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ECONOMY-WIDE EFFECTS OF IMPROVING SMALL AND MEDIUM ENTERPRISES' ACCESS TO CAPITAL MARKETS: AN APPLIED GENERAL EQUILIBRIUM ASSESSMENT

EFECTOS SOBRE LA ECONOMIA DE MEJORAR EL ACCESO DE LAS PEQUEÑAS Y MEDIANAS EMPRESAS AL MERCADO DE CAPITALES: UNA EVALUACION EN EQUILIBRIO GENERAL COMPUTADO

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Abstract

Is it possible to increase GDP, reduce unemployment and improve income distribution by providing small and medium enterprises (SMEs) better access to capital markets? In this study, we used a CGE model of Argentina to address this question and to evaluate the economy-wide net impact accounting for the reallocation of resources from other sectors. We find that although the benefits in question could be attained, SMEs should also be expected to self-exclude from programs that provide access to capital markets if that access is contingent upon higher formalization. Formalization can be expensive for SMEs. Additionally, this model estimated the gains in productivity necessary to incentivize SMEs to formalize and to voluntarily access capital markets; however, after gaining productivity, the SMEs created fewer jobs than initially expected.

Keywords: *Small and medium enterprises, CGE, access, capital markets, Argentina.*

JEL Classification: *C68, D58, O17, O54.*

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Resumen

¿Es posible aumentar el PIB, reducir el desempleo y mejorar la distribución del ingreso mejorando el acceso de las pequeñas y medianas empresas (PyMEs) al mercado de capitales? En este estudio usamos un modelo de Equilibrio General Computado de Argentina para analizar esta cuestión y para evaluar el impacto general sobre la economía, de modo de tener en cuenta la reasignación de recursos desde otros sectores. Encontramos que si bien los beneficios podrían ser alcanzables, las PyMEs podrían autoexcluirse de programas que mejoren el acceso, si este fuera condicional a un mayor grado de formalización. La formalización puede ser costosa para las PyMEs. Además, el modelo estima las ganancias de productividad necesarias para inducir a las PyMEs a formalizarse y acceder voluntariamente al mercado de capitales; sin embargo, después de ganar productividad las PyMEs terminan creando menos puestos de trabajo que los esperados al inicio.

Palabras clave: *Pequeñas y medianas empresas, EGC, acceso, mercado de capitales, Argentina.*

Clasificación JEL: *C68, D58, O17, O54.*

1. INTRODUCTION

Is it possible to improve the manufacturing performance of SMEs and simultaneously increase GDP, reduce unemployment and improve income distribution by providing SMEs better access to capital markets?

This paper uses the following approach to address that question. First, we use a general equilibrium model to account for the impact of the reallocation of resources between the SMEs and the rest of the economy. Second, we examine the possibility of self-exclusion of firms from programs providing access to capital markets that are conditional on higher formalization (because formalization could be costly as a result of higher effective taxes and required compliance with norms and standards).

We used a Computable General Equilibrium (CGE) model of the economy of Argentina to address these two objectives.

Why a CGE approach? There are great expectations and hopes on the capacity of SMEs to create jobs and help the Latin American economies to grow. Most of the available analyses and evaluations of that capacity do not take into account the cost of opportunity of resources, i.e. the cost for the economy of allocating other scarce factors to SMEs. The CGE evaluation gives the net results while at the same time takes into account changes in relative prices of goods and factors.

To construct the data, we separated the manufacturers sector in the Social Accounting Matrix into SMEs and large enterprises/firms (LE). We obtained information on the SMEs from the Fundación Observatorio Pyme's database. Separating activities by firm size in the Social Accounting Matrix was one of the contributions of this paper. The

comprehensive data that was required to model the firms by size was only available for the manufacturing sector.

After dividing the manufacturing sector by size, the resulting groups had different characteristics. In the first group, SMEs, we included firms that operated on a lower scale, were less formal and were more labor-intensive on average. In the second group, we included large manufacturing firms, which were more capital-intensive, operated at a higher scale and were more formal (in terms of compliance with legal taxes and regulations)**.**

It has been argued that although SMEs face several potential regulatory constraints, they do not pay the full legal taxes and their level of evasion is higher. For example, Bertranou and Paz (2003) found a high correlation between the size of a firm and the protection of its workers. The high positive correlation between formality and the size of the firms and their scale of operation has been observed in the literature following the analysis of Rauch (1991) –see, for example, Neumeyer (2013), Galiani and Weinschelbaum (2007) and Busso *et al.* (2012).

It can also be argued that the larger a firm's scale of operations, the higher the probability is of being detected and charged with taxes; therefore, firms must choose between gaining access to capital markets or maintaining a smaller operation and continuing to pay lower taxes.

The paper is organized as follows. The next section presents a discussion of SMEs' access to capital and formalization. In Section 3, we present the main characteristics of the SMEs in Argentina and the Social Accounting Matrix. In Section 4, the characteristics of the model used in the simulations are described followed by a theoretical illustration of the analytical structure. Section 5 shows the results of the simulations. Finally, Section 6 presents the main conclusions.

2. SMEs, ACCESS TO CAPITAL MARKETS AND FORMALIZATION

SMEs' limited access to capital markets and higher cost of capital, low productivity and informality have already been described by the Fundación de Investigaciones Económicas Latinoamericanas (1996) and by Auguste, Bebczuck and Sánchez (2013).

The higher costs of capital could be the result of unintended imperfections (such as asymmetries of information), but they could also be the natural response of capital markets to the low levels of firm formalization.

However, our study shows that even when formalization could eliminate the difference in costs of capital with large and more productive firms, formalization is not the primary preference of SMEs. A recent report by the Fundación Observatorio Pyme (2013) found that SMEs that self-excluded from formal credit markets were an important proportion of the total manufacturers (60% in 2012)[1].

Stein, Pinar and Hommes (2013) emphasize that self-exclusion from formalization is a common situation in developing countries: firms remain informal because they do

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[1] sic "*… existe todavía una amplia proporción de PyMEs industriales de tamaño inferior a las ya bancarizadas que se autoexcluyen del sistema bancario…*" (Fundación Observatorio Pyme, 2013, pp. 2).

not have the proper incentives or the capacity to formalize. Moreover, some country studies show that simplifying registration channels and reducing its costs have had little effect to increase the formalization of firms[2] -see Klewitz and Hansen (2011).

A somewhat vicious cycle is inherent to this process; the low productivity of SMEs are to some extent the reason for their self-exclusion and informality, and to be sustainable, they compensate for higher (labor) costs per unit of product with informality and a lower level of tax compliance[3]. This in turn explains the higher capital costs.

However, we did not explore the causes of higher costs of capital in this study; instead, we considered higher capital costs to be a fact and explored the net results of eliminating the differential costs of capital while simultaneously increasing the taxes paid at the average of the corresponding industry.

In our model, the units of analysis were not individual firms. Instead, we analyzed the sectors of SMEs and large firms. Those sectors could expand their activity or contract depending on how the allocation of capital and labor was incentivized. Thus the allocation of capital was not unidirectional; depending on the incentives, capital could move from SMEs to large firms or be reallocated from the large formal sector to the SMEs. The birth and death of firms were therefore not major events in this model; they responded to the incentives provided by the general equilibrium of the economy when all of the incentives were taken into consideration. This approach is consistent with the idea that not all firms want to grow and become formal because formalization could be costly in terms of tax and regulation compliance. However, there are consequences to the reallocation of resources regarding employment and income distribution because SMEs are on average more labor-intensive than larger firms.

An alternative view emphasizes instead the problems of development and its structural characteristics: difficult access to credit and capital, low compliance to tax and regulations and low productivity and specialization of SMEs in inferior goods. An interesting discussion of the characteristics of the SME sector was presented by Tybout (2000), in which the author identified two main characteristics of SMEs in less developed economies: limited access to capital markets and specialization in inferior-good markets. See also De Paula and Scheinkman (2007), Straub (2005) and Bennett and Estrin (2007).

One key component of informality is tax evasion. Tax evasion is not that uncommon in the economies of Latin American Countries (LAC). A recent analysis of tax evasion in LAC was conducted by Gómez Sabaini and Jiménez (2012). They observed that SMEs were more informal and that the taxation of SMEs was not easily enforced.

However, the need to combat this tax evasion creates a trade-off. Is the common belief that SMEs are critical for the creation of employment supported by evidence? Could the reallocation of resources absorb employment if legal taxes were enforced?

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[2] De Giorgi and Rahman (2013) for Bangladesh, McKenzie and Sakho (2009) for Bolivia and Mel *et al.*(2013) for Sri Lanka.

[3] Fundación Observatorio Pyme (2014) estimated that the productivity level of SMEs is around 74% lower that the LEs.

If SMEs are essential to creating employment opportunities, this could justify a light-handed approach to the issue of evasion. However, the critical question remains how this approach affects social welfare.

On the one hand, the role of SMEs seems to be important for the creation of employment in most LAC economies. SMEs are more labor-intensive than large firms, and their performance seems to be related to the performance of the economies of the region. Based on this perspective, it is important to recall the work of Marchand, Pestiau and Wibaut (1989), which showed that under unemployment, Ramsey taxes should be reduced when an industry is labor-intensive because higher employment could enhance social welfare even when the optimal taxation scheme is distorted[4].

On the other hand, the consequences of a light-handed approach to the SMEs' tax evasion could be a reduction in the average scale of firms, the loss of productivity at the level of the firms and a decrease in the economy's TFP.

3. A SOCIAL ACCOUNTING MATRIX WITH SMEs ACCOUNTS

In this section, we present the data and the calibration procedure utilized to build a SAM for Argentina in 2010. We separated the firms in the manufacturing sector into two groups: SMEs and large firms/enterprises (LE). Additionally, we describe the necessary sources to estimate the specific accounts for the SMEs included in the SAM.

3.1. Characterization of SMEs

SMEs are more labor-intensive and are less formal than LEs. The technical efficiency of SMEs is central to the debate regarding their role in economic development. Some studies have found them to be more efficient than large enterprises in some industries but not in others, while other studies have found them to be less efficient overall (Little, Mazumdar and Page, 1987; Cortes, Berry and Ishaq, 1987; Liedholm and Mead, 1987). More recent research has reported that most SMEs are less efficient on average than their larger counterparts in five countries (Malaysia, Indonesia, Mexico, Colombia and Taiwan) but with a high dispersion, as some SMEs were as efficient as large companies (Batra and Tan, 2003). Ayyagari, Demirguc-Kunt and Maksimovic (2011) observed that although small businesses were important contributors to total employment and job creation, they had a lower growth of productivity than large companies, which explains why job creation does not translate into faster growth.

We separated the firms in the manufacturing sector into two groups: SMEs and LEs. The first group, SMEs, included firms that operated at a lower scale, were less formal and were in general more labor-intensive than LEs. In the second group (LEs), capital-intensive firms were included. These firms operated at a higher scale and were more formal.

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[4] See also Koskela and Schöb (2001) and Böhringer, Boeters and Feil (2005).

National Accounts do not contain disaggregated data by company size; hence sectoral information was collected to represent the firms in the SAM. An aggregate manufacturing sector was initially created; small and medium manufacturer information was then collected and large industrial enterprises emerged as the difference between the two. The process used to represent the small and medium enterprises within the SAM is described next.

Studies that measure the share of SMEs in the GDP have investigated different periods and economic activities, which limit their comparability. Ayyagari, Beck and Demirgüc-Kunt (2003) estimated that from 1990 to 1999, all small and medium firms (not only manufacturing) accounted for an average of 54% of Argentina's GDP. Peres and Stumpo (2000) estimated a contribution of 36% with respect to the manufacturing GDP in 1993. Additionally, the National Economic Census 2004 showed a share of 24% of the GDP in the manufacturing sector. Given these mixed results, we used the most current information available to weight SMEs within manufacturing: sales statistics recorded by the federal fiscal agency (Administración Federal de Ingresos Públicos)[5] in 2010.

Based on the SMEs' gross value of production, economic statistics were obtained from a specific survey of SMEs conducted by the Fundación Observatorio PyME (FOP)[6]. The survey was composed of a panel of 2500 industrial SMEs that were classified using the two-digit United Nations International Standard Industrial Classification. In terms of geographical coverage, the survey covered the industry nationwide. The variables surveyed included the firm's characteristics, problems and expectations, investments, use of information technologies and communications, performance, human resources, finance and economic-financial relations, customers and suppliers and infrastructure and logistics[7].

In particular, the statistics used were: the intermediate consumption/value added ratio, the capital/labor ratio and the proportion of exports to total sales. The remaining sales were distributed among other uses (intermediate consumption, final consumption and exports) based on the sales distribution of the aggregate manufacturing sector. The tax burden by firm size was obtained from the National Economic Census 2004.

Table 1 presents a comparison of the manufacturing statistics by firm size.

SMEs represented 33% of the manufacturing industry's gross output, 37% of the value added and 30% in terms of the intermediate consumption. SMEs were also more intensive in their use of labor than large manufacturing industries. SMEs had less participation in international markets. Finally, a lower tax burden on SMEs was observed when compared with larger firms.

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[5] Based on the definition of a SME used by the Secretariat of Small and Medium Enterprises and Regional Development (Resolution N0 21/2010), the term "SME" represents companies with annual sales of between $2.4 million and $111.9 million.

[6] Periodically, and to cover the information gap between small and medium enterprises in this sector, the FOP generates surveys that produce relevant information on the structural characteristics and development of SMEs. This information was provided by the FOP through a joint project with the Universidad Argentina de la Empresa (UADE).

[7] This survey considered SMEs to be firms with 10 to 200 employees.

TABLE 1

ARGENTINA, 2010. MANUFACTURING STRUCTURE BY FIRM SIZE

Sectors	Gross Output	Value Added / Gross Output	Labor / Value Added	Exports / Gross Output	Net Tax Burden
Manufacturing: SME	33	41	45	6	9
Manufacturing: LE	67	33	21	30	13
Total Manufacturing	100	35	30	22	12

Source: Own elaboration based on AFIP, National Economic Census 2004 and FOP.

3.2. Social Accounting Matrix

The basic data for the model were obtained from a social accounting matrix (SAM) that also separated the manufacturing industry by firm size. We summarize the most critical aspects of data collection and treatment in the following paragraphs.

Data on the global supply and demand and on the sectoral value added as of 2010 were obtained from the National Accounts published by the National Institute of Statistics and Census (INDEC). Information on the government accounts was obtained from the Ministry of the Economy (Oficina Nacional de Presupuesto). The information on national and local taxes was provided by the Administración Federal de Ingresos Públicos and by Provincial ministries. Regarding data on the demand side, household demand by good was obtained from the Survey of Household Expenditure 2004/2005 and data on exported goods was from INDEC.

The model included 8 production sectors: 2 primary sectors (agriculture and mining), 2 manufacturing industry sectors (SME and LE) and 4 service sectors. The factors of production that were modeled were labor and capital. The 2008 matrix of factor payment created by the Generation of Income Account (CGI) of INDEC was updated using the cross-entropy method.

Table 2 presents the share of each sector in terms of gross value of production, value added, intermediate consumption, factors and tax burden.

The sectors that contributed the most to gross value of production were Other services, Manufacturing and Agriculture. SMEs comprised 33% of the Manufacturing industry in terms of gross output value, 37% in terms of VA and 30% in terms of intermediate consumption. Additionally, SMEs were more intensive in their use of labor than large manufacturing industries. A lower tax burden on SMEs industries was also observed when compared with larger firms.

On the demand side, consumer groups were divided into domestic households (rich and poor), the government, foreign consumers and foreign producers. The assumption of a small open economy was adopted, which implied that Argentina was a price taker in international markets.

TABLE 2

ARGENTINA, 2010. PRODUCTION AND VALUE ADDED STATISTICS AS A PERCENTAGE OF THE TOTAL

Sector	Gross Output	Value Added	Intermediate Consumption	Labor	Capital	Net Tax Burden
Agriculture, Forestry & Fishing	7	9	5	7	15	7
Oil & Mining	2	3	1	1	5	9
Manufacturing: SME	11	8	13	9	6	9
Manufacturing: LE	22	13	31	7	9	13
Electricity, Gas & Water	2	1	3	3	3	-27
Construction	9	6	12	4	7	6
Transport	6	6	7	5	7	3
Other Services	41	53	28	64	47	7
Total	100	100	100	100	100	8

Source: Own elaboration based on INDEC.

Two types of households distributed by per capita income level were modeled. Poor Households corresponded to the first six deciles of per capita income, and Rich Households applied to the remaining four richest deciles[8]. In this model, households made expenditures on consumer goods and investments and pay taxes. Their income was provided based on the factor production payment and on transfers. Sectoral consumption was obtained from the Survey of Household Expenditure 2004/2005. The statistics on household income by type of factor and transfer were obtained from the Permanent Household Survey 2010.

In the model, government resources were tax revenues, social contributions and other non-tax revenues. Government expenses related to both the acquisition of goods and services for consumption and investment as well as to transfers to households. The income and expenditures of the public sector were consolidated for the federal administration, the provinces and the municipalities. Information on the government accounts was obtained from the Ministry of the Economy.

The consumption of the rest of the world was generated from Argentina's exports and goods from other countries. The production of the rest of the world was Argentina's imports and transactions with other countries. Data on sectoral exports and imports were obtained from INDEC. The revenues and expenditures for factor income were subsequently obtained from the balance of payments from INDEC.

For the modeled institutions, the balance of income and expenses was the net financial status, the latter being the financial account used for the closure of the SAM. For the government and households, financial status was determined by the difference

[8] 40% of the richest households comprised 30.5% of the population in the Permanent Household Survey 2010.

between the modeled revenues and expenditures, and for the rest of the world, it was the surplus/deficit on the current account of the balance of payments.

4. THE MODEL

In this section, we present the main features of the CGE model utilized for simulations and a simplified model that represented an economy with heterogeneous firms.

4.1. Characteristics of the general equilibrium model used for the simulations

Our CGE model was static, had all of the basic properties of the Walrasian perspective and was numerically determined using GAMS/MPSGE[9]. Prices were computed to clear all of the markets except for the labor market because it was assumed that unemployment was present and therefore that there was a minimum wage constraint.

The economy was assumed to be small with respect to international markets. The rest of the world bought domestic exports and sold imports in addition to making bond transactions and collecting dividends from investments.

Regarding the supply side, the production function in each sector was a Leontief function between value-added and intermediate input; one output unit required x percent of an aggregate of productive factors (labor, physical capital, financial capital and land) and $(1–x)$ percent of intermediate inputs. The intermediate input function was a Leontief function of all of the goods, which was a strict complement to production. Value-added, on the other hand, was a Cobb-Douglas (CD) function of productive factors. Private savings, public savings and foreign savings were totaled to finance investments.

The demand side was modeled through two representative households (poor and rich), a government and an external sector. Households bought or sold bonds, invested and consumed in constant proportions (Cobb-Douglas) based on the remuneration of the factors they owned (and the government transfers they received). The selection of the optimal proportion of the goods consumed was obtained from a nested production function in the utility function through a cost minimization process.

The government was represented as an agent that participated in investment markets, consumed and made transfers to households and had a Cobb-Douglas utility function; its main source of income was tax collection (although it also made financial transactions through bonds). The rest of the goods were assumed to be complementary, and the elasticity of the substitution between them was zero. Therefore, a CD utility function was attributed to the government. This decision was motivated by the property of the CD function to maintain the same share of each type of expense in the total, which seemed to be a neutral way of modeling the behavior of the government. Thus, it was assumed that each dollar of revenue was spent on different factors and goods in the same proportion as it was originally spent in the benchmark year.

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[9] The solution of the model was obtained using the representation of General Equilibrium and using the Mixed Complementarities Approach.

For private agents, welfare changes were calculated using the Equivalent Variation, and the same measure was used for the public sector. We believed that this would represent a monetary proxy of the changes in society welfare stemming from the modifications in the availability of goods and services provided by the public sector (education, health and defense, for example). A simple change in revenue would not account for the changes in price of the goods, services and factors; using the Equivalent Variation thus helped generate an estimate of those changes.

The basic data for the model were organized into a social accounting matrix (SAM). As is customary in applied general equilibrium analysis, the model was based on the economic transactions in a particular benchmark year. Benchmark quantities and prices – together with exogenously determined elasticities – were used to calibrate the functional forms.

Accordingly, the initial level of positive unemployment observed during the benchmark year was assumed; the evolution of the economy determined endogenously whether unemployment persisted. To represent unemployment, we assumed that there was a minimum real wage rate constraint and that the typical Walrasian mechanism did not apply to unemployment (however, it is possible to simulate different rules of adjustment of wages, e.g., constant in nominal terms).

4.2. A model of an economy with heterogeneous firms

A general equilibrium perspective considers changes in industrial structure, and the industrial structure is important in accounting for additional dimensions such as evasion, informality and creation of employment[10].

With regard to the industrial structure, the basic idea is to consider that firms in the industrial sector are heterogeneous with respect to four main categories: the productivity of the factors, the efficiency in the use of intermediate inputs, the quality of goods produced and the level of formality and of tax evasion.

The first two characteristics refer to internal efficiency. They address the question of whether it is possible to produce the same quantity of products using smaller quantities of capital, labor and/or intermediate goods and services.

The third characteristic can be interpreted as an external effect that is related to the efficiency of the markets and not necessarily of the shareholders. To approximate this efficiency, it is assumed that if the goods produced are not of standard quality, the consumers will have to purchase more units to obtain the expected service, which will increase their expenses. The problem of quality could underlie a substantial portion of the discussion regarding the capacity of SMEs to access foreign markets.

The fourth feature is often quoted as being intrinsic to SMEs, which can dwell in markets without complying with regulations or paying all of the necessary taxes. This characteristic is the issue that we explored with the CGE model.

In this simplified version of the model, we considered evasion of labor taxes only, which are likely the easiest to evade; however, the model used for simulations

[10] Little work has been done concerning the presence of heterogeneous technologies in general equilibrium. See, for instance, Zhai (2008) and Balistreri and Rutherford (2013).

encompassed several taxes and differing levels of evasion. Although we did not focus explicitly on productivity or efficiency, it should be noted that the above mentioned lack of efficiency or of quality (as well as the additional cost of capital, see below) could be compensated for with a lower degree of fulfillment of obligations and higher tax evasion. In the following section, we describe the addition of two characteristic syndromes that are typically attributed to SMEs: i) limited access to capital markets or a higher cost of capital due to imperfections, such as asymmetries of information, and ii) limited access to export markets. As we observed, these phenomena can be connected, as gaining access to capital markets can reduce costs and improve the competitiveness of firms in the international markets.

We considered an economy that consisted of only one private agent, three types of industrial firms (large firms that produce tradable goods, large firms that produce non-tradable goods and SMEs) and a public sector (that collects taxes and purchases goods and labor).

We accounted for two mobile non-specific factors, labor (L) and a fraction of the total capital (K_m), while the rest of the capital was assumed to be specific and not mobile between industries. Thus, even when the production functions exhibited a constant return to scale, there continued to be profits associated with the remuneration of specific capital.

Regarding access to capital markets, it was assumed that there were no quantitative constraints. Instead, we assumed that SMEs had to pay a mark-up on mobile capital to replicate their differential costs for accessing capital markets.

Labor unemployment was also included, which was associated with a rule that determined the wage rate (indexation to prices of goods faced by final demand).

The economy was considered to be small with respect to the rest of the world's economies.

4.2.1. *Households*

The budget constraint of the households sector was:

$$\begin{aligned} &P_{1T}C_{1T} + P_{1N}C_{1N} + P_2C_2 + P_M M = W\left(L^0 - Un\right) + \\ &\pi_{1T} + \pi_{1N} + \pi_2 + r_m K_{1Tm} + r_m K_{1Nm} + r_m K_{2m}\left(1+\gamma\right) \end{aligned} \tag{1}$$

where P_i was the price of the goods produced by the larger firms, indicated with sub-index 1 (T for tradable goods and N for non-tradable goods) and by SMEs, sub-index 2; P_M was the price of imported goods; C_{1T}, C_{1N} and C_2 represented the household demand for domestic goods and M represented the household consumption of imported goods. The sources of income for the household were labor earnings determined by wage (W) and actual employment, the difference between the endowment of labor (L^0) and unemployment (Un), profits of the firms (π_i) and the remuneration (r_m) of mobile capital and the K_m employed in firms 1 and 2. In the case of SMEs, there was an additional cost of capital indicated by γ.

The utility function U of a representative household depended on the consumption of C_{1T}, C_{1N}, C_2 and M, and it adhered to habitual regularity conditions. The first order conditions for the determination of consumption of goods produced by both types of firms were calculated as:

$$U_{1T} / U_2 = P_{1T} / P_2 (1+\theta) \tag{2}$$

$$U_{1N} / U_2 = P_{1N} / P_2 (1+\theta) \tag{3}$$

$$U_1 / U_M = P_1 / P_M . \tag{4}$$

The general model assumed that the production functions were homogenous in degree one and that those profits became zero, although a certain amount of specific non-mobile capital was included with a specific remuneration. The term "positive profits" can be considered another way of depicting the remuneration of specific non-mobile capital. A relevant parameter implicit in equation (3) was determined a priori to be the elasticity of the substitution between goods produced by large firms and SMEs; in the model, the basic simulations assumed that this elasticity was one.

4.2.2. *Firms*

The profit function of the large firms for tradable goods was:

$$\pi_{1T} = (P_{1T} - a_{1T} P_2 - m_{1T} P_M) FT(L_{1T}, K_{1Tm}) - WL_{1T}(1+t) - r_m K_{1Tm}, \tag{5}$$

where FT was the (neoclassical) production function and was dependent on labor employed in the sector L_{1T} and on mobile capital, K_{1Tm}. The parameter a_{1T} was the input requirement of the goods produced by SMEs per unit of production of large firms. The input requirement of imported goods was m_{1T}.

The conditions for the maximization of profits were determined to be:

$$(P_{1T} - a_{1T} P_2 - m_{1T} P_M) FT'_L(L_{1T}, K_{1Tm}) - W(1+t) = 0, \tag{6}$$

$$(P_{1T} - a_{1T} P_2 - m_{1T} P_M) FT'_K(L_{1T}, K_{1Tm}) - r_m = 0. \tag{7}$$

The profit function for non-tradable goods and services was:

$$\pi_{1N} = (P_{1N} - a_{1N} P_2 - m_{1N} P_M) FN(L_{1N}, K_{1Nm}) - WL_{1N}(1+t) - r_m K_{1Nm}, \tag{8}$$

where $FN(L_{1N}, K_{1Nm})$ was the (neoclassical) production function that was determined by the labor and capital employed in the sector. The parameter a_{1N} was the input requirement of the goods produced by SMEs per unit of production of non-tradable goods and services.

The corresponding first order conditions for the maximization of profits were:

$$\left(P_{1N} - a_{1N}P_2 - m_{1N}P_M\right)FN'_L\left(L_{1N}, K_{1Nm}\right) - W(1+t) = 0, \tag{9}$$

$$\left(P_{1N} - a_{1N}P_2 - m_{1N}P_M\right)FN'_K\left(L_{1N}, K_{1Nm}\right) - r_m = 0. \tag{10}$$

4.2.3. *SMEs*

Profits were defined in a similar manner:

$$\begin{aligned}\pi_2 = \left(P_2 - a_{2T}P_{1T} - a_{2N}P_{1N} - m_2P_M\right)H\left(L_2, K_{2m}\right)/ \\ (1+\varepsilon) - WL_2(1+tv) - r_mK_{2m}(1+\gamma).\end{aligned} \tag{11}$$

In this expression, the production function was $H(L_2, K_{2m})$, and there were three additional parameters: ε, v and γ. The first parameter represented an index of productivity in the use of labor and capital; a higher level of ε indicated a lower level of productivity. Parameter v stood for the degree of evasion of labor taxes ($0 \le v \le 1$); a lower of level of v implied a lower effect rate tv. The additional cost of capital faced by SMEs was indicated by γ; a higher level of this parameter indicated that the firm would have to pay an additional cost to access one unit of capital.

The profit maximization conditions for those firms were:

$$\left(P_2 - a_{2T}P_{1T} - a_{2N}P_{1N} - m_2P_M\right)H'_L\left(L_2, K_{2m}\right)/(1+\varepsilon) - W(1+tv) = 0. \tag{12}$$

$$\left(P_2 - a_{2T}P_{1T} - a_{2N}P_{1N} - m_2P_M\right)H'_K\left(L_2, K_{2m}\right)/(1+\varepsilon) - r_m(1+\gamma) = 0. \tag{13}$$

4.2.4. *Government*

The tax revenue R of the government was calculated by the collection of taxes:

$$R = tW\left(L_1 + vL_2 + L_g\right). \tag{14}$$

This revenue was devoted to the purchase of goods and labor, which were indicated by G_i and L_g:

$$G_{1T} = g_{1T}R / P_{1T}, \tag{15}$$

$$G_{1N} = g_{1N}R / P_{1N}, \tag{16}$$

$$G_2 = g_2R / P_2(1+\theta), \tag{17}$$

$$L_g = g_LR / W(1+t). \tag{18}$$

The corresponding shares were determined by the constants g_{1T}, g_{1N}, g_2 and g_L, respectively. Those shares were constant; thus, equations (15) to (18) could be obtained from the maximization of a Cobb-Douglas utility function attributed to the government, as suggested in Ballard *et al.* (1985). As a result, a measure of the welfare of the public sector could be introduced. In the simulations, the Equivalent Variation was used both for households and for the public sector.

4.2.5. *Market equilibrium*

We were able to characterize the market equilibrium for this economy (notice that this was pseudo-equilibrium because we admitted the existence of involuntary unemployment). The model was determined by computing a vector of prices (and quantities) such that households maximized welfare, firms maximized profits and all of the markets were simultaneously in equilibrium.

The demand for labor plus unemployment had to be equal to the total endowment L^0.

$$L_{1T} + vL_{1N} + L_2 + L_g + Un = L^0. \tag{19}$$

As there was unemployment, it was necessary to include a rule regarding the determination of wages above the equilibrium level. This rule was assumed to be represented by:

$$W = \varphi_{1T} P_{1T} + \varphi_{1N} P_{1N} + \varphi_2 P_2, \tag{20}$$

where φ_i was the share of good i in the Consumers Price Index. Notice that higher labor taxes (the only type of tax considered in the simplified version) increased the prices of final demand and therefore increased nominal wages.

Equation (20) had to be interpreted in a more general form as a minimum wage condition; thus, the simulations allowed the possibility of increasing real wages under full employment.

The market for mobile factors illustrated the equalization of demand for capital and supply of mobile capital owned by households, represented by $K_m{}^0$:

$$K_{1Tm} + K_{2Tm} + K_{2m} = K_m^0. \tag{21}$$

The last three equations represent the market equilibrium conditions for goods produced by large firms and by SMEs in the economy:

$$C_{1T} + G_{1T} + a_{2T} H\left(L_2, K_{2m}\right) / \left(1+\varepsilon\right) + X = FT\left(L_{1T}, K_{1Tm}\right), \tag{22}$$

$$C_{1N} + G_{1N} + a_{2N} H\left(L_2, K_{2m}\right) / \left(1+\varepsilon\right) = FN\left(L_{1N}, K_{1Nm}\right), \tag{23}$$

$$C_2 + G_2 + a_{1T} FT\left(L_{1T}, K_{1Tm}\right) + a_{1N} FN\left(L_{1N}, K_{1Nm}\right) = H\left(L_2, K_{2m}\right) / \left(1+\varepsilon\right). \tag{24}$$

The left-hand side of these equations represents the demand: private consumption, government expenditure of the respective good and demand of the good as a production input of the rest of the economy. Notice that a gain in productivity (an increase in parameter ε) reduces the demand for intermediate uses per unit of value added.

This was a general equilibrium model, which in principle was consistent because it contained 24 unknown variables to be determined: 1) the demand for labor in every sector and unemployment, L_{1T}, L_{1N}, L_2, L_g and Un; 2) the demand for mobile capital, K_{1Tm}, K_{1Nm} and K_{2m}; 3) the prices of factors and goods, W, r_m, P_{1N} and P_2; 4) the household and government demand for goods, C_{1T}, C_{1N}, C_2, G_{1T}, G_{1N} and G_2; 5) the profits and revenue of the public sector, π_{1T}, π_{1N}, π_2, and R; and 6) the export X and import of goods M.

4.3. Calibration and Validation

To calculate the benchmark and counterfactual solutions, we used MPSGE as developed by Tom Rutherford based on the works of Mathiesen (1985), who showed that economic general equilibrium can be expressed as a set of equalities and inequalities (mixed complementary programming). The program includes a procedure of self-calibration that facilitates its use and a change in specification of elasticities and structural characteristics. Thus, provided that the SAM was correctly balanced, the first solution of the model computed the parameters that enabled the replication of the benchmark year data. The counterfactual exercises were in effect comparative statistic simulations using the calculated parameters. Therefore, calibration was obtained in the first run of the model, which is a standard procedure for this type of research (see Chisari and Romero (2009) for a summary of the methodology and references). We have used this methodology for different countries in Latin America as well as for the analysis of economies with sectors that are under regulation (see Chisari, Estache and Romero, 1999).

For validation, we attempted to replicate the dynamic path of the economy. To do so, we identified the main shocks (of policy or exogenous) that impinged upon the economy in year t+1 and tried to replicate the observed main macroeconomic indicators based on the information regarding changes in stocks, technology and labor force with respect to year t. One key variable that was consistently useful in validating the model was the degree of mobility of capital, i.e., the proportion of capital employed by production sectors that was not specific but was mobile. Thus, the validation included the determination of the proportion of capital that was mobile for the first two years, which for Argentina was approximately 12.5%. A more thorough discussion is presented in Chisari, Maquieyra and Miller (2012).

5. SIMULATION RESULTS

In this section, we report the results of the analysis of the general equilibrium effects derived from potential programs enabling access to capital markets conditional on higher formalization. Formalization was considered to imply greater effective taxes

and compliance with norms and standards. Additionally, we estimated the minimum level of productivity improvement necessary to prevent the self-exclusion of SMEs from these programs.

Based on these objectives, we conducted three groups of simulations: a) access of SMEs to capital markets and access conditional on formalization (tax compliance), b) tax substitution and equal-yield-replacements and c) compensatory productivity gains of SMEs.

The results are summarized using a set of indicators for the economies. We included the change in GDP and trade balance and the equivalent variations for the poor, the rich and the public sector. The last indicator (equivalent variation of the public sector) is less standard, but as has already been argued, we assumed a Cobb-Douglas utility function for the government because that function implies constancy of the share of different types of expenses. We also included the average rate of profit in primary, secondary and tertiary sectors to appraise how the industrial structure responded or would respond to the new relative prices.

Using the simple version of the model, we considered the following comparative exercises:

a. Elimination of a differential cost of capital (equivalent to reductions of γ).
b. Increase in the formalization of SMEs (represented as an increase in v, the tax differential between SMEs and LEs)
c. Increase in the productivity required to compensate for the negative effects of formalization ($\varepsilon < 0$)

As described above, it has been argued that SMEs do not have access to capital markets and that they have to pay an additional cost per unit of capital. Regarding the model, that argument is equivalent to saying that $\gamma$is positive and most likely very high. A policy that is oriented to reduce that cost could help increase the scale of SMEs, but it could also foster some substitution of labor for capital. Large firms would also see an increase in the price of capital, which would reduce the demand for labor.

Auguste, Bebczuk and Sánchez (2013) supported the idea that financial constraints influence SMEs. In our model, this constraint was approximated by a mark-up. However, the possibility that SMEs would choose to not enter formal capital markets for reasons other than the direct marginal cost of funds cannot be ruled out. For example, accessing formal capital markets could require the disclosure of certain information about the firm, including projects in development as well as sensible information on tax bases. Hence, a firm might face a trade-off between the lower cost of funds and higher taxes due to formalization. The net effect of a movement to formalization that reduces the cost of capital has to be complemented by an evaluation of the effective taxes paid by the firm (e.g., those charged on labor expenses).

Accordingly, two exercises were performed. In the first one, we reduced γ, and in the second, we assumed that this reduction was accompanied by an increase in v, the parameter that indicates tax compliance.

Our benchmark included the higher cost of capital paid by SMEs. Therefore, to represent the differential interest rate, we divided the remuneration of mobile capital into two parts: the mobile capital at market remuneration and the differential cost of capital or mark-up charged on the normal remuneration of capital. We modeled the

differential cost of capital as an additional mark-up on the remuneration of capital by SMEs that was collected by the richest households. The elimination of this mark-up allowed for an estimate of the effect of a program to provide SMEs access to capital markets. The simulations considered a differential rate of 10% that was paid by the SMEs (Table 3).

An increase in GDP was observed. The change was slight because of the reduced proportion of manufacturing SMEs in relation to the whole economy. In addition, manufacturing SMEs showed a significant increase in activity level, but this was accompanied by a reduction in the activity level of the large manufacturers and of other sectors of the economy. This result was due to the substitution at the consumption level of other goods for products of SMEs and to the fact that the capital moved from the rest of the economy to the SMEs. Accompanying this reallocation of capital was a reduction in the rate of unemployment because SMEs are labor intensive and require more workers than the number of positions that would be eliminated in other sectors.

There was also a fiscal reduction, as SMEs pay lower effective taxes than the large manufacturers.

The reduction in the cost of capital included a gain in the international competitiveness of SMEs. Consequently, their exports were the main driver of the increase in activity level[11]. SMEs could face a number of different restrictions when accessing foreign markets. Therefore, to obtain the benefits of eliminating the differential cost of capital, it would be necessary to implement polices directed at removing those restrictions.

The poor showed an increase in welfare that was greater than that of the rich. This result was due to the reduction in the differential cost of capital that was eliminated, as it was assumed that this cost comprised part of the total income of the rich.

The third column of Table 3 shows the results of reducing the 10% cost of capital differential when the reduction is matched with an increase in the effective taxes paid by SMEs, thus equating the taxes paid by SMEs with those paid by the large manufacturing firms (the same average effective tax).

This simulation showed a full reversal of the results. There was a decrease in GDP, an improvement in fiscal result, an increase in the level of unemployment and a reduction in the activity level and in the rate of profits of SMEs.

This simulation confirmed the belief that many firms would self-exclude from gaining better access to the capital markets if formalization, and thus tax compliance, were required.

What was more notable about these results was that the economy was weakened by the decrease in the activity level of the SMEs and that there was a reduction in the activity level of all of the other industrial sectors. The main reason for this result could be that because SMEs were paying higher taxes, including taxes on labor, the rate of unemployment increased, which reduced the level of household consumption and investment.

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[11] We simulated the elimination of the cost of capital differential maintaining the benchmark level of SME's exports. We observed that the profit rate and production of SMEs also remained close to the benchmark levels.

TABLE 3

SIMULATIONS OF ACCESS TO CAPITAL MARKET, FORMALIZATION AND PRODUCTIVITY IMPROVEMENTS

Indicators	Elimination of Cost of capital Differential	Tax rates equalization of SME & LE	Tax rates equalization with ex-ante fiscal neutrality	Productivity gains required to compensate fiscal pressure on SME
Macroeconomic Indicators				
GDP	0.14	–3.64	–1.25	0.60
Trade balance	0.34	–3.69	0.24	0.56
Unemployment rate (base= 7.75)	7.46	12.87	9.60	8.94
Fiscal Result	–0.72	–0.87	–2.33	1.95
Welfare Indicators				
Welfare of the Poor	0.29	–3.57	–1.79	0.82
Welfare of the Rich	0.21	–4.31	–1.04	–0.22
Rate of profit				
Agriculture, Forestry & Fishing	–0.25	–0.99	4.07	–0.81
Manufacturing: SME	3.44	–2.93	1.56	0.00
Manufacturing: LE	–1.03	–7.52	–0.14	–3.50
Services	1.02	–4.71	–0.32	1.83
Sectoral activity level				
Agriculture, Forestry & Fishing	–0.63	–0.49	1.19	–1.05
Oil & Mining	–0.54	0.11	1.66	–0.71
Manufacturing: SME	4.26	–12.71	–9.84	8.50
Manufacturing: LE	–1.20	–4.74	–0.74	–2.97
Electricity, Gas & Water	0.19	–3.40	–0.94	0.68
Construction	0.09	–2.88	–1.02	0.75
Transport	0.05	–3.49	–0.72	0.13
Other Services	0.03	–2.10	–0.52	1.00

Source: own elaboration.

The negative impact on the economy was mitigated when the increase in effective taxes paid by SMEs was compensated with a reduction in the average rate of effective taxes for the whole economy. Although this helped sustain the activity level, it was not sufficient to recover the benchmark levels of the economy and of the SMEs.

However, after formalization and gaining access to capital markets, SMEs did become more productive[12]. The gains in productivity of the SMEs were equivalent to the reductions in parameter ε. Those gains reduced the costs of production and the use of intermediate goods. Accordingly, two main consequences can be expected.

[12] However, SMEs could witness gains in quality too, which would be a gain in efficiency for the market; the firms would most likely not have a large enough incentive to make the necessary efforts to obtain those changes unless they were for free or were forced by competitive conditions. Whatever the case, the question is how the economy would react to those quality gains, which would be observed in the impact on relevant variables, such as employment. Quality can also be a critical variable to gaining access to export markets –see González and Hallak (2013). Although the main factor that González and Hallak found was knowledge, in our model, SMEs could face difficulties if they had to increase quality to gain access to export markets because that would require additional capital and, as already mentioned, more formalization and consequently an increase in effective taxes.

On the one hand, there could be a direct decrease in employment. On the other hand, indirectly, an increase in the demand for the goods produced by SMEs could be observed because a reduction in costs would transfer to some extent to prices; this would increase SMEs' production.

Therefore, we estimated the necessary productivity gain after reforms to sufficiently compensate SMEs to equalize their rate of profit with that of the benchmark. We found that that this productivity gain would need to be approximately 20%.

As the GDP grew, we observed that although the activity level of SMEs increased, the rate of unemployment remained high. This is not surprising, as SMEs are more productive and therefore need to hire fewer workers.

This result demonstrates a negative effect of a policy oriented to reduce unemployment by granting SMEs access to capital markets.

6. MAIN RESULTS AND FINAL REMARKS

This paper examines the impact of facilitating SMEs' access to capital markets using a computable general equilibrium model of Argentina.

Although there is abundant literature on this topic, most of which emphasizes the possible economic gains by eliminating the differential cost of capital paid by SMEs, there have been no quantitative studies. In this study, we used a CGE model to investigate the economy-wide impact of a policy removing the differential cost of capital, i.e., considering the repercussions on other sectors.

First, the simulations showed that the economy would gain from better access of SMEs to capital markets. However, this was at the cost of reducing the activity level of other sectors. Additionally, although the rate of unemployment was reduced, this result was not as significant as expected. Moreover, the economic gains were at the expense of the fiscal result because SMEs pay lower effective taxes than the other industries.

Second, if the elimination of the differential cost of capital paid by SMEs was conditional on formalization and tax compliance, then SMEs would have an incentive to self-exclude from that type of program to remain informal and excluded from capital markets. Additionally, our results showed that a reduction in the average effective taxes for the economy would not be enough to compensate SMEs.

Finally, when higher formalization and access to capital markets was complemented with an increase in the productivity of SMEs, the economy grew again, and SMEs reached the profit rates of the benchmark. However, the rate of unemployment was higher than at the benchmark because the productivity gain reduced the SMEs' required number of workers.

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