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Distortion between Economic and Financial Performance. Does the Human Capital Matter?

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This paper focuses on and compares two specific definitions of performance: economic and financial, with the aim to provide evidence that supports the distinctions between both definitions. Relying on a Belgian sample consisting of 14,135 firms, our results show that one specific variable deserves to be questioned: the worker's level of education. On one hand, it seems that the workers' level of education has a positive impact on economic performance; namely, the more the firms hire highly educated workers, the more productive it is. On the other hand, it seems that the effect is entirely the opposite when the financial performance is taken into account. In this case, the more the firms rely on highly educated workers, the less it is performing in a competitive manner.

Keywords: *Firm Performance, Panel data, Economic Performance, Financial Performance*

JEL Classification: *G10, D22, D24*

1. Introduction

Nowadays in our advanced economies, performing in a competitive manner seems to become a major concern for firms. However, performance is not a brand new word, since it was already question of performance in the 19th century, but its meaning evolves year after year. Performance may take various definitions, some definitions being linked to specifics, others presenting more classical views of performance, while others focus on more globalized and larger perspectives to include most of the firm's stakeholders.

It thus seems clear that performance can take different meanings, even if representing one single concept. Different media channels talking about firm performance do not seem aware that such statement may have huge consequences on our economies. That is, it is not rare to read in a newspaper that firms are performing better and better due to technological changes, and at the same time those same firms are facing drastic reduction in their financial performance, leading to higher levels of bankruptcy along the way.

Therefore, one may question: "Who is right?" "Are firms improving their performance or is it clear that their financial performance is reducing with years?". This is the main research question this paper tries to answer.

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Focusing on measures of classical performance, this paper investigates the impact of firms' and workers' characteristics on firm performance, with a specific focus on formal human capital, i.e. on the level of education attained by workers.

Relying on Belgian data from the years 2006-2009, and implementing estimation strategies that take into account potential biases such as unobserved heterogeneity or endogeneity in the relations, the originality of this paper lies in the fact that it focuses on and compares two specific definitions of performance: economic and financial, with the aim to provide evidence that readers must be careful when using each definition.

2. Literature Review

2.1. A Historical Overview of Performance

The word performance comes from the ancient French *'par-fournir'*, meaning achieving something. It could also come from the term *'parformer'*, meaning accomplishing, achieving. Nowadays, performance may be seen as a record, an exploit, an accomplishment (Foucher, 2007).

The origin of the word *performance* goes back in the 19th century in France. At that time, *performance* was related to the results of a racehorse and its success following a race. Then, it represented the results of an athlete. In the 20th century, the meaning of this word changed a little, representing the quantified capabilities of a machine in an exceptional way.

Opposite to its French meaning, the English meaning of *'performance'* is related to the action and its result, and eventually to its unexpected success (Bourguignon, 1995). Finally, some authors suggest that performance must be seen as the relation between an achievement, i.e. the results obtained, and a reference system. In this context, the word performance may be seen as a benchmarking analysis.

In an economic sense, performance represents the potential, the capacity of a worker or a firm to achieve a goal, which involves a concept of measurement. Performance is therefore an indicator of success of a firm, a team, a manager, a worker, and may be evaluated in a competitive framework.

In the 20th century, performance referred only to financial operational performance of short term. Financial ratios were then only investigated in order to assess the health of a firm. Things have changed in the 90' with the predominance of all stakeholders in the firms' decisions making. Then, a more global view of performance was taken into account, with social, economic and environmental performance being gathered (Baret, 2005).

Given these various explanations of performance, it seems that a single definition is not feasible. Two main streams of literature may be pointed out: one the one hand, the classical, more specific one with financial and economic measurement of performance on which this paper is focused on, and, on the other hand, the modern, more global definition of performance.

2.2. One Classical View - Two Specific Measures of Performance

Based on the idea that firm financial performance has an impact on its continuity, research on firm performance starts with the DuPont Corporation in 1920s about the Return on Investment (ROI). It has then mushroomed since 1980', and the willingness of researchers to prevent managers from bankruptcy (Bouquin, 1986; Bourguignon, 1995; Lebas, 1995; Bescos et al., 1997; Bessire, 1999; Cheriet et al., 2007; Douhour et Berland, 2007). Following their research, successful firms (i.e. firms that are present on their markets for more than ten years) seem to register higher levels of financial performance.

Following the economic decline of the United States starting in 1980, and particularly since the beginning of 1990, researchers come off the monolithic vision of performance and start to analyse non-financial indicators of performance besides more classical financial ones (Cauvin and Bescos, 2004). As mentioned in Dixon et al. (1990), research directed itself towards a more strategical view of firm performance, focused on the value creation for clients. Researchers of the 90' even consider that the true value of a firm should be measured thanks to non-financial indicators, not anymore financial ones (Wallman, 1995; Edvinsson and Malone, 1997; Stewart, 1997).

It thus therefore seems that both measures of firm performance are used to evaluate firm's health and continuity. Current evidence in the literature shows that variables related to a firm and its workforce are linked to such measures and may influence the firm's performance. Among a huge number of variables, characteristics such as age, gender, level of education (human capital through education and training), employment policy (type and length of contract), size of the firm and wage are considered the most important factors that may influence a firm's performance.

2.3. The Levers of Performance

The characteristics of the firm and its workers can have an impact on its performance. Thus, wages, gender, size, type of contract or level of education of workers can impact its productivity levels and the overall performance of the firm.

Many studies focus on the influence of *wages* on worker performance. Bringing together politicians from both Left and Right, merit wages have spread for several years but the main question is whether this merit wage is a good indicator of performance (Lazear, 2004). During the 1880s, Americans noticed the link between wage increase and a better performance with the leaders of this movement being Taylor and Henry Ford. During the next century, authors such as Maslow (1943) or Hertzberg (1966) questioned the link between "performance incentives" and "wages". During the 1960s, performance-based wages experiences a new lease of life with the work of Vroom (1964) and Porter and Lawler (1968). Nowadays, researches of these authors are questioned because of some scientific gaps, specifically at the level of the results. The proponents of this theory argue that linking wage to performance is beneficial if the worker feels motivated by such policy: an increase in motivation leads to an increase in productivity and therefore in wage (Cahuc and Dormont, 1992). Critics of this theory believe that merit wage would not be an indicator or a means of motivating workers but rather a means of selecting the best staff (Lazear, 2004). Moreover, the "free rider" theory was put forward by Weitzman (1979), explaining that a collaborator can count on other members of his team to improve the production of the firm and thus, benefit from a wage reward without having to increase his own productivity.

In the resource based theory, the firm is *"a set of resources and skills that are translated by management into strengths and weaknesses"* (Tywoniak, 1998). According to Mahut and Lafont study (2009), a firm's competitive advantage can be found in different types of resources that allow the firm to function as a whole. They seek to highlight the link between gender and performance. Relying on American data, Landrieux-Kartochian (2004) shows that companies that promote the presence of women in their organizations tend to achieve better financial results, improved quality of human resources management, and better performance at the level of sales teams. However, other studies quote that it is difficult to highlight the "feminization" link between managerial positions and economic performance. Indeed, the rate of women in management positions is too low to have any real influence (Kanter, 1977). In the debate about the impact of the mix of gender on the firm performance, the results in the literature are, if not contradictory, at least ambiguous. Despite the number of studies on this subject, the mentalities do not seem to change. Gender inequality in the world of work seems to be still present and the impact of gender on productivity still not proven (Laufer and Paoletti, 2010).

The *level of human capital* (through education or training) obtained by the workers may also be a lever of performance. Becker (1964) settles the human capital theory according to which education allows developing capabilities that makes workers more productive. Therefore, gaps in wages would reflect differences in levels of productivity and researchers infers the effects of human capital on performance through its effects on wages. This has been done by Rumberger (1987), who shows, based on U.S data, that the impact education on wages is positive. Therefore, he suggests that *"additional schooling is not completely unproductive, but simply that jobs constrain the ability of workers to fully utilize the skills and capabilities they acquire in school"* (Rumberger 1987). Other studies, some of which control for workers' fixed unobserved heterogeneity and/or field of education, also found that higher educated workers earn more than their fewer educated peers. This implies, according to human capital theory, that a higher level of human capital increases workers' productivity (see e.g., Battu et al. 1999; Dolton and Silles 2008; Duncan and Hoffman 1981; McGuinness and Sloane 2011; Sicherman 1991; Van der Meer 2006).

Among the "measurable" variables that can influence the performance of the firm, we also find in specialty literature the size of the firm. The main related questions asked are, is the size a competitive advantage, is it making the firm more efficient or is it better not to be too big? In a general way, the size of a business is equated with cost reduction which offers a competitive advantage (Mlouka and Sahut, 2008). However, not all authors agree on the impact of size on firm performance. Indeed, in an industrial logic, large companies, by their size, are better prepared to evolve in their market (Savoye, 1994). They benefit from economies of scales (Chandler, 1962), can co-ordinate their actions (Simons, 1945) or more easily bear market losses (Williamson, 1975). In a sector characterized by increasing returns, the advantage is still for large firms, since small firms cannot be as productive as they are. Moreover, market power increases with size, which allows, for example, to be able to determinate the price (to some extent) as well as to obtain better financing interest rates from the banks (Cette and Spiro, 1992; Mlouka and Sahut, 2008). However, even if "Big is better", "Small is beautiful". Indeed, the advantage of SMEs lies in their flexibility and their rapid adaptation to changes in supply and demand. Moreover, the competitiveness gain generated by the size of the firm is reduced at a certain point, due to the lack of motivation of the workers, itself influence by a lack of integration

in big companies (Picard, 1990; Digson and Rothell, 1991). Anyway, authors agree that there may be optimal sizes by sector but that the influence of the size on the productivity depends also on the variable retained to measure this size (Savoye, 1994).

Finally, the type of contract, which is part of the firm's policy, can significantly influence the productivity of the firm. According to Duhautois and Gonzalez (2007), companies hire employees mainly on fixed-term or temporary contracts and their findings is that firms prefer to have "older" and stable employees and that there is no link between the performance of the firm and the temporary contract. A positive link between indeterminate contract and performance is found by the OCDE (1999). Employees with permanent contracts will be more inclined to accept new technologies within their firm and permanent contracts would allow a better climate in the firm and thereby improve productivity (Levine and Parkin, 1994).

Pénard et al. (2000) argues that there is indeed a positive link between the quality of the employment relationship and the duration of the employment relationship. A permanent contract motivates the worker to cooperate while the fixed-term contract creates an inefficient relationship between both parties. Conversely, according to Mahy (2005), a fixed-term contract may prompt the employee to send maximum productivity signals to his employer, hoping to obtain a permanent contract. They are ready to increase their productivity to prove their motivation and skills. We thus see through these various studies carried out by the scientists of the field that it is not obvious to obtain a clear link between the type of contract and the performance, from an economic point of view.

3. Research Methodology

3.1. Econometric Specification

In order to examine the impact of human capital of workers on both measures firm performance, we implement two specifications, the first related to a measure of financial performance through the Return on Assets, the other related to a measure of economic performance, through the Value Added per worker:

$$\ln ROA_{j,t} = \beta_0 + \beta_1 Edu\_1_{j,t} + \beta_2 Edu\_2_{j,t} + \beta_3 Edu\_3_{j,t} + \beta_4 Edu\_4_{j,t} + \beta_5 Training_{j,t} + \beta_6 Blue\_Collar_{j,t} + \beta_7 Wage_{j,t} + \beta_8 Size_{j,t} + \beta_9 CDI_{j,t} + \beta_{10} Male_{j,t} + \beta_{11} Nace_{j,t} + \upsilon_{j,t} \quad (1)$$

$$\ln VA_{j,t} = \beta_0 + \beta_1 Edu\_1_{j,t} + \beta_2 Edu\_2_{j,t} + \beta_3 Edu\_3_{j,t} + \beta_4 Edu\_4_{j,t} + \beta_5 Training_{j,t} + \beta_6 Blue\_Collar_{j,t} + \beta_7 Wage_{j,t} + \beta_8 Size_{j,t} + \beta_9 CDI_{j,t} + \beta_{10} Male_{j,t} + \beta_{11} Nace_{j,t} + \upsilon_{j,t} \quad (2)$$

In this equation, $VA_{j,t}$ is the economic performance indicator, measured as the average value added per worker in firm *j* in year *t*; $ROA_{j,t}$ is the financial performance indicator, measured as the return on assets of the firm *j* in year *t*. *Edu_1* to $4_{j,t}$ represent the percentage of workers in the firm *j* at year *t* holding a primary level of education (Edu_1), secondary level of education (Edu_2), higher level of education (Edu_3) and university level of education (Edu_4), respectively, whereas *Training* measures the cost of training per worker spent by the firm *j* at year *t*. The variables *Male*, *Blue_Collar*, *Wage*, *Size*, *CDI* and *Nace* represent the shares of male, blue-collar, the average individual wage, the size of the firm, the type of labour contract (indefinite or fixed term contract) in firm *j* in year *t*, respectively; and $\upsilon_{j,t}$ is the error term.

These equations therefore focus on the influence of workers and firms characteristics on two measures of performance.

3.2. Estimation Techniques

Equation (1) has been estimated with two different methods: pooled ordinary least squares (OLS), and a fixed-effects (FE) model. The OLS estimator with standard errors robust to heteroscedasticity and serial correlation is based on the cross-section variability between firms and the longitudinal variability within firms over time. However, this OLS estimator suffers from a potential heterogeneity bias because firm productivity can be related to firm-specific, time-invariant characteristics that are not measured in micro-level surveys (e.g., an advantageous location, firm-specific assets such as patent ownership, or other firm idiosyncrasies).

One way to remove unobserved firm characteristics that remain unchanged during the observation period is to estimate a FE model. However, neither pooled OLS, nor the FE estimator address the potential endogeneity of our explanatory variables. Expected biases associated with OLS and the relatively poor performance and shortcomings of the FE estimator in the context of firm-level productivity regressions are

reviewed in Van Beveren (2012). Yet, there might be some cyclical 'crowding out', namely a process by which highly educated workers take jobs that could be occupied by less educated ones during recessions, because of excess labour supply. This assumption suggests that mean years of over-education within firms may increase as a result of a lower labour productivity (and vice versa). To control this endogeneity issue, in addition to state dependence of firm productivity and the presence of firm fixed effects, we estimate equations (1) and (2) with the dynamic system GMM (GMM-SYS).

The GMM-SYS approach boils down to simultaneously estimating a system of two equations (respectively, in level and in first differences) and relying on internal instruments to control for endogeneity. More precisely, targeted variables are instrumented by their lagged levels in the differenced equation and by their lagged differences in the level equation. The implicit assumption is that differences (levels) in (of) performance in one period, although possibly correlated with contemporaneous differences (levels) in (of) targeted variables, are uncorrelated with lagged levels (differences) of the latter. Moreover, differences (levels) in (of) targeted variables are assumed to be reasonably correlated to their past levels (differences).

3.4. Data and Descriptive Statistics

In order to estimate the relations, we rely on a Belgian dataset of 14,135 companies. Some restrictions in the dataset have to be considered. For example, we only investigate firms that register information for at least two consecutive years. Also, they have to supply some financial information about their value added, return on assets, etc. so that firms that do not display such information have to be removed from the data.

Once our sample is validated, our final sample covering the period 2006-2009 consists of an unbalanced panel of 52,204 firm-year-observations. It is representative of all small and medium-sized firms in Belgium's private sector.

Table 1. *Descriptive Statistics, 2006-2009*

Variables	**Mean**	**Standard deviation**
Added value per worker (k€)	168.89	1,484.74
Added value per worker (ln)	4.48	0.82
ROA	5.13	21.68
Primary education (%)	12.33	0.21
Secondary education (%)	52.13	0.38
Higher education (%)	22.08	0.22
University education (%)	9.46	0.14
Number of workers	76.74	414.98
Female (%)	0.31	0.28
Male (%)	0.69	0.28
Temporary workers (%)	0.03	0.1
Indefinite term workers (%)	0.96	0.17
Blue collar workers (%)	0.36	0.38
White collar workers (%)	0.64	0.37
Cost of training per worker (€)	524.71	21.044
Number of observations	52,204	

Descriptive statistics of selected variables are presented in Table 1. They show that the annual firm-level value added per worker represents on average of 168,890 EUR. The ROA stands on average at 5.13, which means that on average firms produce 5.13€ of net income for every euro invested in assets. Regarding the workers' attained level of education, they show that the average share of primary educated, secondary educated, higher educated and university educated workers stands respectively at 12.33%, 52.13%, 22.08% and 9.46%, the rest of the sample does not reach primary education as serves as control group. Moreover, we find that around 32% of employees within firms are women, 36% are blue-collars, and firms have an average of 77 employees. Finally, 96% of employees are working under indefinite term contracts, and each firm spends on average 524€ in training, per worker.

4. Results

We first estimate equation (1) related to the financial definition of firm performance (through ROA) by OLS with standard errors robust to heteroscedasticity and serial correlation. The results presented in the second column of Table 2 mainly reveals striking results in terms of level of education. They show, on a global view, that increasing the share of workers with higher levels of education decreases a firm's financial

performance. That is, increasing the share of workers with a primary, secondary, higher and university education by 1% is expected to affect financial performance by -0.20%, -0.15%, 0.10% and -0.06%, respectively. This result is totally the opposite when the economic performance in equation (2) is taken into account. There, the fourth column of Table 2 shows that increasing the share of workers with higher levels of education constantly increases economic performance. More precisely, increasing the share of workers with a primary, secondary, higher and university education by 1% is expected to affect financial performance by -0.12%, -0.09%, 0.24% and 0.63%, respectively.

Table 2. *Financial and Economic Performance (OLS and GMM estimates, 2006-2009)*

	OLS		**GMM-SYS**	
Dependent variable	**Financial Perf. ROA (ln)**	**Economic Perf. Value-added per worker (ln)**	**Financial Perf. ROA (ln)**	**Economic Perf. Value-added per worker (ln)**
Primary education	-0.204***	-0.123***	-0.270***	-0.132**
	(0.036)	(0.018)	(0.038)	(0.057)
Secondary education	-0.155***	-0.090***	-0.297***	-0.058*
	(0.021)	(0.011)	(0.026)	(0.030)
Higher education	0.099***	0.242***	-0.280***	0.219**
	(0.039)	(0.021)	(0.044)	(0.098)
University education	-0.061*	0.634***	-0.320***	0.291***
	(0.058)	(0.045)	(0.071)	(0.109)
Other Control Variables [a]	YES	YES	YES	YES
Sig. model (p-value)	0.000	0.000	0.000	0.000
Number of observations	52,204	52,204	52,204	52,204

Notes: Robust standard errors are reported between parentheses. [a] The share of the male workers, the number of workers within the firm, the share of blue-collar workers, the share of fixed term contracts, the average wage per worker, the cost of training per worker as well as the industrial sector are included in the set of control variables.
***, **, * significant at the 1, 5 and 10% level, respectively.

However, these estimates suffer from the fact that time-invariant unobserved workplace characteristics are not controlled for. They can also be inconsistent due to endogeneity of some variables. The FE estimator only controls for the potential bias related to the time-invariant unobserved workplace characteristics. So, only OLS and GMM results are reported.

To control for these potential biases, we thus re-estimate equation (1) and (2) using the dynamic GMM-SYS estimator. The results confirm OLS investigations. That is, concerning the financial indicator of firm performance, the results show that increasing the share of higher educated workers is expected to globally decrease the firm financial performance. More precisely, firm performance is expected to constantly decrease from -0.27% to -0.31% after an increase in 1% of respectively the share of primary educated and university educated. The results related to the economic performance indicator also confirm OLS investigations, with the return to education being constantly higher with the degree hold by the workers. That is, increasing the share of workers holding a primary education degree by 1% is expected to decrease a firm's economic performance by -0.13%, whereas increasing the share of secondary, highly or university educated workers is expected to impact firm performance by -0.06%, 0.22% and 0.29%, respectively. Note that we ran a test of differences between means in order to know whether a significant difference appears between the estimated parameters for each of the two subsamples, where the two parameters are not significantly different under the null hypothesis, while the two parameters are significantly different under the alternative.

5. Discussion and Conclusion

Firms are currently behaving in an economic context characterized by high levels of competition, higher levels of uncertainty, deep globalization, etc. Moreover, shareholders but also clients, suppliers and other external stakeholders lead the firms to be the most productive as they have never been before.

This productivity, performance, or any other term representing firm efficiency slightly becomes the main indicator highlighting the economic health of the firm: if you are competitive and productive, you will live; if not, you will go bankrupt.

This paper investigates the impact of firms' and workers' characteristics on firm performance, with a specific focus on formal human capital, i.e. on the level of education attained by workers.

The originality of this paper lies in the fact that it focuses on and compares two specific definitions of performance: economic and financial, with the aim to provide evidence that readers and researcher must pay attention when using either definitions.

Our results, based on Belgian data representing 52,204 firm-year observations, show that, according to the definition of performance used, the conclusions related to performance differ. That is, when relying on financial measure of firm performance, through the analysis of the logarithm of the return on assets, our results show that increasing the share of workers with higher degree is expected to decrease firm performance, the trend curve presented in Figure 1 (for OLS estimator) and in Figure 2 (for GMM estimator) showing a negative relationship between education and performance. However, when analysing the economic measure of performance, through the level of value added per worker, our results show that increasing the share of workers with higher degree was beneficial for firm performance, the trend curve being positive.

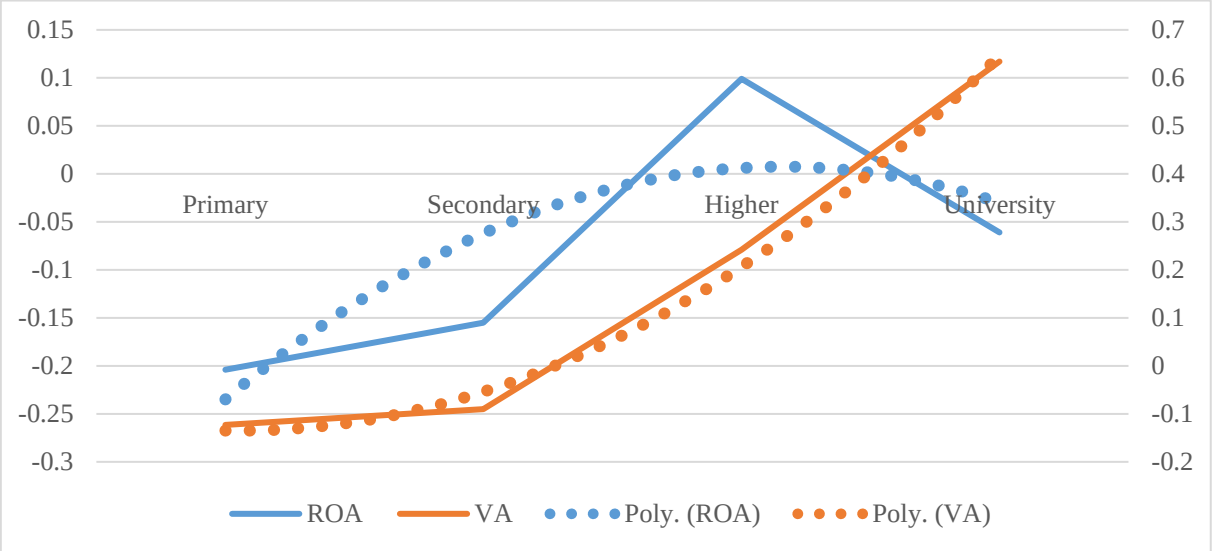

***Figure 1**. Relation between financial and economic performance according to OLS estimator*

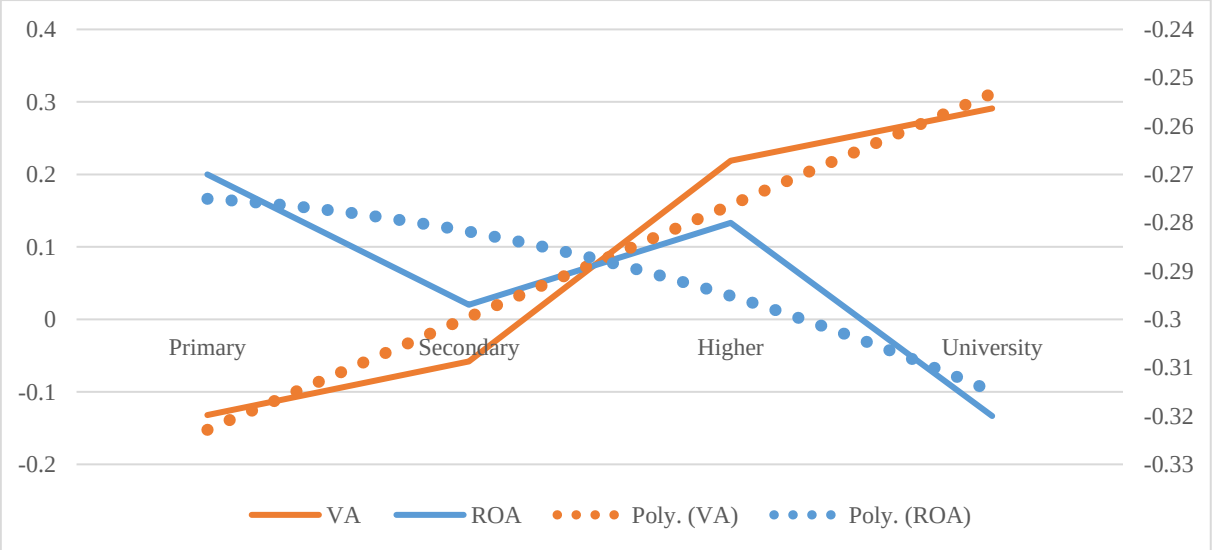

***Figure 2**. Relation between financial and economic performance according to GMM estimator*

Thus, on one hand, it seems that the workers' level of education has a positive impact on economic performance; namely, the more the firms hire highly educated workers, the more productive it is. On the other hand, it seems that the effect is entirely the opposite when the financial performance is taken into account. In this case, the more the firms rely on highly educated workers, the less it is performing in a competitive manner.

These results call into question the vocabulary sometimes used by politics and other decision-makers when relying on performance indicators to evaluate firms' health. This paper has shown that according to one definition or another, policy implications may be totally different.

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