Innovation and Sales Growth Among Heterogeneous Albanian Firms: A Quantile Approach

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Abstract This study contributes to the stream of research that critically questions the relationship between innovation and firm's growth performance. Using the 2019 World Bank Group enterprise survey data, Ordinary least square (OLS) and Quantile regression (QR) have been employed to examine the effect of various measures of innovation on the sales growth of Albanian firms. The two-regression analysis offer inconsistent results. OLS study results show that the adoption by firms of new processes is the only innovation measure that positively affects sales growth. Controversially, the more nuanced QR results show that the impact of innovation on sales growth is significant only for those firms located at the 90th percentiles. Product innovation and internal R&D appear to be the drivers of high-growth firms' performance. Surprisingly, process innovation and external R&D have a negative impact on the growth performance of such firms. For the rest of the quantiles, the results show that innovation does not affect sales growth. Our study results show that innovation explanatory power is weak and noteworthy only for high-growth firms.

Keywords Innovation · Firm growth · Quantile regression · Albania · Transition countries

1 Introduction

In his seminal work, The Theory of Economic Development (1934), Joseph Schumpeter argued that innovation is an essential driver of economic growth. Schumpeter's theory, built around the innovative entrepreneur, views markets as a dynamic arena where heterogeneous firms compete with each other by introducing new products, processes, and ways of doing business. Theoretical models rooted in the Schumpeterian thought which take a macroeconomic perspective (e.g.,

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Some scholars have been motivated by these inconsistent findings to use novel statistical techniques such as quantile regression (QR) in an attempt to account for the heterogeneous impact of innovation on firms' sales growth (Coad & Rao, 2008; Santi & Santoleri, 2017; Segarra & Teruel, 2014). Whether innovation is measured as a composite index (Bianchini et al., 2018; Coad & Rao, 2008) or separate indicators are used (Segarra & Teruel, 2014), the results suggest that innovation is of significant importance for high-growth firms only.

This paper aims to test the innovation-firm growth relation in the context of a developing economy, using a heterogeneous sample of firms operating in different sectors based on the 2019 World Bank Group enterprise survey data. The study focuses on how different firm-specific characteristics such as size, age, patenting, internal and external R&D, product, and process innovation affect sales growth.

The paper is structured as follows: Section 2 presents data and the model used. Section 3 contains linear and quantile regression analysis. Section 4 includes discussions, implications at the policy level, and limitations.

2 Method and Data

2.1 Data

The survey data were obtained from the World Bank Group (WBG) enterprise survey dataset, collected between January and May 2019. The final sample for this research comprises 272 firms randomly selected using three levels of stratification: industry, firm size, and region (World Bank Albania, 2019). All cases whose responses were classified as accurate or somewhat accurate, and cases with missing data, more than 20% have been removed from the sample.

2.2 Main Variables and Measurement

Sales growth (dependent). Following Bianchini et al. (2018), sales growth was measured as the log-difference between the natural logarithm of sales for the 2018 fiscal year with the logarithm of sales for the previous year.

Independent variables. The independent variables in this study are (1) process innovation, (2) product innovation, (3) external research and development (R&D), (4) internal research in R&D, and ownership of patents. All these variables are binary. Managers were asked whether any of the above has been introduced or used by the firm during the last 3 years.

Control variables. Size (natural logarithm of the number of employees) and age (natural logarithm and years since foundation) are the two controls in this study.

Table 2 OLS and QR estimation: the coefficient and standard error on innovation measures reported for the full sample and 10, 25% quantiles

	Full sample		Q10		Q25	
Variables	Coef.	S. E.	Coef.	S. E.	Coef.	S. E.
Ln (size)	.111	.101	.072	.108	.022	.026
Ln (age)	−.009	.041	.003	.276	−.009	.073
Product innovation	−.019	.111	.050	.229	.021	.063
Process innovation	.262**	.129	.308	.224	.081	.059
R&D internal	−.099	.162	−.407	.657	.040	.067
R&D external	−.025	.301	−.631	.446	−.518	.512
Patents	.089	.202	.168	.184	.032	.054
Constant	−.413	.289	−.808	.925	−.180	.175
R2/pseudo R2	0.024		0.0527		0.0157	
N. of observation	272		272		272	

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 3 QR estimation: the coefficient and standard error on innovation measures reported for 50, 75, and 90% quantiles

	Q50		Q75		Q90	
Variables	Coef.	S. E.	Coef.	S. E.	Coef.	S. E.
Ln (size)	.023*	.009	.013	.014	.0324	.033
Ln (age)	−.032	.036	−.053	.047	−.041	.065
Product innovation	.011	.037	.0501	.041	.198	.088***
Process innovation	.035	.029	.0192	.029	−.143	.053***
R&D internal	.049	.044	.0357	.128	.213	.167*
R&D external	.002	.181	−.073	.143	−.412	.184**
Patents	−.040	.047	.010	.063	−.007	.172
Constant	.056	.104	.283	.116	.383	.199
R2/pseudo R2	0.0133		0.0109		.0614	
N. of observation	272		272		272	

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Overall, the results show that the innovation measures that have a strong and significant relationship with sales growth are product and process innovation. These results are in line with Vivarelli (2014) discussion, who suggested that these types of innovations are more suitable for firms operating in transition and developing economies.

4 Discussion

Since the seminal work of Joseph Schumpeter (1934), innovation has been widely recognized as a source of competitive advantage and growth for firms. However,

growth, neglecting the compounding effect of different innovation activities (see Bianchini et al., 2018; Coad et al., 2016). Future research can use composite 'innovativeness' indexes.

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