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The microeconomic impact on growth of SMEs when the access to finance widens: evidence from internet & high-tech industry

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Abstract

The paper studies the impact on growth of SMEs in Europe when the access to finance increases, and the respective correlation between credit evaluation and accounting ratios. The research supporting the findings involved a sample of 1327 enterprises, and will be conducted by a multiple regression econometric model. The aim of this analysis is to identify the relationship between growth, solvency, and liquidity accounting ratios. The expected outcome of this paper is that growth of SMEs is strongly dependent on the financial access. Furthermore the author addresses the governmental decision makers with recommendations to ease the access to finance.

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1. Introduction

The current status of small and medium enterprises (SMEs) in terms of financing is in general characterized by the absence of sufficient funds to sustain the corporate structure, the technologic modernization, and growth. The main channel of financing remains the bank credit loan, despite the associated high costs, the unavailability of credit in the market, the required assets as collateral (Mark Zhou, 2011), and the bank's risk adverse policies to supply loans to SMEs. Despite these current obstacles, SMEs remain as the key driver to trigger the competitiveness, growth, innovation, and employment of European countries particularly during the economic crises when the large corporations downsize their work force. To create a favourable business environment to enhance the SMEs

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potential, governments shall develop adequate policy responses such as easier financial access, business support, and investments in education to improve the labour skills. Efficient policy frameworks can help the SMEs to face their binding growth constrains, promote the competitiveness, and entrepreneurship (OECD, 2012).

SMEs are the central pillar of European economy, where 99 out of 100 firms are SMEs, and in every 3 employees 2 are working also for SMEs. The European employment structure of SMES comprises 33% employees working for companies with more than 250 workers, 17% working for medium size companies, and 50% within small and micro firms. The SMEs have shown a weak economic recovery from 2012 to 2013 with a +1.1% increase of value added created, and a fully recovery in services. The manufacturing and construction industries are still behind the pre-crisis levels in 2008. The top 6 challenging problems considered by SMEs in 2013 were: finding customers with 22.4%, access to finance 15.4%, regulation 14.2%, availability of skilled staff 14.2%, competition 13.8%, and cost of labour with 12.9% (EC Annual report on European SMEs, 2014).

This paper gathers a combination of detailed information related to findings in Bureau van Dijk's (Amadeus) database, which includes financial information on more than 5.000.000 enterprises registered across western and Eastern Europe (Klapper, Allende, Sulla, 2002).

There are existing a large number of papers and study researches about the existing realities of small and medium enterprises in developed countries with a focus on traditional industries, however just few attempts were made in the internet and new high-technologic businesses.

Small and medium enterprises are prospectively the most flexible and adaptive firms in the emerging internet and high-tech market. They usually are dynamic and get into modern areas as ecommerce or research & development of new technologies. Notwithstanding, it is common for them to have limited access to credit, long term loans, often also with administrative obstacles, and legal restrictions.

The author deals with the topic of access to finance by SMEs in Europe with a central focus on bank lending. SMEs are an essential sector of any economy because despite the respective job creation, they are able to bring new services that usually are not provided by any large businesses. Even though SMEs are so important to the economy in Europe, the bank system has barriers to supply loans to new unproven entrepreneurs, start-ups, and more specifically internet companies. Looking at the example of the business environment in United States (US), the venture capitals funds are by far the largest investors in the internet and technologic industries (Munro, 2012). Like US, many developed countries have created as well the "business angels" or "incubators" to support the new entrepreneurs building up their companies. Furthermore, despite of some banks started to be interested in providing loans to SMEs, they are likely only to become their creditors when the financial statements of SMEs switch to positive in what regards accounting ratios such as equity, solvency and liquidity. The banking system is not being able up to now to perform a fairly and extensive credit risk assessment of SMEs. The banks recall often the existing information asymmetry as the main reason to decline credit applications, but in reality there does exists a shortage of credit analysts with enough knowledge to evaluate the creditworthiness accurately (Munro, 2013). As an alternative to approve the credit loans, financial institutions require substantial tangible collaterals along with other guarantees from the shareholders.

In the aftermath of the financial crisis in 2009, where the financial system had to shrink the available offer of loans due the existing toxic assets in portfolio, the credit underwriters start to rely on old-fashion low risk scorecards, rather than updating the skills or developing new modern econometric credit models with algorithms allowing the prediction of behaviours based on past observations.

2. Research Hypothesis

Are the solvency and liquidity accounting indicators determinants of the SMEs growth? Evidence from internet and high-tech industry

3. Paper structure

The paper is structured into sections: 1st, 2nd, and 3rd sections have the introduction, the hypothesis and the structure; the 4th section has the literature review, the conceptual and empirical framework; the 5th, 6th, and 7th sections include the research methodology and the econometric model; the 8th has the discussion of the researched

results; the 9th section includes the interpretation of the parameters studied; the 10th section has the conclusion, the policy implications for governmental decision makers, and references.

4. Literature review

4.1. Conceptual Framework – Small and Medium Scale Enterprises

When attempting to clarify what are small and medium enterprises (SMEs), there is no common accepted definition of small or medium businesses because the classification of businesses into large, medium or small scale is a subjective and qualitative judgment (Ogboru, 2007). Despite this assumption, small and medium size businesses are generally quite flexible and adaptive to their environment or to fast changes.

4.2. Internet and high-tech companies

Internet companies use mainly the worldwide computer network to carry on their business. They are currently more than doubling in size year over year, and transforming the communications and the commerce. The unique capabilities of internet, and the respective technologic advances, led to a redesign of almost all related industry standards and international legal framework (Gary M. Lawrence, Carl Baranowski, 1999)

The internet and high-tech industries have exclusive structures with an unlimited potential to reach customers. With the development of these businesses the global economy can offer now more products and services to companies and individuals, while contributing to the growth of supply chain networks, communications, and flow of capitals. With the related technologic advances, the online international transactions and payments are more secure leading customers to shop without the typical brick and mortar constraints (Gary B. Shelly, Thomas J. Cashman, Scott Scheife, Sue Scheife, 1999). Along with the development of internet, there are existing representative strategic alliances between different high-tech companies supplying online metrics and traffic services, and digital marketing products, therefore the establishment of cooperation and contracts among related parties became a common practice.

The European environment of internet and high-tech industries shows an average business growth of more than 30% annually however most of the SMEs are under pressure to start making higher profits. To survive in this competitive environment they are having the need to be driven by profit rather than only market share, to cut costs, to minimize expenses, to strive for sustainable expansion, and to forecast realistic business plans (Sandra Weber, 2004). To address this survival requirements internet and high-tech companies have to get the capacity to access finance, to mitigate the perception of being an industry with higher financial risks, and to be able to prove their creditworthiness to the financial underwriters.

4.3. Measuring the growth of enterprises

The growth of enterprises can be measured by separated variables which have a different reflect on the final result. The variables may be: quantitative metrics such as labour force employed, studied academic period of time, market share, or other calculations using logarithms, absolute or relative figures, turnover, sales, among others. Notwithstanding, the most common growth indicator is employment because is commonly accepted and perceived as a measure of development.

Enterprises showing high growth rates measured by employment, or turnover, are enterprises with an annual average growth of employees (or turnover) greater than 20% a year, during a three-year period, and with ten or more employees at the beginning of the observation period (Structural and demographic business statistics database, 2015). The enterprises with medium growth rates, when measured by the same labour metrics, are enterprises with an average annualised growth of employees between 10% and 20% per year, over a three-year period, and with ten or more employees at the beginning of the observation period.

4.4. *SMEs and Economic Growth*

It is widely accepted that when the SME have a sustainable business growth, the economic and social development improve the wealth of countries, bringing numerous positive benefits to whole society. Some policy decision makers have been considering the growth of SMEs in developing countries as a major field of their focus, considering SMEs as the principal trigger of development, and employment. They have clear advantages comparatively to the large players in the market, because typically the SME are more flexible, adaptive to the market environment, and technologic forward in terms of research and development. In what regards the workforce, the SMEs are usually more intensive comparatively to the large firms, and due their respective wages are initially lower, this enables a faster employment growth (Liedholm & Mead, 1987). The SMEs are typically located geographically throughout the countries without being necessarily concentrated within the largest cities, promoting a fair distribution of wealth.

4.5. *Access to Finance*

The fundamental element for the development of SMEs is the respective capacity to access finance. There is a key difference between a large scale enterprise (LSE) and a SME when applying to bank loans because while the LSEs have the possibility to explore the potential of capital markets, the SMEs usually don't.

The SMEs in Europe have as a common priority the need of funding their working capital, inventory, and fixed investments. The financial debt instruments commonly used by SME are the trade credit, bank loans, credit lines, and overdrafts. Proportionally as larger become an enterprise, as likely is to increase its credit needs. More than half of SMEs in Europe forecasted a significant business growth within the following two years, and their most preferable financing types are the bank loans, trade credit or supplier's credit, and investments made by shareholders (EC, 2014).

The availability of financing is regarded as one of the most important obstacles to start businesses (Organization for Economic Co-operation and Development, 2000). The drivers considered important by the SMEs to improve the access to loans and funding are the governmental measures such as tax exemptions, while the less important drivers were export guaranties and equity investments. Regardless the existing different types of credit offers in the market there are a considerable number of SMEs that are not having enough information or knowledge to fully take advantage of the available credit instruments (EC, 2014).

5. **Research Methodology**

This section deals with an econometric multiple regression model with which the researcher identifies relationships between the independent variables, and their statistical significance.

Multiple regression analysis is a very useful econometric model for predicting a quantitative outcome for supervised learning, and has been applied by numerous researchers. It is also applied to test hypotheses of relationships between dependent variables and independent variables along with a prediction (Dominique Salvatore, Derrick Reagle, 2002). This model allows to clearly control various factors at the same time that are influencing the dependent variable. This feature allowed the researcher to test financial hypotheses and to draw recommendations for policy decision makers. The most popular method to estimate the parameters of this model is the ordinary least squares (Jeffrey M. Wooldridge, 2009).

The multiple regression model developed by the researcher has the growth of SMEs as a dependent variable, and it is measured by the number of workers in function of accounting financial ratios. The researcher aims to identify the effect of these independent variables on SMEs growth, and what are their relationships in terms of access to finance and credit evaluation.

To address this purpose, the researcher had to seek answers related to the following topics:

- What relationship exists between the ratios of solvency, liquidity, and growth of SMEs?

- The goal is to determine if the financial ratios collected from the Amadeus database provide enough evidence of a relation between them and the SMEs growth. In the case of weak evidence, the researcher may argue that these ratios should not be considered as determinants of growth, even though they are important for credit evaluation.
- How statistically weak is the relationship between solvency, liquidity, and growth?
- Taking in consideration the assumption that there is a weak relationship between these variables, and that they are important inputs for the credit underwriters when evaluating the creditworthiness of SMEs, the researcher recommends new governmental policies to address this topic.
- What are the independent variables that contribute to the SMEs growth?
- The researcher finds separately the individual effects of each variable and explains the accuracy of the prediction.

The researcher consulted the Amadeus databased in order to collect a sample of internet and high-tech SMEs in Europe with the last accounting ratios available. This industry was chosen due the fact that there are very few attempts so far made by other researchers to explore this uprising field. The dependent variable used to measure the growth was the number of existing workers.

The independent variables were a combination of accounting ratios, volume of business measured by turnover, number of subsidiaries, ratios of solvency and liquidity. These two last ratios are important because they are typically used by credit risk underwriters to evaluate the creditworthiness of an enterprise (Edward I. Altman, 1968). The data sample was chosen with the objective of growth estimation of internet and high-tech SMEs, using the last annual financial information available. The statistical software used to analyse the data was SAS Enterprise Guide 6.1., in order to be able to explain and predict the causal relationship between different financial ratios. The observed result was that even the best performing companies may have poor ratios of solvency and liquidity, while they are considered to be evaluation factors when accessing finance and scored by credit underwriters (ModysRiskCalc, Version, 1.0 Netherlands). The expected outcome of the following econometric model is: solvency and liquidity ratios are not determinants of growth.

Furthermore, if the small and medium internet enterprises would have more support from their governments when accessing finance, their growth measured in number of workers could be significantly higher, thus unemployment rates would have also a positive impact.

Multiple regression model:

$$FG_i = \beta_0 + \beta_{1i}OR + \beta_{2i}TA + \beta_{3i}RS + \beta_{4i}P \& L + \beta_{5i}SR + \beta_{6i}LR + u$$

FG = Firms Growth

OR = Operating revenue (Annual Turnover)

TA = Total assets thousands EUR

RS = Number of recorded subsidiaries

P&L = P/L for period (= Net Income)

SR = Solvency ratio (Asset based) in %

LR = Liquidity ratio

u = Error term or disturbance

i = 1...*n*, where *n* is the number of firms

B's = are multiple regression coefficients estimated.

In this model the determinants of SMEs growth include: operating revenue (annual turnover) in EUR thousands, total assets in EUR thousands, number of recorded subsidiaries, profit & loss for period (= net income) in EUR thousands, solvency ratio (asset based) in %, and liquidity ratios in %.

Other variables may enhance growth of an enterprise but in this study the researcher used the number of employees. The *FG_i* is the dependent variable and represents the growth of internet and high-tech SMEs, the *B₀* is the intercept, the *X_i*s are the independent variables, and the *B_i*s the coefficient or parameter estimate of variable *i*. The value of the regression coefficients show the amount of expected variation of *Y* when *X_i* is changed by one unit, and all other *X_i*s are held constant.

The researcher took in consideration if the following assumptions are verified: model specification, causality, linearity, sample size, no multicollinearity, and homoscedasticity (Karine Charry, Nathalie Demoulin, Kristof Coussement, 2012)

6. Justification of Independent Variables

Operating revenue (Annual Turnover): the researcher has chosen this variable because represents the amount of money, including discounts and deductions that a company receives during a specific period. It is the gross revenue figure from which costs are subtracted to determine net income. This independent variable was selected with the following assumption: if the annual turnover becomes higher, the growth measured by the number of employers will also increase.

Total assets measured in thousands of EUR (last available): represents a resource with economic value that an individual, corporation or country owns or controls with the expectation that it will provide future benefit. This means that if the value of the assets held by a SME increase, the enterprise is likely to grow at the same increasing pace.

Number of recorded subsidiaries: A subsidiary is a company that is partly or completely owned by another company that holds a controlling interest in the subsidiary company. The researcher has chosen the number of subsidiaries to make part of the econometric model because if they increase in number the author assumes that the enterprise is expanding the operations with a positive relationship with the growth rate.

P/L for period: is a financial statement that summarizes the revenues, costs and expenses incurred during a specific period of time, usually a fiscal year. These records provide information about a company's ability – or lack thereof – to generate profit by increasing revenue, reducing costs, or both. This ability to generate increasing profits is related to a prospective exponential growth rate.

Solvency ratio (asset based): it is a key metric used to measure an enterprise's ability to meet its debt and other obligations. The solvency ratio indicates whether a company's cash flow is sufficient to meet its short-term and long-term liabilities. Traditionally, the lower a company's solvency ratio, the higher becomes the probability that will default on its debt obligations. Moreover the population sample shows that even the largest companies with the highest performance rates may have a low solvency ratio.

Liquidity ratio: a company's ability to pay off its short-terms debts obligations. It is considered that when the liquidity ratio increases, the margin of safety that the company possesses to cover short-term debts also increases. The liquidity ratios in the short run are at the spotlight of credit evaluators and underwriters because it shows if the enterprise has capacity to pay back the debts and obligations.

u or error term: this independent variable contains other factors than the observed in the independent variables, affecting the dependent variable FG_i (Growth).

7. Estimation and Evaluation Techniques

The Ordinary Least Squares (OLS) technique was used in this econometric model to estimate the parameters. Apart from its simplicity, it gives reliable estimates.

Statistical techniques were applied to evaluate the model accuracy and analyse the variance. The adjusted coefficient of determination called "R-bar squared" was used to test the best fit of the model. The "R-bar squared" evaluation measured the explanatory power of the specified model.

The "t-ratio" was used to determine the significance of the included variables.

The "F-Statistic" was also used to test the joint significance of the independent variables. It must be pointed out that in a cross section data analysis of this nature, the significance of the "F-statistic" is as crucial as the value of the "R-bar squared".

8. Results and Discussion of the Econometric Model

Table 1. Parameter estimates

Parameters estimates Variables	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	7	17.20895	4.13859	4.16	<.0001
Operating revenue (Turnover) thousands EUR	7	0.0006506	0.000116	5.59	<.0001
Total assets thousands EUR	7	0.0005671	9.72E-05	5.84	<.0001
Number of recorded subsidiaries	7	-17.04192	2.05529	-8.29	<.0001
P/L for period in thousands EUR	7	0.0004323	1.45E-05	29.8	<.0001
Solvency ratio (Asset based) %	7	0.07351	0.07953	0.92	0.3555
Liquidity ratio %	7	-0.59225	0.35189	-1.68	0.0926

Table 2. Null hypothesis

P Value	Evidence against H0
P > 0.1	weak or moderate
0.05 < P < 0.1	moderate
0.01 < P < 0.05	strong
P < 0.01	Very strong

Table 3. Analysis of Variance and F value

Analysis of Variance					
Source	DF	Sum of Squares	Mean of Square	F Value	Pr > F
Model	6	3365016317	560836053	42756.7	<.0001
Error	1320	17314322	13117		
Corrected Total	1326	3382330639			

Table 4. Analysis of R value

Root MSE	114.52908	R-Square	0.9949
Dependent Mean	71.00829	Adj R-Sq	0.9949
Coeff Variable	161.28974		

8.1. Discussion of the Regression Results

The estimated result showed an “R-Squared” of 0.9949. This indicates that 99.49% of the variations on the growth of SMEs are explained by the independent variables. This percentage shows a high fit of the model.

The “F-Statistic” which is a key statistic metric in this study is significant = 57.076, <0.0001, indicating that the model explains a significant portion of the variation of the data.

This implies that some of the independent variables in the model have jointly contributed to the growth of the internet and high-tech SMEs in Europe.

Pr > |t|- This column shows the 2-tailed p-values used to test the null hypothesis and if the coefficient (parameter) is 0.

Using an alpha of 0.05:

Operating revenue (OR = Annual Turnover) in thousands:

The parameter estimate OR = 0.00065057, and the $p = <0.0001$, this probability indicates that the coefficient is significantly different from zero, or has a strong evidence against the null hypotheses. The coefficient is positive indicating that larger operation revenue is related to a higher grow rate – which is what the researcher expected previously.

Total assets (TA) in thousands EUR:

The parameter estimate TA = 0.0005671, and the $p = <0.0001$. This probability indicates that the coefficient has strong evidence against the null hypotheses. The coefficient is positive indicating that more assets hold by an enterprise, are related to higher grow rates.

Number of recorded subsidiaries (RS):

For every unit increase in RS, there are -17.04192 decreasing units (number of workers), holding all other variables constant. This result was unexpected and may be related with the gains of efficiency when SMEs decentralize the operations and opens subsidiaries. This outcome does not mean necessary that an enterprise is not growing, and the $p = <0.0001$ indicates that the coefficient has a strong evidence against the null hypotheses.

P/L for period (= Net Income) in thousands EUR:

The parameter estimate P/L = 0.0004323, and the $p = <0.0001$, indicates that the coefficient has strong evidence against the null hypotheses. The coefficient is positive indicating that for every unit increase in P/L, it is expected approximately 0.0004 of increase in growth, holding all other variables constant. This may be interpreted as: when an enterprise generates more income the growth is likely to increase too.

Solvency ratio (asset based) %:

The coefficient for solvency ratio SR = 0.07351, and $p = 0.3555$. This probability ratio indicates weak or moderate evidence against the null hypotheses therefore it is not statistically significant. The interpretation may be connected with the common fact that companies with high growth rates typically have insolvent ratios (asset based). This is an important binding constrain to get access to finance, and a solvent credit score.

Liquidity ratio (x):

The coefficient parameter estimate Liquidity Ratio = -0.59225 , and $p = 0.0926$. This probability indicates that the coefficient has weak evidence against the null hypotheses therefore it is not statistically significant. When an enterprise grows, its financial liquidity typically decreases, which is also a binding constrain in terms of access to finance as the author expected.

9. Interpretation of parameters estimates

Small and medium scale enterprises play an important role in the economic development of both developed and developing nations. However, the SMEs are confronted with challenges of credit accessibility to pursue the business expansion and growth. The constraints of accessing finance gave rise to the researcher to examine credit accessibility, and its effects on the growth of internet and high-tech SMEs in Europe.

The core of the interpretation on parameters estimate is related to the independent variables solvency and liquidity. The most relevant finding is that they are not statistical significant in this econometric model, and the reason is because they fail to explain the growth of enterprises. These two ratios were just included in the model because they are considered binding inputs by underwriters to allow SMEs accessing credit.

Despite the liquidity and solvency ratios were not determinants of growth when measured by the number of workers according to the credit evaluation rating methods applied globally, they are relevant evaluation factors.

The objective of the study was to examine the influence of a wider access to credit on growth of internet and high-tech SMEs in Europe.

The multiple regression analysis was the model applied in the analysis of the relevant data, and the interpretation of the results show that access to credit exerts a significant effect on growth of SMEs.

Furthermore, the independent variables solvency and liquidity ratios were considered determinant factors in terms of creditworthiness evaluation however they are not statistically significant in terms of explaining the growth rates.

10. Conclusion and Policy Implications

Based on the research findings and related empirical analysis, an increase in credit accessibility supported by improved governmental European legislation for SMEs, may significantly promote the growth, wealth, and employment rates in Europe.

The main policy implication of this study is that European governments should be more committed to meet the credit needs of the internet and high-tech SMEs, for a faster and sustainable economic growth.

Recommended governmental policies to foster the growth of SME through wider access to finance:

- Minimum bank thresholds for lending money to SMEs (OECD, 2012).
- Central bank lending programs with favourable conditions to other banks specialized in funding SMEs.
- Wider accessibility to credit through financial institutions. These funds should be made available to the SMEs at reduced interest rate.
- Constitution of a well-funded European Credit Guarantee fund to support credit facilities of banks and other financial institutions. This will help to reduce the excessive demand for collateral securities.
- Development of clear European development objectives to meet the needs of the SMEs sector. That is, formal policies and regulations that guarantees achievement of predictive results of SMEs.
- Address the unemployment rates with policies and laws which can promote the access to credit by SMEs that typically have the access to credit restrained due their poor solvent and liquid accounting ratios.
- Specific guarantees and loans for SMEs during the first years of existence.
- Selective tax exemptions and support of the interest rates paid by credit applicants to the financial institutions.
- Governmental funds, credit guarantees, “angel” investors, and venture capital.

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