opted for a more eclectic approach based on the traditional investment accelerator model integrated with variables capturing how firms' fixed capital decisions react to labor market differences, and how the latter in-

teracts with the contemporaneous presence of capital market imperfections. In spite of its simplicity, the investment accelerator model performs relatively well in empirical studies. A number of recent evaluations ascribe to accelerator equations a better predictive power than any competing model in such diverse situations as industrialized economies, developing economies and transition economies (Lensink and Sterken, 2000; Bigsten et al., 1999; Mairesse et al., 1999; Abel and Blanchard, 1989).

Therefore, our model specification is the following:

$$\left(\frac{I}{K}\right)_{i,j,t} = \beta_0 + \beta_1\left(\frac{I}{K}\right)_{i,j,t-1} + \beta_2\left(\frac{\Delta SALES}{K}\right)_{i,j,t} + \beta_3\left(\frac{LIQ}{K}\right)_{i,j,t} + \beta_4 EPL_{j,t} + \beta_5 EPL_{j,t} * \left(\frac{LIQ}{K}\right)_{i,j,t} + d_t + \eta_i + \phi_j + \nu_{i,j,t} \quad (1)$$

where the subscript *i* refers to the company, *t* to time period, and *j* to the country.

Model (1) includes an autoregressive term, $\left(\frac{I}{K}\right)_{i,j,t-1}$, together with the accelerator variable, $\left(\frac{\Delta SALES}{K}\right)_{i,j,t}$, and two variables that capture financial and labor market imperfections, $\left(\frac{LIQ}{K}\right)_{i,j,t}$ and $EPL_{j,t}$ respectively. Here $\left(\frac{LIQ}{K}\right)_{i,j,t}$ stands either for cash flow or cash flow plus cash holdings. Moreover, we added an interaction variable $EPL_{j,t} * \left(\frac{LIQ}{K}\right)_{i,j,t}$ that selects those firms that simultaneously face the most (least) strict financial constraints and are located in countries with the most flexible (rigid) labor markets. By means of this multiplicative interaction term we test the conditional hypothesis that the effect of EPL (liquidity) on investment also depends on the degree of financial (labor) market imperfection.[9]

Finally, model (1) includes a set of dummy variables. We assumed that the variation in the user cost of capital among firms can be controlled for by using additive year- specific effects,

(d_t, $t = 1995,...,2003$), and firm-specific effects, (η_i, $i = 1,...,N$), (Bond and Meghir, 1994). Firm-specific effects are also justified by the variation of depreciation rates across firms, whereas time dummies also control for the business cycle.

We also added country dummies, (ϕ_j, $j = 1,...,7$), to the empirical equation. Indeed, given the country specific nature of the Employment Protection Legislation, the EPL variable might capture other aspects, such as the differences in the heterogeneous environments in which firms operate, and not the differences in the tightness of employment protection.

Finally, $v_{i,j,t}$ is an error term satisfying the usual properties.

Based on reasoning and results from a previous paper of Calcagnini and Saltari (2003) and a well-known strand of the economic literature, according to which cash flow might capture future investment opportunities not fully measured by the profitability variable (Gomes, 2001; Erickson and Whited, 2000; Saltari and Travaglini, 2003), or indicate other sources of misspecification in the investment model (Bond and Van Reenen, 2003), our liquidity variable is either cash flow or the sum of cash flow at time t plus cash holdings at the end of time t-1 (both divided by the level of fixed assets at time t-1). The latter, beside an at-hand source of liquidity, adds information to cash flow as a measure of financial market imperfections, because it is not directly influenced by multiple sources of shocks that might affect the time-t generation of internal funds.[10] Indeed, cash holdings are closely related to cash flow, given that they might be thought of as some function of cumulated cash flow over time. Why should a firm's investment project be delayed by insufficient cash flow if it might be funded by using its liquid assets or by offering them as collateral in the loan market? Moreover, financiers might see firms with a sounder liquidity position as less risky and charge them a lower interest rate. Indeed, the liquidity variable calculated as the sum of cash flow and cash holdings is strongly and positively ($r = 0.72$) associated with an index of financing obstacles obtained from the World Business Environment Survey (WBES) and published in Beck et al.

(2002), Table I, p.39.[11] To check the robustness of our results, Table 2 shows estimates obtained by using either $\left(\frac{CF}{K}\right)_{i,j,t}$ or $\left(\frac{LIQ}{K}\right)_{i,j,t}$.

To estimate model (1), given its dynamic structure, we use the system GMM estimator approach (Blundell and Bond, 1998). This method controls for the presence of the unobserved firm-specific effect and for the endogeneity of contemporaneous regressors.[12] It uses equations in first-differences for which endogenous variables lagged two or more periods will be valid instruments provided there is no serial correlation in the time varying component of the error term. This assumption is tested by performing tests for serial correlation in the first differences residuals. The equations in differences are combined with the equations in levels, for which lagged differences of the variables are used as instruments. Instruments validity is tested by using a Hansen J test for overidentified restrictions that, differently from the Sargan test, is robust to autocorrelation or heteroskedasticity. We decided to report the most customary one-step variant of the system GMM.[13]

4. Results

Dynamic Panel-data estimates of model (1) over the period 1995-2003 are shown in Table 2.[14] Columns (1) and (2) show robust estimated coefficients obtained from the unbalanced panel data when firm liquidity is measured by cash flow and cash flow plus cash holdings, respectively.[15]

As expected, results in column 1 show positive and statistically significant coefficients for the (first) autoregressive term, the accelerator and liquidity variables.

The estimated coefficient of the EPL variable is negative and statistically significant: even though firms have an incentive to substitute labor with capital in the presence of strict employment protection legislations, this incentive appears to be more than counterbalanced by the negative effect of rigid labor market on firm's ability to respond to changes in fundamentals.

Finally, the estimated coefficient measuring how the potential contemporaneous presence of imperfect capital and labor markets impact on investment is negative and statistically significant. It signals that investment is lower where both markets show high degrees of imperfection. Therefore, in a Modigliani-Miller world, where investment is independent from internal sources of funds, firms would have no incentive to hold cash and the coefficient of this interaction variable would be zero. To fully understand what this coefficient means, it is convenient to evaluate the total effect on investment of the liquidity and employment protection legislation variables.

We first note that the difference between the estimated coefficient of the cash flow by itself and that disentangled from the coefficient of the interaction term is positive (0.113) and statistically different from 0 at the 1% probability level.[16] This result is shown in Table 2 in the row labelled "Total Cash-Flow Effect". In other words, the overall effect of cash flow on investment is positive.[17] However, its positive contribution is dampened wherever the labor market's imperfections are severe: i.e., firms worried to find themselves in a hold-up situation due to the legislative constraints that make labor utilization more difficult to adjust to cyclical conditions. They do not expand their fixed capital, but more likely use internal funds to expand financial assets or reduce their debt burden. Moreover, when EPL is large, the availability of internal funds could matter less for investment because part of the funds must be used to pay firing costs to get rid of redundant workers.

Even though the coefficients of EPL and (EPL*CF/K) are both negative, meaning that the impact of employment protection legislation on investment is clearly signed, the row in Table 2 labelled "Total EPL Effect" shows the overall impact of EPL on investment (-0.033). The latter is statistically different from 0 at the 1% probability level.

The negative relationship that we find between EPL and investment is often found in reports stressing the influence of institutions on economic variables.[18] Usually, this conclusion is drawn by simple correlation or graphical analysis. Our results confirm this conclusion, but in a more robust

way. Moreover, we show that the negative impact of employment protection legislation on investment is the result of two opposite effects, where the negative one dominates the positive one, and the contemporaneous presence of capital market imperfections appears to reinforce this negative effect.

Column (2) in Table 2 shows the estimated coefficients of model (1) when the Cash-Flow variable is replaced by the Liquidity variable, calculated as the sum of cash flow and cash holdings. Results of column (2) are equivalent to those shown in column (1), but the overall impact of EPL on investment is larger than in the previous case, while the impact of cash flow and cash holdings on investment is smaller than in the case when only cash flow is used.

Finally, Table 3 shows estimation results of two alternative specifications of model (1), but limited to the case with the Cash-Flow variable. In the first specification we assumed that both the EPL and the cash flow affect investment with a lag of one year. In the second one, we assumed that only EPL enters model (1) lagged. Overall, results are less satisfactory than those in Table 2. The coefficient of lagged EPL is statistically significant only when cash flow is also lagged one period, but the coefficient of the latter is not statistically significant as the coefficient of the interaction term. In the case when only EPL is lagged one period, the sole statistically significant coefficient is the interaction term one. Thus empirical results are favourable to the specification the estimates of which are shown in Table 2 and on which we will base our conclusions.

5. Conclusion

There is a growing concern among policy makers and economists about the loss of competitiveness shown in recent years by the European economy versus the U.S. economy. Among several explanations, we think that one important direction requiring investigation is the faster pace of capital accumulation observed in the U.S. economy compared to the European one. This difference in the capital accumulation process has allowed the U.S. economy to exploit the advantages of new tech-

nologies in all sectors of the economy; moreover, it supported the creation of new jobs without penalizing U.S. labor productivity. Diversely, the expansion of employment in Europe favoured by less strict employment protection legislation was not accompanied by a proportional growth in fixed capital, resulting instead in a relative decrease in labor productivity. Indeed, recent contributions show that the productivity slowdown in the euro area in the second part of the nineties may be linked to a slower capital accumulation process and greater hiring of workers (especially in traditional industries) following the structural wage-setting changes that occurred in Europe during the second half of the 1990s (Estevão, 2004; Travaglini and Saltari, 2006).

Our results show that the design of economic policies aimed at filling the gap between the two economies should be directed to contemporaneously eliminating or easing imperfections in both markets. European institutions are becoming more and more aware of the necessity to pursue this strategy, that also includes the search for more competition in the product market.[19] Therefore, we are more optimistic about the prospects of the European economy, as long as policy interventions continue along the lines that have already been undertaken.

Table 1
Descriptive Statistics: 1995-2003

Country	I/K	ΔSALES/K	CF/K	LIQ/K	EPL
BELGIUM					
Nr. of firms	315	315	315	315	--
Nr. of Obs	2029	2029	2029	2014	--
Mean	0.25	0.30	0.49	0.98	2.40
Median	0.20	0.18	0.38	0.60	2.20
Standard Dev.	0.21	2.61	0.48	1.19	0.40
FRANCE					
Nr. of firms	4512	4512	4512	4512	--
Nr. of Obs	25345	25345	25345	24717	--
Mean	0.24	0.39	0.61	1.52	3.00
Median	0.18	0.21	0.46	0.97	3.00
Standard Dev.	0.23	2.78	0.66	1.60	0.00
GERMANY					
Nr. of firms	52	52	52	52	--
Nr. of Obs	248	254	254	247	--
Mean	0.22	0.19	0.40	0.65	2.60
Median	0.18	0.08	0.29	0.44	2.50
Standard Dev.	0.18	1.98	0.37	0.60	0.26
ITALY					
Nr. of firms	3374	3374	3374	3374	--
Nr. of Obs	19636	19636	19636	19224	--
Mean	0.24	-0.02	0.28	0.63	2.62
Median	0.18	0.01	0.21	0.36	2.59
Standard Dev.	0.21	2.20	0.36	0.88	0.53
NETHERLANDS					
Nr. of firms	34	34	34	34	--
Nr. of Obs	212	212	212	208	--
Mean	0.20	0.22	0.46	0.69	2.34
Median	0.15	0.06	0.37	0.50	2.10
Standard Dev.	0.17	1.94	0.43	0.70	0.29
SPAIN					
Nr. of firms	4172	4172	4172	4172	--
Nr. of Obs	23172	23183	23183	22615	--
Mean	0.22	0.32	0.38	0.84	3.01
Median	0.15	0.16	0.29	0.50	3.10
Standard Dev.	0.22	2.32	0.40	1.07	0.10
U. K.					
Nr. of firms	1219	1219	1219	1219	--
Nr. of Obs	6947	6947	6947	6748	--
Mean	0.20	0.06	0.31	0.62	0.64
Median	0.16	0.01	0.22	0.34	0.60
Standard Dev.	0.21	2.19	0.39	0.91	0.04

Source: Calculations based on AMADEUS and OECD data.

Table 2
Arellano-Bond Dynamic Panel-data Estimation
One-step System GMM Results [a]

	(1)	**(2)**
Dependent variable	$(I/K)_t$	$(I/K)_t$
Explanatory variables		
$(I/K)_{t-1}$	0.302*	0.328*
	(0.172)	(0.197)
$(I/K)_{t-2}$	0.024	0.023
	(0.016)	(0.017)
$(\Delta SALES/K)_t$	0.006***	0.008*
	(0.001)	(0.001)
$(LIQ/K)_t$		0.115***
		(0.015)
$(CF/K)_t$	0.177***	
	(0.019)	
$(EPL*LIQ/K)_t$		-0.014**
		(0.005)
$(EPL*CF/K)_t$	-0.025***	
	(0.007)	
EPL_t	-0.022***	-0.030***
	(0.009)	(0.009)
Constant	0.122***	0.103**
	(0.042)	(0.047)
Time dummies	Yes	Yes
Country dummies	Yes	Yes
Firm specific effect	Yes	Yes
Hansen J Overid. Restrictions, *p-value*	0.562	0.420
Arellano-Bond Test AR(1), *p-value*	0.000	0.001
Arellano-Bond Test AR(2), *p-value*	0.166	0.162
Total Cash-Flow Effect ($\partial I/\partial CF$)	0.133***	
Total Liquidity Effect ($\partial I/\partial LIQ$)		0.080***
Total EPL Effect ($\partial I/\partial EPL$)	-0.033***	-0.044***
No. of Observations	47650	46550
No. of Firms	12835	12821

Standard Errors are shown in parentheses; * p<0.10, ** p<0.05, *** p<0.01 significance levels, respectively

Table 3
Arellano-Bond Dynamic Panel-data Estimation
One-step System GMM Results [a]

	(1)	**(2)**
Dependent variable	$(I/K)_t$	$(I/K)_t$
Explanatory variables		
$(I/K)_{t-1}$	0.342*	0.299*
	(0.186)	(0.172)
$(I/K)_{t-2}$	0.022	0.025
	(0.016)	(0.016)
$(\Delta SALES/K)_t$	0.008***	0.004*
	(0.001)	(0.001)
$(CF/K)_t$		0.183
		(0.019)
$(CF/K)_{t-1}$	0.031	
	(0.040)	
$EPL_{t-1}*CF/K_t$		-0.027***
		(0.007)
$(EPL*CF/K)_{t-1}$	0.040	
	(0.006)	
EPL_{t-1}	-0.016***	-0.002
	(0.005)	(0.006)
Constant	0.140***	0.081**
	(0.028)	(0.036)
Time dummies	Yes	Yes
Country dummies	Yes	Yes
Firm specific effect	Yes	Yes
Hansen J Overid. Restrictions, *p-value*	0.405	0.721
Arellano-Bond Test AR(1), *p-value*	0.000	0.000
Arellano-Bond Test AR(2), *p-value*	0.093	0.181
No. of Observations	47650	47650
No. of Firms	12835	12835

Standard Errors are shown in parentheses; * p<0.10, ** p<0.05, *** p<0.01 significance levels, respectively

Figure 1 - EPL vs Share of Extension Investment 1991-2003
(annual country-level observations for 7 countries: Belgium, France, Germany, Italy, Spain, The Netherlands, U.K.)

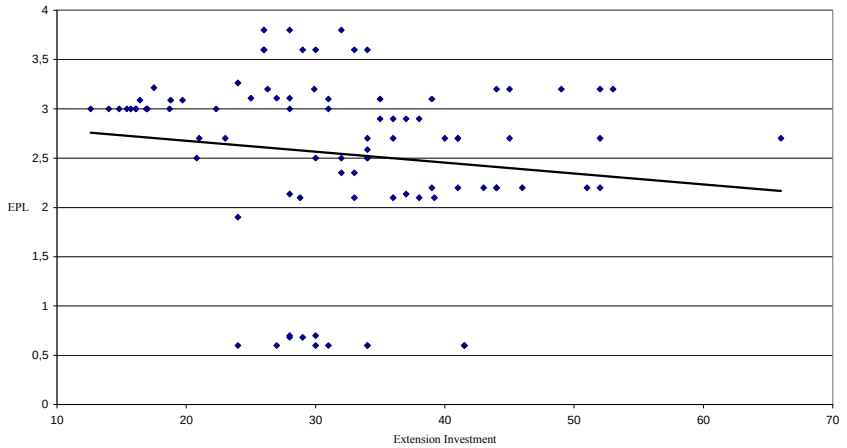


Figure 2 - EPL vs Share of Rationalization Investment 1991-2003
(annual country-level observations for 7 countries: Belgium, France, Germany, Italy, Spain, The Netherlands, U.K.)

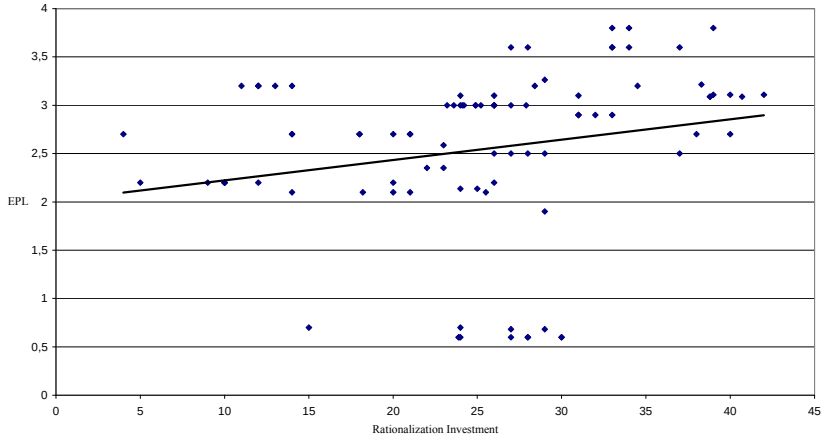


Figure 3 - EPL vs Share of Extension Investment 1991-2003
(annual country-level observations for 5 countries: Belgium, Germany, Italy, Spain, The Netherlands)

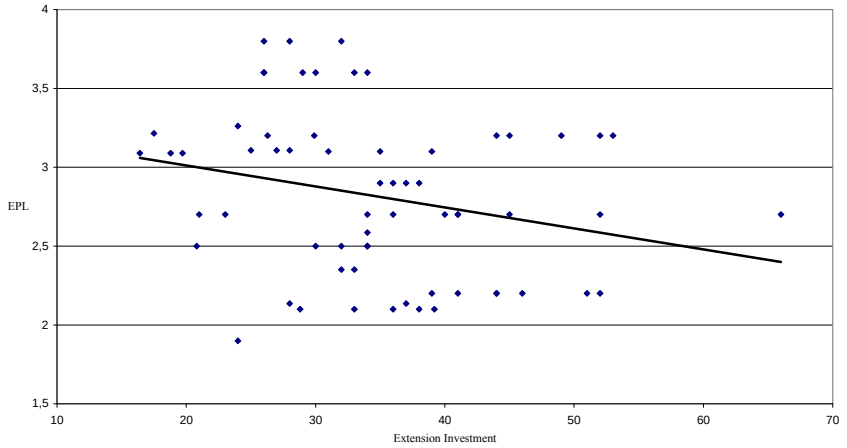
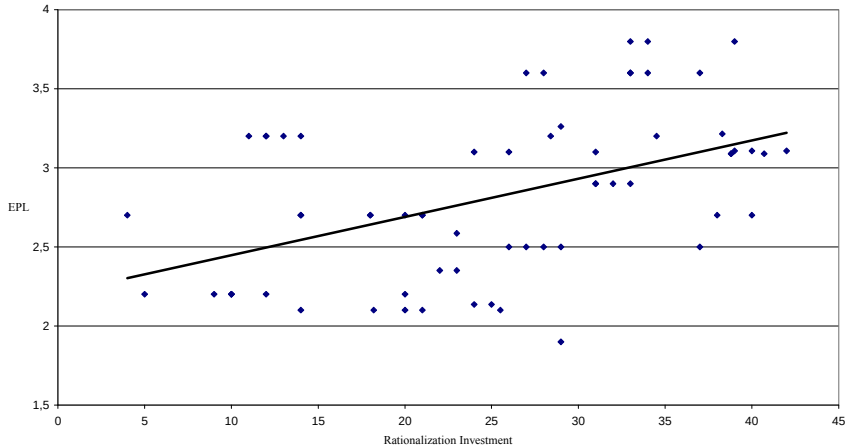
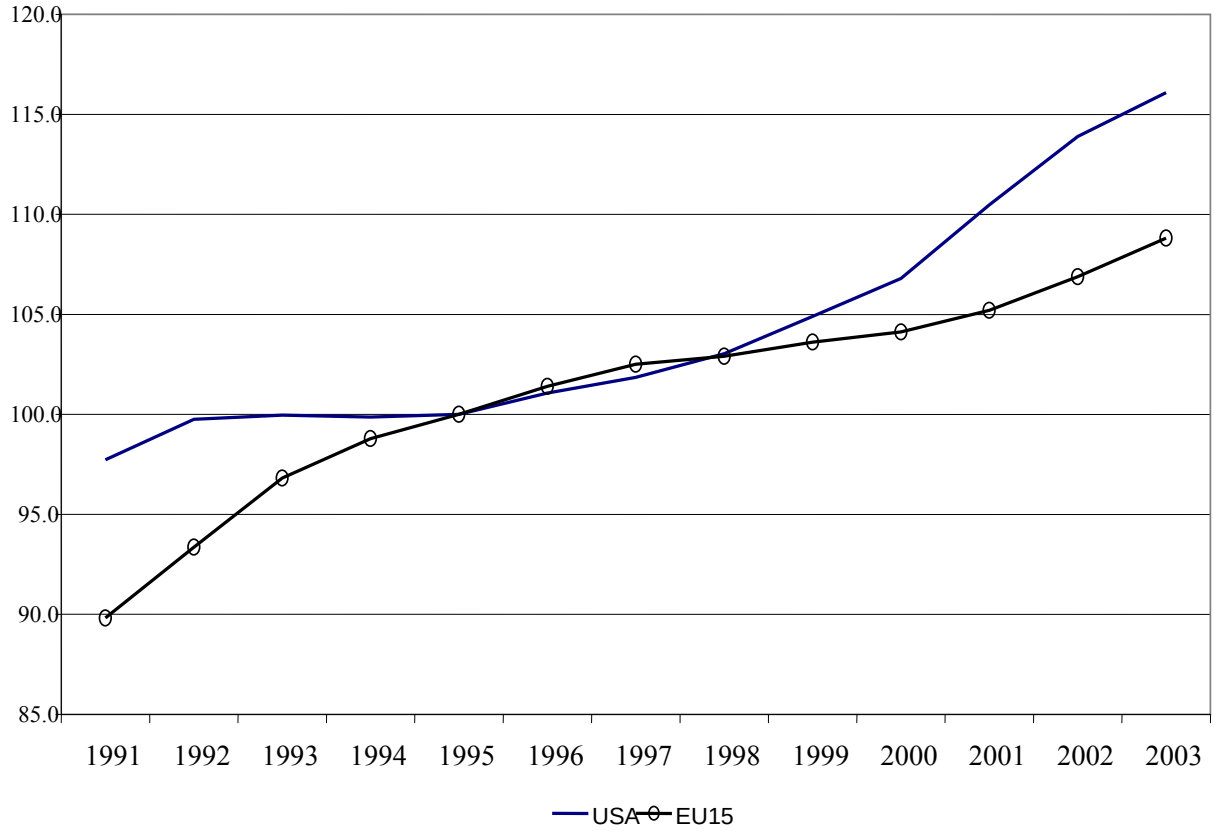


Figure 4 - EPL vs Share of Rationalization Investment 1991-2003
(annual country-level observations for 5 countries: Belgium, Germany, Italy, Spain, The Netherlands)



Source : EU Commission and OECD

Figure 5- Capital Stock per Worker, Euro Area (15 countries) and U.S.A.
(1995=100)



Source: EU Commission, AMECO database.

References

Abel, Andrew B., Olivier J. Blanchard (1989), "Investment and sales: Some empirical evidence", NBER Working Paper Series, w2050.

Aidt, Toke, Tzannatos, Zafiris (2002), *Unions and Collective Bargaining. Economic Effects in a Global Environment*, The World Bank, Washington, D.C.

Alesina, Alberto, Silvia Ardagna, Giuseppe Nicoletti, and Fabio Schiantarelli (2005), "Regulation and Investment", *Journal of the European Economic Association*, 3, pp. 791-825.

Beck, Thorsten, Asli Demirgüç-Kunt, Luc Laeven, Vojislav Maksimovic (2003), "The Determinants of Financial Obstacles", World Bank, mimeo.

Beck, Thorsten, Asli Demirgüç-Kunt, Vojislav Maksimovic (2002), "Financing Patterns Around the World: The Role of Institutions", World Bank Policy Research Working Paper, No. 2905.

Belke, Ansgar, Rainer Fehn (2000), Institutions & Structural Unemployment: Do Capital-Market Imperfections Matter?", CEPS Working Document, No. 158.

Bentolila, Samuel, Giuseppe Bertola (1990), "Firing Costs and Labour Demand: How Bad is Euro Sclerosis?", *Review of Economic Studies*, 57, pp. 381-402.

Bertola, Giuseppe, Tito Boeri, Sandrine Cazes (1999), "Employment protection and labour market adjustment in OECD countries: Evolving institutions and variable enforcement", *Employment and Training Papers*, No. 48, I.L.O.

Betcherman, Gordon, Amy Luinstra, Makoto Ogawa (2001), "Labor Market Regulation: International Experience in Promoting Employment and Social Protection", *Social Protection Discussion Paper Series*, No. 0128, World Bank.

Bigsten, Arne, Paul Collier, Stefan Dercon, Bernard Gauthier, Jan Willem Gunning, Anders Isaksson, Abena Oduro, Remco Oostendorp, Cathy Pattilo, Mans Soderbom, Michael Sylvain, Francis Teal, and Albert Zeufack (1999), "Investment in Africa's manufacturing sector: A four country panel data analysis", *Oxford Bulletin of Economics and Statistics*, 61:489-512.

Blanchard, Olivier (2004), "Reforming Labor Market Institutions: Unemployment Insurance and Employment Protection", MIT Working Paper Series, No. 04-38.

Blanchard, Olivier, Philippon Thomas (2004), "The Quality of Labor Relations and Unemployment", mimeo MIT.

Blundell, Richard, Steve Bond (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models", *Journal of Econometrics*, 87, pp. 115-143.

Bond, Steve, Costas Meghir (1994), "Dynamic Investment Models and the Firm's Financial Policy", *Review of Economic Studies*, 61, pp. 197-222.

Bond, Steve, John Van Reenen (2003), "Microeconomic Models of Investment and Employment", Institute for Fiscal Studies, mimeo.

Brambor, Thomas, Clark, William R., and Matt Golder (2006), "Understanding Interaction Models: Improving Empirical Analyses", *Political Analysis*, 14, pp. 63-82.

Calcagnini, Giorgio, Enrico Saltari (2003), "Labour and Financial Market Determinants of Investment Decisions in Europe", Università di Roma "La Sapienza", Dipartimento di Economia Pubblica, Working Paper No. 56.

Cleary, Sean, Povel Paul, Michael Raith (2004), "The U-shaped investment curve: Theory and Evidence", CEPR Discussion Paper Series, No. 4206.

Grubb, David, William Wells (1993), "Employment Regulation and Patterns of Work in EC Countries", *Economic Studies* No. 21, Paris: O.E.C.D.

Erickson, Timothy, Toni M. Whited (2000), "Measurement Error and the Relationship between Investment and *q*", *Journal of Political Economy*, (108), pp.1027-1057.

Estevão, Marcello M. (2004), "Why Is Productivity Growth in the Euro Area So Sluggish?", *IMF Working Paper* WP/04/200.

European Commission (2001), *European Economy*, 73, Brussels.

Eustace, Clark (2000), *The Intangible Economy Impact and Policy Issues. Report of the European High Level Expert Group on the Intangible Economy*, European Commission.

Fazzari, Steven, Hubbard Glenn, Bruce C. Petersen (1988), "Financing Constraints and Corporate Investment", *Brookings Papers on Economic Activity*, pp.141-195.

Fazzari, Steven, Hubbard Glenn, Bruce C. Petersen (2000), "Investment-Cash Flow Sensitivities are Useful: A Comment on Kaplan and Zingales", *Quartely Journal of Economics*, 115, pp.695-705.

Gomes, Joao F. (2001), "Financing Investment", *American Economic Review*, 91(5), pp.1263-1285.

I.M.F. (2004), *World Economic Outlook. Advancing Structural Reforms*, World Economic and Financial Surveys, Washington D.C.

Kaplan, Steve N., Luigi Zingales (1997), "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?", *Quarterly Journal of Economics*, 112, pp.169-215.

Kaplan, Steve N., Luigi Zingales (2000), "Investment-Cash Flow Sensitivities Are Not Valid Measures of Financing Constraints", *Quartely Journal of Economics*, 115, pp.707-712.

Lensink, Robert, Elmer Sterken (2000), "Capital market imperfections, uncertainty and corporate investment in the Czech Republic", *Economics of Planning*, 33:53–70, 2000

Love, Inessa (2001), "Financial Development and Financing Constraints: International Evidence from the Structural Investment Model", World Bank, mimeo.

Nickell, Stephen, (2003), "A Picture of European Unemployment: Success and Failure", Centre for Economic Performance, L.S.E. (U.K.).

Nickell, Stephen, Luca Nunziata, Wolfgang Ochel (2002), "Unemployment in the OECD since 1960s. What do we know?", Bank of England.

O.E.C.D. (2004), *Employment Outlook*, Paris: O.E.C.D.

Pica, Giovanni (2001), Labour Demand and Financial Markets Imperfections", *Studi Economici*, 73, pp. 41-74.

Gaëlle, Pierre, Stefano Scarpetta (2004), "Employment Regulations through the Eyes of Employers: Do They Matter and How Do Firms Respond to Them?", IZA Working Paper, No. 1424.

Rendon, Silvio (2004), "Job Creation and Investment in Imperfect Capital and Labor Markets", Fundación Centro de Estudios Andaluces, Working Paper, No. E2004/35.

Saltari Enrico, Giuseppe Travaglini (2006) "Technological and non-technological shocks in the labor market", *mimeo*.

Saltari Enrico, Giuseppe Travaglini (2003) "How do future constraints affect current investment?", *Topics in Macroeconomics*: Vol. 3: No. 1, http://www.bepress.com/bejm/topics/vol3/iss1/art8.

Saint-Paul, Gilles (2002), "Macroeconomic fluctuations and the timing of labor market reform", paper presented at the *International Economic Association Congress*, Lisbon.

Sterken, Elmer, Lensink Robert, Hong Bo (2002), "Investment, Cash Flow, and Uncertainty: Evidence for the Netherlands", paper presented at the Atlanta Meetings of the American Economic Association, January.

Wasmer, Etienne, Philippe Weil (2004), "The Macroeconomics of Labour and Credit Market Imperfections", *American Economic Review*, 94(4), pp. 944-963.

Young, David (2003), "Employment protection legislation: its economic impact and the case for reform", *Economic Papers*, European Commission, No. 186.

Endnotes

[1] The economic literature on this topic is nowadays vast. For a more in depth discussion see Bertola et al. (1999), Betcherman et al. (2001), Blanchard (2004), Blanchard and Philippon (2004), Grubb and Wells (1993), Nickell et al. (2002), Nickell (2003).
[2] Pica (2001) shows that borrowing constrained firms have lower current employment. In other words, labor demand positively depends on the stock of internal funds because they contribute to relax future financial constraints.
[3] Our results are consistent with those of Rendon (2004) referred to Spanish companies.
[4] Figure 1 and 2 show annual country-level observations over the period 1991-2003 for 7 countries: Belgium, France, Germany, U.K., Italy, The Netherlands and Spain. In Figure 3 and 4 France and the U.K. are left out of the sample: France is excluded because their EPL indexes do not change in the period; U.K. because displays low levels of the EPL index compared to the average European levels.
[5] On this topic see also Love (2001).
[6] The AMECO database is available from the European Union web site:
http://europa.eu.int/comm/economy_finance/indicators/annual_macro_economic_database/ameco_en.htm.
[7] See OECD (2004), pp. 64-70.
[8] Variable labels in parentheses are the original AMADEUS labels.

[9] Multiplicative interaction models are common in the quantitative social and political science literature. Institutional arguments frequently imply that the relationship between economic inputs and outcomes varies depending on the institutional context. See Brambor et al. (2006).
[10] See also Beck et al. (2003) and Sterken et al. (2002).
[11] WBES is a cross-national survey conducted in developed and developing countries in 1999 led by the World Bank. We find that the correlation of cash flow alone with the WB index is lower (r=0.37).

[12] In all our estimates EPL is assumed to be exogenous. This assumption might be invalidated by the presence of reverse causation between I/K and EPL. However, we make use of data at firm level, while EPL information is at the national level. Therefore, we do not see how changes in the investment rate at firm level may affect EPL. This might happen due to business cycles reasons, but we control for the business cycle in our estimation. Further, we also estimated model specifications where EPL is endogenized and, consequently, instrumented. Even in this case the estimated coefficients of all variables do not change significantly, except for the estimated coefficient of EPL itself that is still negative (and statistically significant), but higher in absolute value. These results are available upon request from the authors.

[13] Two-step system GMM results are equivalent to the one-step results and are available upon request from the authors.

[14] Estimated coefficients obtained by the Stata SE 10.0 command xtabond2.

[15] We also estimated model (1) excluding French firms from our sample because during the period 1995-2003 EPL did not change in France. Results are qualitatively similar to those shown in Table (2) and, thus, we opted to not report them. However, they are available upon request from the authors.

[16] The total effect of cash flow on investment has been calculated as the coefficient of cash flow plus the coefficient of the interaction term times the average of EPL. Similarly, we calculated the total effect on investment of LIQ and EPL.

[17] Cleary, Povell and Raith (2004) theoretically show that cash flow might have a negative impact on investment for sufficiently negative levels of the cash flow. To control for the potential existence of non linearities between investment and cash flow, we also estimated the model over a smaller sample with only positive levels of CF. In this case we loose 2712 observations, but our estimated coefficients do not change with respect to those obtained with the whole sample. These results are available upon request from the authors.

[18] For instance, see European Economy (2001), Chapter 3.

[19] See IMF (2004).