

## Firms' Investment in the Presence of Labor and Financial Markets Imperfections<sup>?</sup>

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### Abstract

This paper analyses how financial and labor markets jointly influence investment decisions. Our results show that a negative correlation between EPL levels and investment: firms facing negative shocks see their financial constraints worsening in countries with greater labor market rigidities. Instead, internal funds have an overall positive impact on investment. However, the presence of labor market rigidities disincentives the use internal funds for financing new projects: i.e., if capital is largely sunk and the legal environment favors ex-post profit appropriation by workers, firms may use internal funds for any ends alternative to fixed investment. Our results support the effort put forward by European institutions to reform both markets in recent years.

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 markets 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 ours (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).<sup>1</sup> 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 (Pierre 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.

This paper innovates our previous work in two main areas: the use of consistent investment information in our sample, and the use of explicit measures of EPL, instead of simple or more elaborated proxies for it, as an explanatory variable of our model.

Our results show that both financial and labor markets influence investment; however, the joint presence of imperfections in both markets makes investment react to shocks in a complex way.<sup>2</sup> We report estimated and statistically significant coefficients for variables that are expected to measure the degree of imperfections in both markets, after controlling for lagged investment and profit opportunities. Specifically, 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.

We also find a direct and positive effect of EPL levels on investment. This result 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. However, this move would be optimal if the capital market was perfect; i.e., firms are always able to fund their projects whenever their net present value is positive. Considering the joint presence of financial imperfections, EPL levels are instead negatively associated with investment: firms facing negative shocks see their financial constraints worsening in countries with more labor market rigidities. Indeed, the overall effect of EPL on investment is negative.

Looking at the coefficient of the interaction variable between labor and capital market imperfections from the point of view of the latter, its negative value means that the presence of labor market rigidities represents a disincentive to using internal funds for financing new investments. In other words, 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 traditionally 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.<sup>3</sup> 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. The main source is the Bank for the Accounts of Companies Harmonised (BACH) database, available on the European Commission web site and developed in co-operation with the European Committee of Central Balance Sheet Data Offices (ECCB). BACH contains data on companies' balance sheets, and profits and losses; the time span varies with each country, beginning in the early 1980s (for the Netherlands and Italy) up to 2002 (for most countries). Data do not always come from a stratified sample; therefore, results may not extend to the whole economy. Generally, the bias favors large- and medium-sized companies. Two types of sample are available. The first one (the "variable" sample) has a different number of companies in each year, and therefore does not allow the construction of reliable variables that involve growth rates. The second sample (the "sliding" sample) provides information for each period and for the same companies over two consecutive years. Only for the latter sample it is possible to construct a consistent yearly growth rate for sales, for instance.

A problem faced in our previous paper was information on investment. Not all countries report data on the acquisition of new investment goods. In the cases in which this information was not available we had overcome the problem by measuring investment as the first difference of fixed assets. However, this solution likely introduced a severe measuring bias in the sample we used to estimate our model. Indeed, the coefficient of lagged investment was never statistically significant; a very odd result when compared with those of the economic literature on applied investment models. Therefore, in the present paper we selected only those countries reporting information on new investment, but extended the time span of our sample to include all the years for which company information was available. Overall, our estimation sample is the same size as the previous one, if not larger.

We limited our analysis to Manufacturing—the most traditional industry to which most economic models are applied—and to the following countries: Belgium, France, Germany, Italy, the Netherlands, Portugal 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).<sup>4</sup>

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.<sup>5</sup>

Finally, information on the investment structure comes from the European Commission's bi-annual Industry Survey on Investment.<sup>6</sup>

### 3. Model Specification

As for the choice of model specification, our approach was to integrate a traditional investment function with variables we thought would be able to capture how firms' fixed capital decisions react to labor market differences, and in the way in which the latter interact with capital market imperfections. Our investment function thus includes lagged investment, an investment profitability variable (the Real Return on Investment), the relative price of investment goods with respect to the GDP deflator, and a liquidity variable as a measure for firms' dependence on internal funds; to these variables, we added the OECD EPL index and its interaction with the liquidity variable.

Based on reasoning and results from our previous paper (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 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 tangible 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.<sup>7</sup> 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. Our liquidity variable is strongly and positively ( $r = 0.68$ ) 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.<sup>8</sup>

### 4. Results

The Dynamic Panel-data Estimation results of our model are shown in Table 1.<sup>9</sup> Column (1) shows robust estimated coefficients from our unbalanced panel data from seven countries. Column (2) shows estimation results excluding observations for the Netherlands, for which data on investment are missing from 1993 onward. Results for the two samples are qualitatively the same, except for the estimated coefficient of the EPL variable, which is not statistically significant for the expanded sample.

As expected, coefficients for the profitability and liquidity variables are positive and statistically significant, while the coefficient of the investment relative price variable is not statistically significant. This is true notwithstanding that the latter shows the correct sign. We also experiment with the cost of capital variable without obtaining any improvement in our results.<sup>10</sup>

Surprisingly, the estimated coefficient of the EPL variable is positive (and statistically significant) highlighting the incentive for firms to substitute labor with capital in the presence of strict employment protection legislations. This interpretation draws support from the positive relationship existing between the EPL levels and the share of investments devoted to rationalisation, as shown in Figure 1, as well as by the slower increase in the capital stock per worker available in Europe, compared to the U.S. economy (see Figure 2). 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).

Finally, the estimated coefficient measuring the interaction between the capital and labor markets 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 variables.

We first note that the difference between the estimated coefficient of the liquidity variable by itself and that disentangled from the coefficient of the interaction term is positive and statistically significant at the 5% probability level.<sup>11</sup> In other words, the overall effect of liquidity on investment is positive. 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.

Secondly, the difference between the estimated coefficient of the EPL variable by itself and that disentangled from the coefficient of the interaction term is negative and, again, statistically significant at the 10% probability level.<sup>12</sup> Therefore, assuming that capital markets are efficient, firms in countries with strict employment protection legislation find it convenient to substitute labour with capital. However, high costs of external financing or the possibility of finance rationing discourage firms to invest. The latter effect dominates the former for the group of countries and the time period analyzed in this paper. The negative relationship that we find between EPL and investment is often found in reports stressing the influence of institutions on economic variables.<sup>13</sup> 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 because of the contemporaneous presence of capital market imperfections.

As for the relative importance of each variable, the *beta* coefficients reveal that profitability plays the largest role in determining investment, while labor market imperfections are slightly more important than capital market ones (see Table 2). The latter is a very interesting result: it demonstrates that policy interventions aimed at stimulating investment should equally improve efficiency in both markets.

## 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 technologies 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 favored 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).

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.<sup>14</sup> 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  
Arellano-Bond Dynamic Panel-data Estimation  
One-step Difference GMM Results <sup>a</sup>

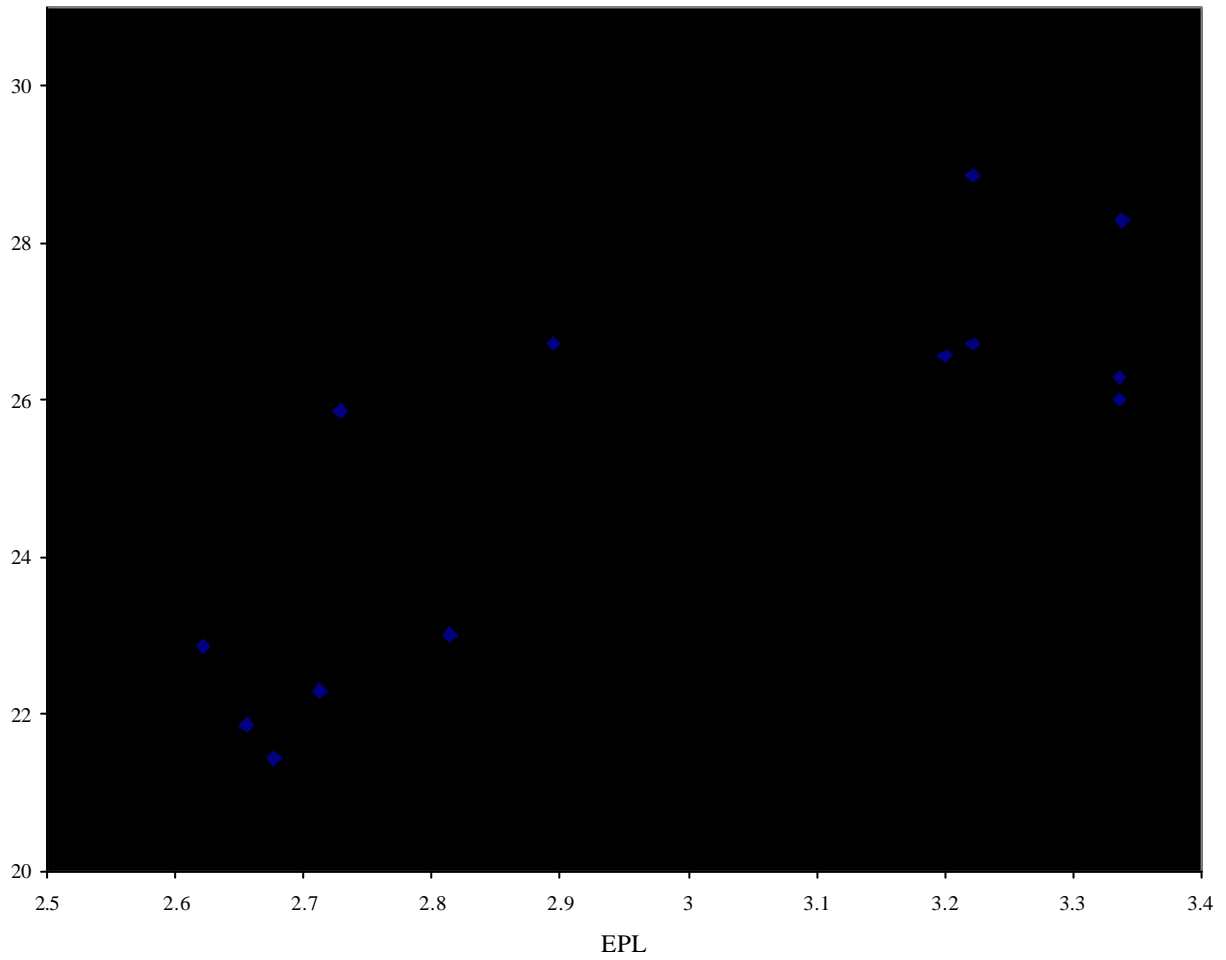
	(1) <i>(7 countries: B, F, G, I, NL, P, S)</i>	(2) <i>(6 countries: B, F, G, I, P, S)</i>
<i>Dependent variable</i>	Investment <sub>t</sub> /Tangible Fixed Assets <sub>t-1</sub>	Investment <sub>t</sub> /Tangible Fixed Assets <sub>t-1</sub>
<i>Explanatory variables</i>		
[Investment <sub>t</sub> /Tangible Fixed Assets <sub>t-1</sub> ] <sub>t-1</sub>	0.519 *** (0.040)	0.519 *** (0.039)
Real Net Return on Investment <sub>t</sub>	0.173 ** (0.061)	0.143 * (0.060)
Relative Price Index of Investment Goods <sub>t-1</sub>	-0.117 (0.119)	-0.113 (0.120)
[(Cash-Flow <sub>t</sub> + Cash Holdings <sub>t-1</sub> )/ Tangible Fixed Assets <sub>t-1</sub> ] <sub>t</sub>	0.367 ** (0.126)	0.447 ** (0.136)
[(Cash-Flow <sub>t</sub> + Cash Holdings <sub>t-1</sub> )/ Tangible Fixed Assets <sub>t-1</sub> ] <sub>t</sub> × EPL Index <sub>t-1</sub>	-0.081 ** (0.032)	-0.096 ** (0.035)
EPL Index <sub>t-1</sub>	1.241 (0.803)	1.740 * (0.797)
No. of Observations	76	70
Arellano-Bond Test AR(1)- ? ? 0: <i>p-value</i>	0.088	0.094
Arellano-Bond Test AR(2)- ? ? 0: <i>p-value</i>	0.727	0.693

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

Table 2  
Beta Coefficients for Model 2

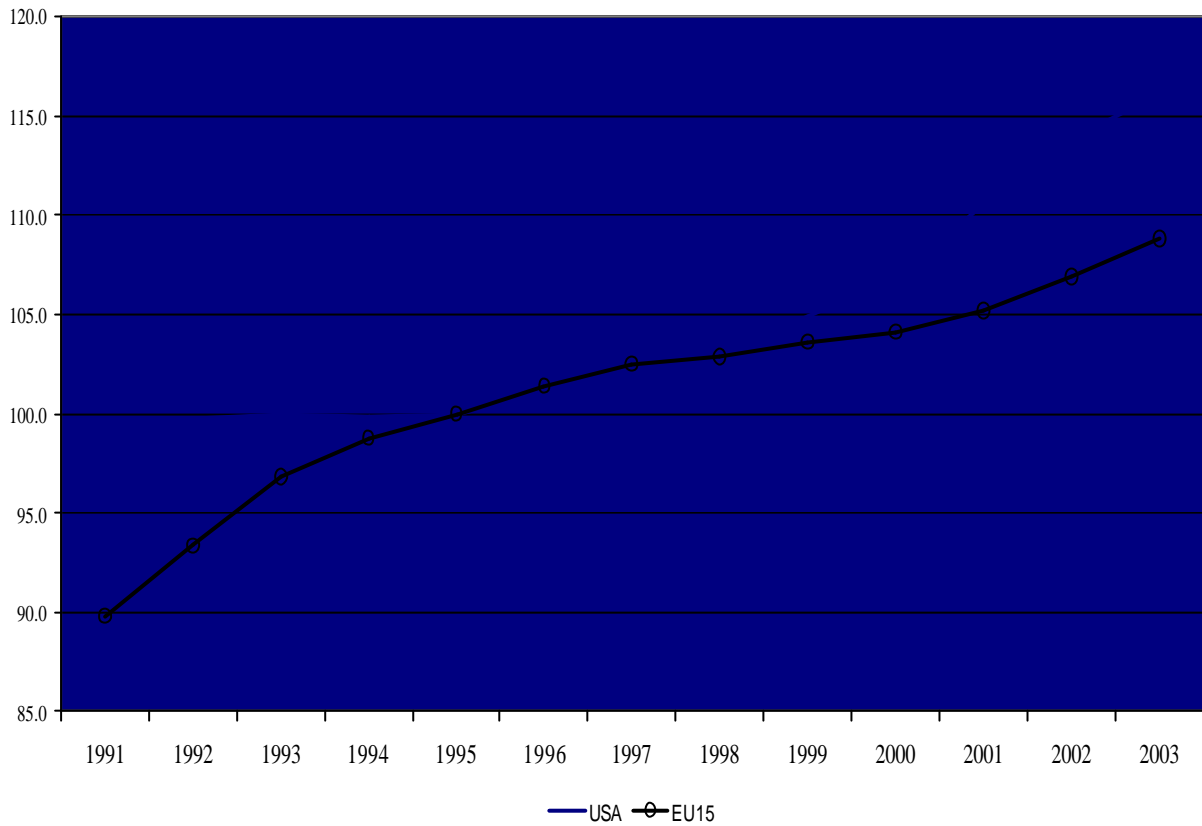
Real Net Return on Investment	(Cash-Flow + Cash Holdings)/ Tangible Fixed Assets	EPL Index
0.20	0.08	-0.09

Figure 1 - EPL vs Share of Rationalisation Investment: 1991-2003  
(annual averages for the 7 countries)



Source: EU Commission and OECD.

Figure 2 - Capital Stock per Worker, Euro Area (15 countries) and U.S.A.  
(1995=100)



Source: EU Commission, AMECO database.

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## Annex

Table 1.A

Summary Statistics (Average Values) for Model Variables

Country	Belgium	France	Germany	Italy	Netherlands	Portugal	Spain
Time span	1997-2002	1985-2002	1987-2001	1983-2002	1980-2002	1992-2002	1983-2002
Investment/Tangible Fixed Assets <sub>t-1</sub> (%)	26.66	15.85	28.75	27.21	18.12	17.65	26.66
Real Net Return on Investment (%)	24.04	28.12	16.96	18.90	17.71	13.82	24.04
Relative Price Index of Investment Goods (Cash-Flow <sub>t</sub> + Cash Holdings <sub>t-1</sub> )/ Tangible Fixed Assets <sub>t-1</sub> (%)	99.04	101.79	99.26	99.88	98.80	102.62	99.04
EPL Index (All Workers)	2.20	2.96	2.88	3.22	3.72	3.36	2.20

### End notes

<sup>1</sup> 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).

<sup>2</sup> Our results are consistent with those of Rendon (2004) referred to Spanish companies.

<sup>3</sup> On this topic see also Love (2001).

<sup>4</sup> BACH and AMECO databases are available from the European Union web site:

[http://europa.eu.int/comm/economy\\_finance/indicators/bachdatabase\\_en.htm](http://europa.eu.int/comm/economy_finance/indicators/bachdatabase_en.htm) and

[http://europa.eu.int/comm/economy\\_finance/indicators/annual\\_macro\\_economic\\_database/ameco\\_en.htm](http://europa.eu.int/comm/economy_finance/indicators/annual_macro_economic_database/ameco_en.htm), respectively.

<sup>5</sup> See OECD (2004), pp. 64-70.

<sup>6</sup> Data available at:

[http://europa.eu.int/comm/economy\\_finance/indicators/business\\_consumer\\_surveys/bcsseries\\_en.htm](http://europa.eu.int/comm/economy_finance/indicators/business_consumer_surveys/bcsseries_en.htm).

<sup>7</sup> See also Beck et al. (2003) and Sterken et al. (2002).

<sup>8</sup> WBES is a cross-national survey conducted in developed and developing countries in 1999 led by the World Bank.

<sup>9</sup> Estimated coefficients obtained by the Stata 8 command `xtabond2`.

<sup>10</sup> The difference between the two variables being the extra term that multiplies the investment deflator in the numerator, i.e. the real interest rate plus the depreciation rate.

<sup>11</sup> Results for this test are available upon request from the authors.

<sup>12</sup> See previous footnote.

<sup>13</sup> For instance, see European Economy (2001), Chapter 3.

<sup>14</sup> See IMF (2004).