

## HETEROGENEITY IN FIRM PERFORMANCE DURING ECONOMIC CRISIS

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**Abstract.** What happens to firms during periods of deep economic crisis? Did different types of firms perform differently under the economic crisis? With the aid of a rich database and focusing on the literature regarding the growth of firms, this paper investigates the relative profitability performance of Italian firms during the current economic crisis, exploring those factors, which help certain firms to do relatively better even in the slowdown period. Some preliminary results show that the Italian firms that are relatively young in age, with relatively better current liquidity and more focused on domestic market have performed better than other firms. Furthermore, firms operating in high-tech and in highly concentrated sectors have enjoyed a better performance in this period.

**Keywords:** firm performance, heterogeneity, economic crisis, Italy, ordered logit model.

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### 1. Introduction

The Italian economy is experiencing the deepest recession of the post-World War II era. Its real gross domestic product (GDP) growth fell by 7.2% between the third quarter of 2007 and the second quarter of 2009, and marginally improved to 2.8% between the second quarter of 2009 and the second quarter of 2011.

From then on, however, the Italian economy has again been under recession: the contraction of the GDP up to the first quarter of 2013 is about 4.1%. Overall, between the third quarter of 2007 and the first quarter of 2013, the Italian GDP fell by 8.6%, returning to the level of 2000. While all firms are faced with the problem of declining demand in the affected sectors, inter-firm growth performance varies considerably, due mainly to

firm-specific heterogeneity in competitive capabilities, financial strength and sources of demand. In a recent survey of about 15,000 European firms in seven countries, Békés *et al.* (2011) show that the crisis has hit firms hard: on average, a 12 percent decline in sales and six percent of their employees laid off; however, these figures show significant heterogeneity across countries and firms in terms of how they have been affected by the crisis. Firms reduced employment by a lesser degree than their sales decline, and firms with workers who were relatively more skilled preserved more jobs. Exporters contracted more than non-exporters, while importers suffered less of a decline. Outsourcers and firms that control other companies fared somewhat better, while firms relying on specific demand from others suffered more. Firms relying on external finance and experiencing financial constraints to growth (before the crisis) experienced greater sales declines. Firms with greater pre-crisis tangible assets or relying on local bank finance were particularly constrained.

A close examination of the growth performance differential among firms can therefore reveal the role of characteristics that may possibly help enterprises to perform well in a slowdown period. Moreover, this could help to identify the aspects of business and the potentially vulnerable firms that might require strong policy support.

In this context, we attempt to answer the following research questions: is there heterogeneity across firms in terms of how they were affected by, or responded to, the economic crisis? Did different types of Italian firms perform differently under the economic crisis? What are the characteristics that increase the probability of firms reacting better to an economic slowdown?

Numerous studies have investigated the factors that influence behavior and performance of a firm, such as growth and profitability, but only a few works (Békés *et al.* 2011) have focused on the determinants of a firm's resistance during an economic slowdown. This paper therefore contributes to the existing literature on firm performance in several ways. Firstly, it explores the determinants which help certain firms to do relatively better even during a slowdown period. Secondly, it pays particular attention to the existence of heterogeneity across firms in terms of how they were affected by the crisis. The remainder of the paper is organized as follows: Section 2 presents some descriptive statistics on the changes in Italian firm performance between the pre-slowdown period (2004–2007) and the slowdown period (2008–2012) and describes the dataset. Section 3 presents the model, and the econometric methodology adopted. Section 4 reports our findings and, finally, Section 5 ends with some concluding remarks.

## **2. Data and descriptive statistics**

### **2.1. Data sources**

In order to investigate the performance of Italian firms during the current economic crisis we use firm-level data from the AIDA database (*Analisi Informatizzata Delle Aziende*), provided by the Bureau Van Dijk. AIDA, which has recently been used in an

increasing number of empirical studies (see for example, Imbriani *et al.* 2011, 2014; Ferragina *et al.* 2012; Cainelli *et al.* 2013), collects annual accounts of Italian enterprises – mainly capital-owned firms – and contains information on a wide set of economic and financial variables, such as sales, costs and number of employees, value added, fixed tangible assets, R&D, start-up year, sector of activity. Because the AIDA dataset offers almost complete coverage of Italian capital-owned firms, we focus our analysis only on this group of firms. In particular, our sample refers to the following types of Italian firms: public limited companies (Società per azioni, S.p.a.), private limited companies (Società a responsabilità limitata, S.r.l.), and partnerships limited by shares (Società in accomandita per azioni, S.a.p.a).

We start with an AIDA sample of about 273,000 annual observations over the years 2004–2012. We then impose a number of restrictions on the data. First, we identify all companies active on December 31st, 2012 with positive values of turnover and value added over the period 2004–2012. Second, we exclude all firms with an added value-turnover ratio  $<0$  and  $>1$ . Third, in order to avoid evident outlying observations, we perform a mild trimming – 2.5% on both tails of the distribution – sequentially on EBITDA to sales ratio (henceforth MOLFAT) and Return on equity – ROE. Fourth, we exclude all firms with incomplete or inconsistent data in terms of value added, total labour cost, fixed capital and value of production, and firms where set up year and number of employees were not available over the period 2004–2012. Finally, we exclude all firms belonging to the following 2 digit ATECO sectors: 01 - 02 - 05 - 10 - 11 - 13 - 14 - 40 - 41- 45 - 80 - 85 - 90 - 91 - 92 - 93 - 99.

The resulting dataset is a balanced panel of 523,899 observations, i.e. 58,211 firms (25,368 and 32,843 manufacturing and services firms, respectively) observed over the period 2004–2012. The advantage of using such a dataset is that it is highly representative of the entire universe of Italian capital-owned firms where private limited companies represent about 84% of total capital-owned firms (e.g., as against 95% declared by the Italian National Institute of Statistics – Istat 2011).

## **2.2. Descriptive statistics**

Two measures of firm performance have been used in this study. The first measure is the MOLFAT, while the second measure is ROE. The density distributions of the two key dependent variables – MOLFAT and ROE – are plotted in Figure 1. They provide a tool by means of which changes over time can be viewed. As we can see for both variables, the curves shift gradually to the left over the period. Specifically, the mean and median increased before the crisis (2004–2007) whereas they declined sharply in the second period (2008–2012).

This aspect is evident in Table 1 which provides summary statistics for the two firm performance measures considered before (2004–2007) and during the crisis (2008–2012).

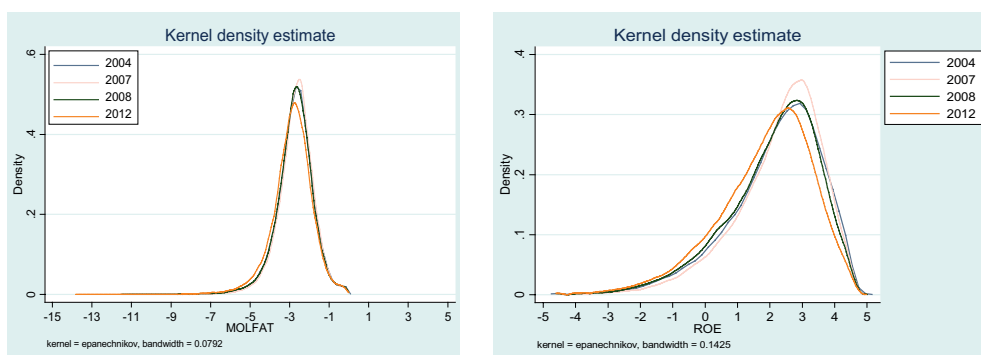


Fig. 1. Density distribution of firm performance before and during the crisis (Source: AIDA, Bureau van Dijk Electronic publishing, authors' calculations)

Table 1. Summary statistics of firms' performance before and during the crisis (Source: AIDA, Bureau van Dijk Electronic publishing, authors' calculations)

Variable	Year	Obs	Mean	Std	Median	Min	Max
MOLFAT	2004	58,210	0.091	0.110	0.067	-1.148	0.997
MOLFAT	2007	58,211	0.095	0.105	0.071	-2.937	0.990
MOLFAT	2008	58,211	0.088	0.107	0.065	-3.112	0.989
MOLFAT	2012	58,178	0.073	0.110	0.054	-3.345	0.995
ROE	2004	56,217	10.239	26.931	7.450	-149.87	149.58
ROE	2007	56,685	11.761	25.236	9.170	-149.94	148.06
ROE	2008	56,551	8.636	25.406	6.360	-149.72	148.82
ROE	2012	55,774	4.977	25.790	4.340	-149.97	144.61

The statistics show that there is a wide dispersion in performance across firms i.e. although the profitability of many firms weakened, there were firms that actually increased their profitability in spite of the crisis. Finally, we examine the evolution of firm performance by means of transition matrix (TM) with regard to four different groups of firms identified according to whether the firm is in the first, second, third or top quartile of the MOLFAT (alternatively, ROE) distribution. In our specific case, the TM allows us to investigate the persistence – i.e. remaining in the state in which the firm initially is – in the performance of firms. As indicated above, the state is defined on the basis of the two different alternative measures of firm performance – MOLFAT and ROE – and with regard to the pre-slowdown period (2004–07) and the slowdown period (2008–2012).

As we will see in the next section, all Italian firms have also been grouped into three categories based on their nature of relative growth: (i) improving firms, (ii) stable firms and (iii) shrinking firms. We identify “improving firms” as all firms that have experienced a positive performance, moving their position towards the upper quartiles of distribution during the two periods. The “stable” firms are those that remained in the same quartiles of distribution between the pre-slowdown and the slowdown period. The “shrinking” firms are defined as those that moved toward lower quartiles of distribution during the two periods.

In Tables 2 and 3, the matrix provides the percentage distribution of firms according to their interquartile displacement with regard to the two key performance variables considered, MOLFAT and ROE respectively, calculated with regard to total row i.e. the number of firms that fall into each quartile in the pre-slowdown period. With regard to MOLFAT (Table 2), the figures suggest that around 90% of the more profitable firms in the 2004–2007 period (class 4) continued to be so from 2008–2012; whereas the remaining 10% lost at least a level of profitability in terms of position. Moreover, 90.2 percent of the less profitable firms in the pre-slowdown period preserved their relative position between 2008–2012.

Table 2. Transition Matrix: MOLFAT

(Source: AIDA, Bureau van Dijk Electronic publishing, authors’ calculations)

		2008–2012			
		1	2	3	4
2004–2007	1	90.18	2.14	2.62	5.06
	2	2.89	90.93	3.53	2.66
	3	3.11	3.6	91.03	2.26
	4	3.95	3.34	2.82	89.88

Similar results were obtained with regard to ROE variable with slightly higher percentages of firms that preserved their pre-slowdown position between 2008–2012 (Table 3).

Table 3. Transition Matrix: ROE

(Source: AIDA, Bureau van Dijk Electronic publishing, authors’ calculations)

		2008–2012			
		1	2	3	4
2004–2007	1	93.07	3.48	1.75	1.7
	2	3.17	92.35	3.14	1.34
	3	2.16	2.83	91.95	3.05
	4	1.6	1.34	3.16	93.91

### 3. Empirical analysis

#### 3.1. The empirical model

This section undertakes a firm-level quantitative analysis of the factors that influence the nature of both firm growth and performance in Italy between the pre-slowdown (2004–2007) and slowdown period (2008–2012). The basic purpose is to identify variables that best increase the probability of Italian firms being among improving firms rather than stable or shrinking firms. Given that there is a multiplicity of factors that may simultaneously affect a firm’s probability to be in the group of improving firms, a multivariate empirical framework is developed and estimated in the following section. In our specification,  $y$  is an ordinal categorical variable ranging between zero and 2. In particular,  $y_i = 0$  for the  $i$ th firm that is “shrinking”,  $y_i = 1$  if it is a “stable” firm and  $y_i = 2$  if it is an “improving” firm.

Since our dependent variable is ordinal but not continuous, a widely used approach to estimating models of this type is an ordered discrete choice model. The central idea is that there is a latent or unobserved continuous variable,  $y^*$ , underlying the ordinal responses observed by the analyst. The latent continuous variable,  $y^*$  is a linear combination of some predictors,  $x$ , plus a disturbance term,  $\varepsilon_i$   $\varepsilon_i$  that has a standard normal distribution:

$$y_i^* = x_i\beta + \varepsilon_i \quad \forall i = 1, \dots, N,$$

where  $x$  is the vector of the explanatory variables, which may include both firm and sector characteristics influencing the probability of different change in firm performance,  $\beta$  is the vector of the associated parameters, and  $\varepsilon$  is a random error term drawn from a standardized normal distribution.

Whereas  $y^*$  is unobserved,  $y$  is observed and related to  $y^*$  by the following relationship:

$$v_w = y_i(v_c) \cdot w;$$

$$y = 1 \text{ if } \alpha_1 < y^* \leq \alpha_2;$$

$$y = 2 \text{ if } y^* > \alpha_2,$$

where,  $\alpha_1 < \alpha_2$  are the unobserved *cut points* identifying the boundaries between the different groups of firm performance. Therefore, given the standard normal assumption for the error term, we can derive each response probability of observing a firm as being “shrinking” (i.e., the dependent variable  $y$  taking the value of 0) as:

$$\begin{aligned} \Pr[y = 0] &= \Pr[y^* \leq \alpha_1]; \\ &= \Pr[\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + \varepsilon \leq \alpha_1]; \\ &= \Pr[\varepsilon \leq \alpha_1 - (\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k)]; \end{aligned}$$

$$= \phi(\alpha_1 - (\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k));$$

$$= \phi(\alpha_1 - x\beta),$$

where  $\phi(\cdot)$  is the standard normal distribution function. Similarly, we can obtain the probability of  $y = 1$  and  $y = 2$  in the following way:

$$\Pr[y=1] = \Pr[\alpha_1 < y^* \leq \alpha_2] = \phi(\alpha_2 - x\beta) - \phi(\alpha_1 - x\beta);$$

$$\Pr[y=2] = \Pr[y^* > \alpha_2] = 1 - \phi(\alpha_2 - x\beta).$$

The  $\beta$  parameters together with the threshold levels on the latent variable that characterize the transition from one observed categorical response to the next (*cut points*  $\alpha$ ) can be obtained by maximum likelihood estimation.

### 3.2. Variables and hypotheses

Drawing upon the existing theoretical and empirical literature on firm growth (Coad 2009), the probability of Italian firms being in the “improving firms” group is postulated to be dependent on the following set of firm and sector specific characteristics.

#### 3.2.1. Firm specific determinants

*Firm size* (SIZE) since the publication of Gibrat’s (1931) “law of proportionate effect”, the relationship between firm size and growth has been widely studied. Firm size might have positive effects on both firm growth and performance if larger firms benefit from economies of scope, exploit scale economies or access capital at lower costs than smaller firms. On the other hand, there could be negative effects on growth and profitability when large firms are not able to respond easily to the changing market environment, due to their inflexibility. During a slowdown period, larger firms seem to be less sensitive to business uncertainty due to their higher intangible assets bundle, scale economies and greater financial leverage. On the other hand, smaller firms may be less affected in the initial period of economic downturn because they can reduce their output quickly (Penrose 1959) and benefit from lower inventory overheads than their large counterparts. Small firms may also be less affected because they serve the niche or missing domestic markets. Empirical studies on the relationship between firm size and growth have produced mixed results. By using British companies’ data, Hart and Prais (1956) show that firm growth is independent of its size. Using the data of 200 Chinese firms, Kang and Lee (2008) showed the significant positive effect of size on the sales growth rate. On the other hand, Evans (1987), Hall (1987) and Dunne and Hughes (1994) find a negative relationship between a firm’s size and growth. Moreover, there is robust empirical evidence showing that small firms react better to economic slowdowns (Wengel and Rodriguez 2006 for Indonesia; Tan and See 2004 for Singapore; and Regnier 2005 for Thailand). Therefore, *a priori* the possible role of firm size on firms’ probability to improve is predicted to be ambiguous. Firm size is defined by three

dummy variables (*Small*, *Medium*, and *Large*) that take the value 1 if a firm is small (or medium or large) and 0 otherwise. Small firms employ 1–49 employees, medium-size firms employ 50–249 employees, and large firms employ more than 250 employees. For each firm, the number of employees refers to the average employment in the pre-slowdown period.

*Firm age (AGE)* Following the prediction of Jovanovic's learning model of firm dynamics, firm age is likely to be negatively related to firm growth (Jovanovic 1982). Older firms grow less rapidly than younger firms due to their accumulated learning over the past; on the contrary, young firms are expected to be more capable of adapting to a changing environment.

Empirical findings generally show a negative relationship between a firm's age and growth (Dunne *et al.* 1989; Evans 1987; Geroski, Gugler 2004) although Fort *et al.* (2013) find that young/small businesses are more cyclically sensitive so that the relative decline in employment during the 2007–2009 recession is greater for young and small businesses than for large and mature businesses. Therefore, we expect a negative relationship between profitability and firm age. In this paper, firm age is defined as the average age in number of years of firm *i* in the pre-slowdown period.

*Level of multinationality (MULT)* Firms' performance can also be affected by the degree of multinationality. The literature suggest that both foreign and domestic multinational firms are the most productive firms (Helpman *et al.* 2003) and have, in principle, better capabilities to achieve higher performance than domestic non-multinational firms (Head, Ries 2003). Therefore, it can be expected that they will have stronger capacity to react better during a recession period. In our paper, we measure the degree of multinationality using a dummy variable that takes a value of one if the *i*-th firm is either a domestic or a foreign multinational and 0 otherwise in the pre-slowdown period.

*Financial structure:* Financial constraints have been suggested to be one of the most important barriers to growth (Storey 1994). In our analysis we consider two different financial variables. The first one – the firm leverage ratio (LEV) – captures the effect of the capital structure on profitability and is given as the average liabilities-to-equity ratio in the pre-slowdown period. According to the pecking order theory (Myers, Majluf 1984) firms firstly use internal financing, but when this is depleted, they will use debt financing, and when they can no longer find any capital through debt financing, they raise capital by looking for external equity. The level of firm leverage may therefore play a crucial role in the growth of firms. More specifically, highly leveraged firms may have difficulty of new borrowing to finance their working capital or some other regular expenditure. Similarly, a sharp increase in (the) leverage may also dampen their performance in terms of accessing new finance<sup>1</sup>. By analyzing the corporate growth of 193 U.S companies from 1987 to 1991, Weinzimmer (2000) found that debt ratio negatively affects growth. Campello

<sup>1</sup> However, high debt ratio could increase profitability by reducing discretion of manager for free cash flows, decreasing agency cost and making efficient management possible (Jensen 1986).



(2002) investigated U.S. companies from 1984 to 1996 and showed that debt financing does not affect sales growth in industries with high debt ratio, but negatively affects industries with low debt ratio. We expect a negative relationship between profitability and debt to equity ratio. The second financial variable is liquidity (LIQ) defined as the average current ratio from 2004 to 2007<sup>2</sup>. Firms with relatively better current liquidity are expected to be less adversely impacted than other firms because they will have less cash constraints and fewer difficulties in repaying suppliers. A firm with a sustained level of cash will trade the surplus cash and make interest on it. If this activity holds year by year, a certain amount will serve as a cash buffer, which can then be used as investment capital or as cash guarantees (e.g. in order to obtain a bank loan): the bigger the cash buffer, the more growth opportunities can be considered. Furthermore, Gill and Mathur (2011) expect that firms which are able to maintain higher liquidity levels, will face less severe financing constraints. Therefore, we expect liquidity to have a positive impact on firm growth.

### **3.2.2. Sector specific determinants**

We consider two sector specific variables. The first captures the effect of the degree of industrial technological intensity on firm performance (TECH). In the literature on firm dynamics, the relationship between the level of technological intensity in a sector and the survival probability of firms active in that sector is not clear-cut (Audretsch 1995). On the one hand, being active in a highly innovative sector enables firms to create new products, stimulating firm growth. There is compelling evidence that product and process innovation are important for firm growth and survival, because even incumbent firms must continuously innovate to mitigate the threat of disruption by new technologies (Christensen 1997). On the other hand, it has been argued that the risk of exit may be higher for firms in high-tech sectors because of the uncertainty associated with innovation (Ericson, Pakes 1995). We measure the degree of industrial technological intensity using a dummy variable which takes the value one if a firm belongs to a sector with a high R&D intensity and zero otherwise<sup>3</sup>.

The second sector specific variable is the degree of industry concentration measured by the Herfindhal concentration ratio at 3-digit industry level (HERF) in the pre-slowdown period. Theoretically, the expectation of market concentration on firm growth is not straightforward. A higher market concentration may lead to higher price-cost margins in the industry, which, *ceteris paribus*, should increase a firm's performance. However, firms in highly concentrated markets may be subject to fiercely aggressive behaviour by rivals, and this behaviour may reduce these firms' growth and profitability.

Finally, we include 20 regional dummies to capture location specific effects and 51 sectoral dummies to control for specific industry dynamics of firm performance.

<sup>2</sup> Current ratio is calculated through dividing the current assets by the current liabilities.

<sup>3</sup> To classify manufacturing (service) sectors as high and medium-high or low and medium-low technology (knowledge- or less-knowledge-intensive), we follow the OECD classification of industry technological intensity. Specifically, we use manufacturing (service) sectors classified by the OECD as high or medium-high technology (knowledge-intensive) for our high-technology sectors (knowledge-intensive). The rest of the manufacturing (services) industries in our sample are classified as being relatively low-tech (less-knowledge-intensive).

## 4. Results

Table 4 shows the maximum likelihood ordered logit estimates with robust standard errors obtained from STATA 12 statistical package. As pointed out in Section 2, two measures of firm performance have been considered in this study – MOLFAT and ROE. In this section we provide the estimation results obtained by considering MOLFAT as measure of firm performance. However, the considering ROE does not change the results in terms of the sign and significance level of the coefficients or in terms of conclusions<sup>4</sup>. In column (i) we report the ordered log-odds regression coefficients whose interpretation is that for a one unit increase in the predictor, the response variable level is expected to change by its respective regression coefficient in the ordered log-odds scale while the other variables in the model are held constant. In column (ii) we show the proportional odds ratios which are obtained by exponentiating the ordered logit coefficients.

In this case, the interpretation would be that for a one unit change in the continuous predictor variable or when changing levels of a categorical predictor, the odds for cases in a group that is greater than  $k$  versus less than or equal to  $k$  are the proportional odds times larger.

The most commonly used version of the ordered logit model assumes that the impact of each variable is the same for all *cut points*. This is known as the assumption of “parallel regression” or “proportional odds” or “parallel lines”, i.e., that the effects of the explanatory variables on the cumulative response probabilities are constant across all categories of the ordinal response. Using a likelihood ratio test where the null hypothesis is that there is no difference in the coefficients between models, we found that the proportional odds assumption has not been violated. Given that data are pooled across heterogeneous sectors and firms, robust standard errors are estimated to take account of the possible heteroscedasticity in the error variance.

Looking at the Wald chi-square of 153.68 with a p-value of 0.0000, we see that our model as a whole is statistically significant, as compared to the null model with no predictors. Among the firm-specific explanatory variables, AGE shows a significantly negative sign: for a unit increase in AGE, we would expect a reduction in the log odds of being in the higher performance group during the slowdown period, other things held constant. This result is in line with earlier findings that older firms grow more slowly than younger firms, which are more dynamic and ready to reorganize their productive and distributive structure during a slowdown period. Firm size in the pre-slowdown period seems to have a positive impact on expected firm performance in the slowdown period only for medium-sized firms. In particular, the ordered logit for medium-sized firms being in a higher performance group is 0.0863 more than small when the other variables in the model are held constant. The coefficient for large firms (SIZE3), although positive is not

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<sup>4</sup> These results are available upon request.

Table 4. Determinants of Italian Firms' Performance (in terms of MOLFATT) – Maximum likelihood ordered logit estimates with robust standard errors (Source: AIDA, Bureau van Dijk Electronic publishing, authors' calculations)

	(i)	(ii)
SIZE2 = 51–249	0.0863***	1.0901
	0.0273	
SIZE3 = >250	0.0070	1.0070
	0.0190	
AGE	–0.001***	0.999
	0.000	
LIQU	0.028***	1.028
	0.009	
HERF	0.025***	1.025
	0.009	
MULT	–0.205*	0.815
	0.108	
LEV	0.000	1.000
	0.000	
TECH	0.059***	1.060
	0.021	
/cut1	–0.268	–0.268
	0.191	
/cut2	0.676***	0.676***
	0.191	
Wald $\chi^2$	153.68	
Prob > $\chi^2$	0.000	
Pseudo R2	0.0013	
Observations	53,680	

Note: (i) \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

statistically significant. The level of multinationality (MULT) was found to have a negative and significant effect on the chances that Italian firms will be in a higher performance category. In particular, for both foreign and domestic multinational enterprises the odds of high performance versus combined stable or low performance are more than 20 percent

lower than for a domestic firm, given that other variables are held constant. Hence, Italian firms involved in international production are likely to be more affected in their performance, controlling for other factors. Among the financial firm-specific variables, we find that leverage (LEV) is not statistically significant whereas the coefficient of the liquidity ratio (LIQ) is positive and statistically significant. In particular, a one-percentage point increase in liquidity ratio raises the firm's probability of being in a higher performance level (versus all lower ones) by about 3 percent during the slowdown period. This result is consistent with what we expected: that is, firms with relatively better current liquidity are likely to be less adversely impacted than other firms.

Looking at the industry specific variables, Table 4 shows that the degree of industrial technological intensity (TECH) exerts a statistically significant and positive effect on firms' performance: for firms operating in high and medium-high technology industries, the odds of high performance versus the combined stable or low performance during the slowdown period are 6 percent higher than for firms in low and medium-low technology industries, given that all the other variables in the model are held constant.

Finally, our results indicate that the degree of market concentration is an important determinant for observed inter-firm differences in performance in the initial period of slowdown. HERF has a positive and statistically significant coefficient showing that Italian firms in highly concentrated sectors are better off and have bigger probability of obtaining higher performance growth.

## **5. Conclusions**

This paper represents a preliminary attempt to examine relative growth performance among Italian firms between the pre-slowdown and slowdown period and to explore factors underlying such performances. To achieve this goal, we conducted an analysis for the period from 2004 to 2012 based on an ordered logit model. This analysis has allowed us to determine whether there is heterogeneity across firms in terms of how they were affected by, or responded to, the economic crisis and what are the firms' characteristics that increase the probability to better react to an economic slowdown.

The analysis reveals that Italian firms performed relatively better (as between the pre-slowdown and slowdown period) with reference to profitability if they were younger in age of establishment, had a higher current liquidity and a size between 50 and 249 employees. Moreover, we found that firms operating in high-tech and highly concentrated sectors have enjoyed a better performance in this period.

Overall, our study enriches our understanding on the determinants of firms' performance during the recession in Italy and highlights the presence heterogeneity across firms in terms of how they were affected by the crisis. From a policy perspective this is a potentially important result because suggests that policies facing the economic crisis should not be of the "one for all" or "one for always" type but should be take into consideration the experience of firms that were relatively successful in weathering the crisis.

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