IDB WORKING PAPER SERIES No. IDB-WP-216

The effect of firm-size dependent policies on the economy: the case of the Repecos law in Mexico

Claudia Sánchez-Vela
Jorge N. Valero-Gil

February 2011

Inter-American Development Bank
Vice Presidency for Sectors and Knowledge

The effect of firm-size dependent policies on the economy: the case of the Repecos law in Mexico

Claudia Sánchez-Vela
Jorge N. Valero-Gil

Universidad Autónoma de Nuevo León

Inter-American Development Bank
2011

Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library

The effect of firm-size dependent policies on the economy: the case of the Repecos law in Mexico[1]

February 20, 2011

Claudia Sánchez-Vela*

Jorge N. Valero-Gil*

Universidad Autónoma de Nuevo León

[1] We are grateful to Santiago Levy for his comments on a previous version of this paper. Any remaining errors are our own responsibility. A previous version of this research was funded by the Inter-American Development Bank as part of its project on informality and productivity, reference RG-K1090.

Abstract

This paper analyzes the effects of a firm-size dependent law, on the Mexican economy which includes a small taxpayers' regime known in Mexico as the Repecos regime. It looks for effects on macroeconomic variables and on the industrial structure, on the proportion of small firms in the economy, which are originated in such regime. It uses a general equilibrium model calibrated on the U.S. economy and applies an environment of high taxes on labor and high tax evasion, characteristic of the Mexican economy, so that their effects can be distinguished from those of the Repecos regime.

JEL Classification: E26, H25, H26, L23, O54

Key words: Small taxpayers, size distortions, Establishment size, Legal effects

1. Introduction

In most developing countries, small firms are the predominant form of firms. Frequently, small firms are associated with informality, as shown in Amaral and Quintin (2006), Cunningham and Maloney (2001), Maloney (2004) and Perry et al. (2007). Governments try to address the problem of so many small firms and design different tax regimes for firms of different sizes. For example, González (2006) discusses the special tax regimes for small firms in 17 Latin American Countries.

Some of the questions that arise in development economics are why there are so many small firms and what the differences are between small and large firms. Some papers, such as Gollin (2008) and Taymaz (2009), consider that productivity is the cause of differences between small and large firms.

Other authors emphasize the importance of financial markets, such as Amaral and Quintin (2005), Gatti and Honorati (2008), Jeong and Townsend (2007) and Straub (2005). La Porta and Shleifer (2008) find that, as long as the firms are small, unregistered and registered firms have the same problems in the financial markets. Bergman (2006) find that small businesses in the US have the same kind of problem in the financial markets, as 77% of the businesses with employees begin with the money of the owner or of the owner's family. In

a similar way, Cunningham and Maloney (2001) find that, in the case of Mexico, the problem of informality is not due to a failure in financial markets.

We follow Levy (1978) and pursue the effects of legal institutions in the economy. This way has been suggested in the original work of Hart (1973) on Kenya when considering the desire of small firms to evade formal institutions. Besides, other research points in this direction. For example, Perry et al. (2007, Ch. 5) suggest that public policies may induce barriers to formalization, Maloney (2004) considers that current Mexican legislation could be an impediment for investment in physical and human capital, and Kehoe and Ruhl (2010) recommend studying the economic effects of the lack of the rule of law in Mexico.

Given the existence of informality and of a large number of formal small firms that evade taxes, the Mexican government has promoted laws that consider different tax regimes for different sizes of firms, possibly in order to incorporate informal firms into the formal system. The objective of this paper is to study the effects of the coexistence of these regimes. In 1998 the Income Tax Law (*Ley del Impuesto sobre la Renta*) created a special regime for small taxpayer firms that is called "Repecos" (from *Régimen de Pequeños Contribuyentes*, Small Taxpayers Regime). This special tax regime replaced other small firm tax regimes, as the Minor Taxpayers Regime. The law considers two kinds of firms, according to annual sales, and provides two tax regimes for them. In the tax regime for Ordinary Firms, there is a 38% (40% since 2010) tax on capital; in the Repecos regime for small firms with annual sales below 163,000 US dollars (2 million Mexican pesos), there is a 2% sales tax that replaces the capital tax of ordinary firms. Besides, the Repecos regime has lower transaction costs with the government.

We study the effects on macroeconomic variables and on the industrial structure (on the proportion of small firms in the economy) arising from the Repecos law. It seems that the Repecos law, rather than seeking to correct an irregular fiscal situation, is trying to legalize it, and in this paper we study the consequences of doing so. Accordingly, to address the effects of the Repecos regime, we should consider an environment of high taxes on labor and high tax evasion, characteristic of the Mexican economy, so that we can distinguish their effects from those of the Repecos law.

We formulate a general equilibrium model that includes characteristics relevant to the Mexican economy. Our starting points are the Lucas (1978) model, which allows an efficient economy with different firm sizes, and the Guner et al. (2008) model, which allows the study of different policies for different sizes of firms. We modify this model in order to include self-employment, tax evasion, transaction costs and the Mexican fiscal laws.

To measure the effects of the Repecos regime we should calculate the equilibrium of an economy without distortions, then impose the characteristics of the Mexican economy and finally remove the Repecos regime and compare the situations with and without it. In the first stage, the model is calibrated to the US economy, as in the models of Guner et al. (2008), Restuccia (2008) and Restuccia and Rogerson (2008); this is because it is considered that the US economy is the one with least distortions. In a second stage, the distortions of the Mexican economy are introduced. In the third stage we obtain the macroeconomic effects and changes in the industrial structure (in the proportion of small firms) and compare the obtained structure with the structure of the Mexican economy. The analysis of results is focused on the effects of the Repecos regime..

In the next section we discuss the Mexican data. We compare the industrial structures by size of firms of Mexico and the US; we discuss the taxes on Mexican firms highlighting the Repecos regime, and we estimate the average tax evasion by size of firm. In the third section we present the model, discuss the results in the fourth and present conclusions in the fifth.

2. Characteristics of the Mexican economy

In this section we discuss important characteristics of the Mexican economy for our study. First, we compare the industrial structure of the US and Mexican economies. Second, we discuss the Mexican tax regimes for ordinary and Repecos firms. Third, we discuss tax evasion in Mexico and how we measure it. Finally, we describe some of the transaction costs of firms with the government which the firm can elude by being an informal firm or by being a Repecos firm.

a. The industrial structure

This section describes the distribution of firms according to their size by number of employees in both Mexico and the US. Our study includes only non-agricultural private sector for-profit enterprises; the agricultural sector, government, private non-profit and domestic and abroad workers are excluded.

Our sources of information are the U.S. Census Bureau (2006, 2009) for the United States, and the Economic Census (INEGI, 2007) and the ENOE (INEGI, 2005) for Mexico. For Mexico we use both Economic Census and ENOE information, separately, as there are great differences between these sources. The informants of the Economic Census are the firms themselves, only established firms "with walls" (with a fixed address, which is not movable, on wheels for example); in this source many small firms are not detected. The ENOE is a sample raised at household level that obtains information about their members' jobs.

The information on self-employment for the United States is obtained from U.S. Census Bureau (2009), which reports 17.7 million self-employed; we only take the 43.9% who indicate that self-employment is their main source of income (U.S. Census Bureau, 2006). In the case of Mexico, Economic Census (INEGI, 2007) reported 2.1 million firms with two people or less and 3 million employees, therefore we estimate that 1.2 million are self-employed assuming that every firm has at less one worker. .

Table 1 presents percentages of employed population by size of firms. Note that of the Mexican sources, the Economic Census includes 16.2 million employees and the ENOE includes 25.7 million. The table shows that Mexico has a higher percentage of employment in small businesses that the U.S. For the U.S. approximately 20% of employment occurs in establishments with fewer than 10 people, while in Mexico this figure is nearly 40% using the Economic Census and over 60% according to ENOE. The Census accurately measures the population employed in large corporations, so the ENOE underestimates employment in these companies. Therefore, the ENOE must be overestimating employment in small businesses and the Census underestimating them[2]. We will use this Table to compare the results for Mexico after including Mexico's taxes and evasion in section 4.

Table 1 .

Employed population by size of firm (%)
U.S. Economic Census (2002), Mexico Economic Census (2003) and ENOE (2005-III).

Firm size by number of employed persons	U.S. Economic Census %	Mexico Economic Census. %	ENOE %
Self-employment	6.3	7.5	28.3
2–4	7.3	23.8	28.4
5–9	6.7	7.0	8.2
10–19	8.5	6.4	7.4
20–49	14.8	8.9	7.9
40–99	13.9	7.0	5.8
100 and more	42.4	39.4	14.0
Total	100%	100%	100%
Millions of people	120.2	16.2	25.7

Prepared with information from U.S. Census Bureau (2006 and 2009) and INEGI (2005 and 2007). Self-employment in Economic Censuses was estimated by the authors.

b. The Income Tax Law and the Repecos regime.

Ordinary firms are subject to the following taxes: capital tax of 38% (40% since 2010), 15% value added tax (16% since 2010), a business tax of 17.5%, similar to a value added tax (for firms with little profit or no profit), social security taxes of the Federal Labor Law (FLL) 33%, a payroll tax of 2% for Federal States, and transaction costs with the

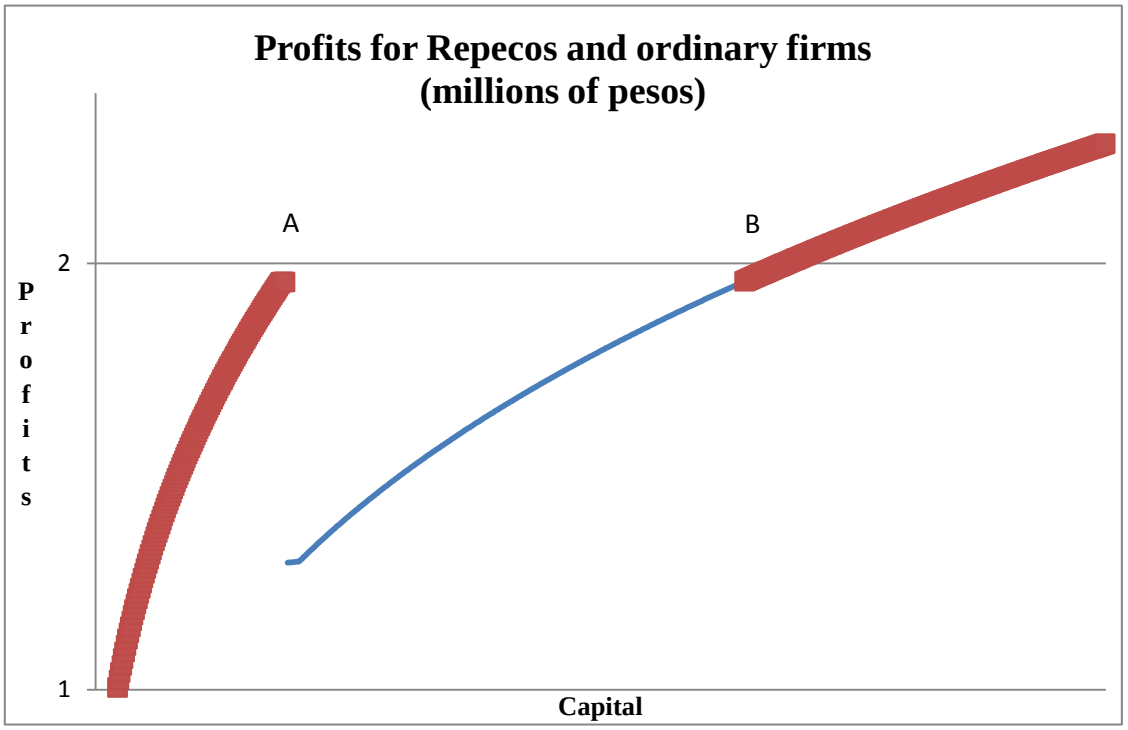
[2] We can calculate from the last row in Table 1 that the Economic Census underestimates employment in micro enterprises, 5.1 million employees in the Census compared with 14.6 million in the ENOE in firms of four or fewer employees, and we see that the ENOE underestimates employment in large firms, 6.4 million in the Census against 3.6 million in the ENOE for firms with 100 and more employees.

government. We estimate the sum of the labor taxes in 35%, following Heckman and Pagés (2003) and Levy (2008), and we consider it a tax on labor. The social security taxes apply only to employees, and they do not apply to self-employment nor to employers who are the owners of their firm. Firms also have to pay the Value Added Tax (VAT) and business taxes (*Impuesto Empresarial a Tasa Única* or Rate Business Tax), however their effects are not included in this study.

The Income Tax Law (ITL) burdens ordinary firms with a tax on capital of 38% (40% since 2010), 28% for the government and 10% as profit sharing with employees. As the 10% mentioned would be deductible the next year, the tax to pay in the state of balanced growth equilibrium would be of 35.2% and after 9% depreciation (according to data of Mexican Economic Census) it becomes 32.03%. But a small firm, about to be registered for the first time with the fiscal authorities, with annual sales of less than 2 million Mexican pesos (about 163,000 US dollars), could be registered as a Repeco firm and its tax burden would be 2% on sales instead of the tax on capital. Besides, it should pay 7.35% of the 2% as profit sharing to employees. The FLL does not indicate any exceptions regarding the Repecos, so they must be modeled to pay all taxes on labor.

For profit maximizing firms, the difference between the two tax regimes means that there could be production levels that are not going to be selected by any firm. This situation is shown in Figure 1, which represents profits for different levels of capital, assuming everything else is constant. The profits drop abruptly when production reaches a level of 2 million pesos and the firm must change from Repecos to ordinary firm. The thick line shows levels of capital and profits for Repecos (point A denotes a production level of 2 million pesos) and for ordinary firms (they start their production in point B). The firms that are between points A and B will prefer the profits (and levels of capital and output) of point A, generating a lack of firms of a certain size.

Figure 1



The most important ITL considerations of the Repecos regime are the following. (i) When a Repeco firm becomes an ordinary firm, it can never be admitted as Repeco again. (ii) Repecos firms cannot issue invoices or original receipts. Both rules tend to separate the two markets: one for ordinary firms and one for Repecos. (iii) The collection of Repecos taxes is delegated from the federal government to the Federal States. (iv) Federal States are allowed to charge fixed fees (weakening the 2% tax).

The VAT Law and the business tax also transfer the responsibility of the collection of such taxes from the federal government to the Federal States in the case of the Repecos. Repecos tax collection rests in the hands of the Federal States that handle tax rates arbitrarily. For example, Mexico's City Government (2009) charges for the three taxes (Income Tax, VAT and Business tax) 2% for yearly sales of 120,000 pesos and the fee increases up to 11.7% for sales of 1.8 million. The charges for the three taxes, in the case of the government of Tabasco (2009), range from 2% for annual sales of 60,000 pesos up to 4.8% for sales of 1.98 million pesos. The government of Baja California (2009) charges approximately 4.2%.

Table 2 contains information about Repecos revenues for each Federal State. The first column shows the Repecos tax revenues for 2008 in millions of pesos. In the second column we calculate what percentage of 2% of sales, required by law, is levied on total sales of a firm with five employees or less (recorded in the Economic Census 2003), and we see that it reaches an average coverage of 10.2%. The estimated percentage of coverage is overestimated here because, as we saw in footnote 2, the Economic Census underestimates the employees in micro-firms. We can see a great variation among the revenues of Federal States. The same variation is observed in the last two columns which reflect the importance of Repecos in the Federal States' own revenues and in their GDP. Since these percentages are relatively small, it is possible that states may find it relatively expensive to try to collect taxes from small firms, either in terms of administrative costs or political costs.

Table 2. Characteristics of Repecos tax revenues by Federal State

Federal State	Repecos tax revenues 2008 (million pesos)	% of revenue from Repecos regarding		
		2% of sales of micro-firms*	State's own revenue 2008	State GDP
Aguascalientes	22	8.9	2.8	0.019
Baja California	177	27.7	5.9	0.056
Baja California Sur	16	10.3	2.0	0.026
Campeche	17	13.5	1.4	0.003
Coahuila	42	8.4	2.1	0.012
Colima	41	30.9	10.2	0.072
Chiapas	54	13.8	1.8	0.029
Chihuahua	111	16.3	2.1	0.032
Distrito Federal	200	4.0	0.5	0.011
Durango	26	11.7	2.7	0.020
Guanajuato	41	4.3	1.3	0.010
Guerrero	36	5.3	3.0	0.022
Hidalgo	43	14.5	2.5	0.026
Jalisco	264	15.3	5.7	0.039
Estado de México	169	8.7	1.1	0.018
Michoacán	80	11.0	4.0	0.031
Morelos	14	4.8	1.5	0.012
Navarit	55	31.4	10.3	0.085
Nuevo León	59	4.6	0.7	0.007
Oaxaca	31	7.3	2.0	0.018
Puebla	88	12.0	4.1	0.024
Querétaro	43	13.6	1.9	0.022
Quintana Roo	54	18.2	2.7	0.034
San Luis Potosí	70	20.0	5.0	0.035
Sinaloa	65	12.9	2.8	0.030
Sonora	74	13.7	2.5	0.027
Tabasco	9	2.6	0.7	0.003
Tamaulipas	93	14.7	3.2	0.026
Tlaxcala	9	7.1	2.1	0.016
Veracruz	139	16.1	5.3	0.028
Yucatán	49	14.5	6.6	0.034
Zacatecas	47	22.6	3.6	0.060
Sum and average	2,238	10.2	1.9	0.021

Source: SHCP (2009), INEGI (2007, 2009a, 2009b) *2% of sales of micro-firms with 0 –5 employees in the Economic Census 2003.

c. Tax evasion

To approximate Mexican tax evasion by firms, we take ENOE data and see how many private sector workers are enrolled in the *Instituto Mexicano del Seguro Social* (IMSS) and how many are not. According to the FLL all private sector employees must be enrolled in the IMSS, with few exceptions. The results are presented in Table 3 and correspond to the private sector for-profit enterprises. As can be seen, the rate of evasion increases as enterprises become smaller, perhaps because it is more expensive for the tax authority to detect them. Of total non-farm private employees, evasion is 53%.

Table 3.
Private sector employees, registered and not registered in the IMSS.

	IMSS	No IMSS	Total	% with IMSS
2–5	749,068	6,544,392	7,293,460	10.3
6–10	808,477	1,309,574	2,118,051	38.2
11–15	500,695	422,056	922,751	54.3
16–20	629,575	343,384	972,959	64.7
21–30	603,495	277,631	881,126	68.5
31–50	876,506	274,863	1,151,369	76.1
51–100	1,226,735	262,746	1,489,481	82.4
101–250	1,118,761	180,165	1,298,926	86.1
251 and more	2,081,553	212,594	2,294,147	90.7
Do not know	259,536	173,675	433,211	59.9
Total	8,854,401	10,001,080	18,855,481	47.0

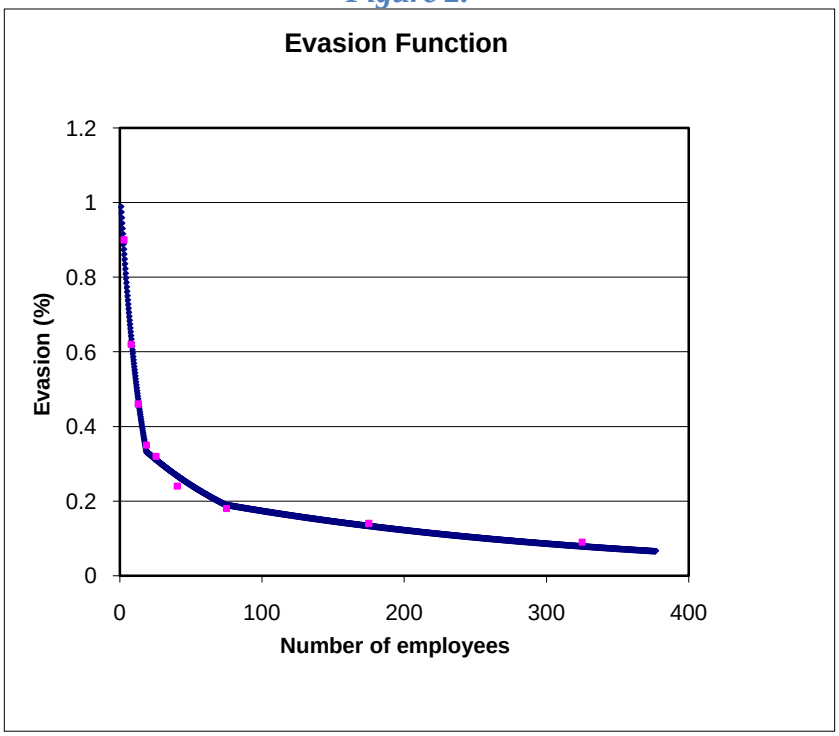
Source: Figures obtained by using information from ENOE (2005-III).

The function of tax evasion, which we estimate to be used in the model, is based in Table 3 and is presented in Figure 2. The number of employees is in the x-axis and the likelihood of tax evasion in the ordinate[3]. Note that – as shown in Table 3 – reducing the number of workers increases the likelihood of evasion. We will use this curve for both labor and capital tax evasion.

[3] If employment is ñ (including the manager), the equation of the graph is:

$$\rho(\tilde{n}) = 1 - \max\left\{K_1(.942)^{\tilde{n}},\ K_2(.9895)^{\tilde{n}},\ K_3(.99755)^{\tilde{n}}\right\};\quad K_1 = 1.04, K_2 = 0.4125, K_3 = 0.221$$

Figure 2.



d. Transaction costs with government

Transaction costs with the government are different for ordinary firms and for Repecos, as the authorities try to simplify their demands in the case of Repecos. An ordinary company entering the market in Mexico must register separately with the different offices of three governmental authorities; federal, state and municipal levels, from Foreign Affairs, environment offices, land use, tax payments, payments to IMSS etc. Table 1 in the Appendix presents some of the steps required to start a business in Mexico. Once you register a company, you have to continue making "statements" to the labor authorities, the Inland Revenue, the environment and other authorities, even if the firm is no longer productive. The process of closing an ordinary company is even more complicated than the registration, so that transaction costs for ordinary firms in present value terms could be high.

Although this also happens in other countries, as presented by De Soto (2002), PricewaterhouseCoopers and The World Bank (2008, Appendix 1.3) rank Mexico 162 among 181 countries in the time it takes for companies simply to pay taxes. These transaction costs will diminish the mass of entrants since it increases the reserve value of

firms (more benefits required before entering the market), as is discussed in Hopenhayn (1992).

In order to study the effects of the Repecos regime, in the next section we discuss a model that allows us to distinguish between the effects of taxes and tax evasion from the effects of the Repecos regime on the industrial structure by size of firm and on macroeconomic variables. The model assumes one job market and one wage. This assumption is based on studies such as those of Cunningham and Maloney (2001), Maloney (2004), Marcouiller et al. (1997), Chapa et al. (2007) and Levy (2008). Besides, the decisions to be an employer, and employee or a self-employee, and to be an ordinary or a Repecos firm, are endogenous.

3. Model and Calibration

This section contains three parts. First we discuss the antecedents of the model and the model itself without distortions. Second, we incorporate into the model the Mexican legislation and evasion by firm size. Third, we discuss the calibration of the parameters.

a. The Model without Distortions

The model follows the guidelines established by Guner et al. (2008), so here we summarize some relevant points and indicate the areas where we depart from them. In the original model there is a representative household that maximizes the utility function $U(C)$ over time with a discount factor β_t, subject to the budget constraint where income must equal consumption C_t and net accumulation of capital K_t. The household is composed by a continuum of agents which are endowed with one unit of labor and z units of managerial ability, as in the model of Lucas (1978). Assume that z follows a semi-logarithmic density function where $\ln(z) \sim N\left(\mu, \sigma^2\right)$. A threshold level is determined endogenously $\hat{z}$, such that an agent with ability $z < \hat{z}$, will be employed with a wage w, and an agent with ability $z \geq \hat{z}$ will be a manager with an income $W(z)$ greater than w. Each firm requires a manager with ability z, n employees and k units of capital. Each period, the decisions of the firm n, k, the input prices, w, R, as well as the threshold $\hat{z}$ are determined endogenously.

The Firms' production function is given by:

$$y_t\left(k_t, n_t, z\right) = A_t k_t^{\alpha_1} \tilde{n}_t^{\alpha_2} z^{\alpha_3} \;=\; A_t k_t^{\alpha_1} \left(n_t + 1\right)^{\alpha_2} z^{\alpha_3},\;\; \alpha_1 + \alpha_2 + \alpha_3 = 1, \qquad (1)$$

where $\tilde{n}$ is the number of people in the firm is ñ, composed of n employees and a manager, so $\tilde{n} = n + 1$. Production is possible with the sole participation of the manager, i.e., with n equal to zero; in these cases we call them self-employed managers. The production function is similar to that in Guner et al. (2008), but we modify it to allow self-employment, as the interest of this study focuses on small firms.

Given the production function and input prices (w, R), the managers maximize their income W each period:

$$W^*\left(z; w, R\right) = \max_{k, \tilde{n} \geq 1} \left\{ A k^{\alpha_1} \tilde{n}^{\alpha_2} z^{\alpha_3} - Rk - w(\tilde{n} - 1) \right\},$$

with the following possible solutions:

Interior solution $\tilde{n} > 1$. Employer manager with income W_e,

Corner solution $\tilde{n} = 1$. Self-employed manager with income W_s.

Therefore, each household member with managerial skill z decides between being employer, self-employed or employed maximizing her income:

$\max\left\{w, W_S^*\left(z; w, R\right),\; W_E^*\left(z; w, R\right)\right\}$. The minimum value of z, $\hat{z}$, to be a manager is given by the market wage w:

$$W_S^*\left(\hat{z}; w, R\right) = w,$$

and the minimum value for which the manager is an employer, $\tilde{z}$, for self-employment income is given by:

$$W_S^*\left(\tilde{z}; w, R\right) = W_E^*\left(\tilde{z}; w, R\right).$$

Maximization of (1) yields the first order conditions:

$\alpha_1 y^* = Rk^*$ for capital, and

$\alpha_2 y^* = w(n^* + 1)$ for labor.

From these equations we obtain the labor–capital ratio h and the manager's income:

$$h = \frac{k^*}{\left(n^* + 1\right)} = \frac{\alpha_1}{\alpha_2}\frac{w}{R},$$

$$\alpha_3 y^* = \Pi^* \ .$$

The solutions for the demand of labor and capital are given by:

$$n^* + 1 = \phi\, z$$

$$k^* = h\left(n^* + 1\right) = h\phi z$$

where:

$$\phi = \left(\frac{A\alpha_1}{R}\right)^{\frac{1}{\alpha_3}} \left(\frac{1}{h}\right)^{\frac{1-\alpha_1}{\alpha_3}} .$$

As in Guner et al. (2008), it is considered that given a sequence of prices, $\left\{w_t, R_t\right\}_{t=0}^{\infty}$, and an initial amount of capital, K_0, each period the representative household chooses the quantity of consumption and investment as well as who will be employer, who is self employed and who is employed. That is, the household chooses the sequences $\left\{C_t^*, K_{t+1}^*, \hat{z}_t^*, \tilde{z}_t^*\right\}_{t=0}^{+\infty}$. If K_0 is the initial endowment of capital, δ is the depreciation rate of capital and $F(\hat{z}_t) = \int_{-\infty}^{\hat{z}} f(z)\, dz$ is the mass of employees with skill z lower than $\hat{z}$, the household utility maximization problem is:

$$\underset{\{C_t, K_{t+1}, \hat{z}_t\}}{\text{Max}} \quad \sum_{t=0}^{\infty} \beta^t \log\left(C_t\right)$$

$$\text{subject to} \quad C_t + K_{t+1} - K_t\left(1-\delta\right) = \left[w_t\, \mathrm{F}\left(\hat{z}_t\right) + \int_{\hat{z}_t}^{\bar{z}_t} W_S\left(z; w_t, R_t\right) f\left(z\right) dz + \int_{\tilde{z}_t}^{\infty} W_E\left(z; w_t, R_t\right) f\left(z\right) dz \right] + R_t K_t, \ \forall t$$

$$K_0 \text{ given}$$

The right hand side of the budget constraint is the household income composed by the income from employees (1st term), self-employed managers (2nd term), employers (3rd term), and capital income (4th term).

The Equilibrium. The equilibrium consists of the sequences $\left\{w_t, R_t\right\}_{t=0}^{\infty}$, $\left\{C_t^*, K_{t+1}^*, \hat{z}_t^*\right\}_{t=0}^{+\infty}$ and $\left\{n_t^*(z), k_t^*(z)\right\}_{t=0}^{+\infty}$, for each z, such that, given $\left\{A_t\right\}_{t=0}^{\infty}$ and K_0, the following is satisfied:

(i) Given $\{w_t, R_t\}_{t=0}^{\infty}$ and K_0, $\{C_t^*, K_t^*, \hat{z}_t^*\}_{t=0}^{+\infty}$ solves the problem of the household. (ii) Each period, given (w_t, R_t) and A_t, $(n_t^*(z), k_t^*(z))$ solves the problem of the manager *z*. (iii) Each period (w_t, R_t) is such that labor, capital and goods markets, are in equilibrium. See Guner et al. (2008).

b. Legislation by firm size and evasion

We add to the model labor taxes, capital taxes, transaction costs (c_0) and transaction costs if there are employees (C_E). In addition, to consider the problems of evasion and informality of the Mexican economy, we define the following variables:

$\rho(\tilde{n})$ is the proportion of taxes paid by the firm.

$\bar{\rho}$ is the proportion of taxes paid by the manager's work.

$I(\cdot)$ is an indicator function such that $I_{true} = 1$ and $I_{false} = 0$.

A manager of an ordinary company would face the following problem:

$$W_O^*(z; w, R) = \max_{k,\tilde{n} \geq 1} \left\{ Ak^{\alpha_1} \tilde{n}^{\alpha_2} z^{\alpha_3} - R(1+\rho\tau_K)k - w(1+\rho\tau_L)(\tilde{n}-1) - c_O - I_{(\tilde{n}>1)} c_E \right\} \frac{1}{(1+\bar{\rho}\tau_L)}.$$

A Repecos firm is subject to the restriction $y < \bar{y}$, pays a sales tax, pay transaction costs $c_R < c_E$, pays no taxes on capital τ_K, and does not pay taxes on manager's work (as we assume the owner is the manager). This last difference means that we are taxing the rents in the case of ordinary firms and that we are not taxing them in the Repecos case. A Repecos manager can have any size of rents as long as he pays the sales tax.

For the decision on hiring labor or not, the manager of an ordinary company must compare net income with employees and without them. But for a Repecos firm, a special case arises when sales reach the limit of 2 million pesos (which is the legal restriction), where $y = \bar{y}$, and it decides to stay there. We call to these firms "Corner Repecos". Therefore, the possibilities for Repecos include:

$\tilde{n} = 1 \quad y \quad y < \bar{y}$ Repeco and self-employed

$\tilde{n} > 1 \quad y \quad y < \bar{y}$ Repeco and employer

$\tilde{n} > 1 \quad y \quad y = \overline{y}$ Corner Repeco and employer.

The analytical classification of firms is presented in Table 4. Table 5 presents the capital labor ratio by kind of firm[4]. In our results we assume that ρ´(ñ) is equal to zero and we estimate that the maximum error introduced in the first order condition for labor, due to this assumption, is around 3% and that this error is decreasing in ñ.

Table 4
Analytical classification of firms

	Characteristic	Employers (E)	Self-employee (S)
		n > 0	n = 0
Ordinary firms (E)	y > $\overline{y}$	EE	ES
Repecos (R)	y < $\overline{y}$	RE	RS
Repecos (corner solution cR)	y = $\overline{y}$	cRE	cRS

Table 5
Results for the capital labor ratio by kind of firm

No Taxes $\quad h = \dfrac{k^*}{(n^*+1)} = \dfrac{\alpha_1}{\alpha_2}\dfrac{w}{R}$

$$h_{EE} = \frac{k^*_{ee}}{\tilde{n}^*_{ee}} = \left(\frac{\alpha_1 w}{\alpha_2 R}\right)\frac{1}{(1+\rho_k\tau_k)}\left[(1+\rho_l\tau_l) + \frac{R\rho'\tau_k k}{w} + \rho'\tau_l n\right]$$

$$h_{RE} = \frac{k^*_{RE}}{\tilde{n}^*_{RE}} = \frac{\alpha_1 w}{\alpha_2 R}\left[(1+\rho\tau_L) + \frac{\rho'\tau_R y_{RE}}{w} + \rho'\tau_L n\right]$$

$$h_{cRE} = \frac{k^*_{cre}}{\tilde{n}^*_{cre}} = \frac{\alpha_1 w}{\alpha_2 R}\left[(1+\rho\tau_L) + \rho'\tau_R\overline{y} + \rho'\tau_L n\right]$$

$$h_{RS} = \frac{k^*_{rs}}{1} = \left(\frac{\alpha_1(1-\rho(1)\tau_r)A}{R}\right)^{\frac{1}{1-\alpha_1}} z^{\frac{\alpha_3}{1-\alpha_1}}$$

[4] We do not include the solutions for self-employee corner Repecos and self-employee ordinary firms in Table 5 because they are not selected by any agent.

c. Calibration of the US economy and parameters of Mexican economy distortions

In this section we discuss the parameters of the model, the calibration procedure and the taxes that we use in our model. We select the parameters to be used so that the results of the model without distortions reflect the distribution of U.S. firms, as do Guner et al. (2008). Therefore, we use some of the parameters they use: rate of productivity growth $g_A = 0.0255$, depreciation $\delta = 0.04$, discount factor $\beta = 0.9357$, and capital participation $\alpha_1 = 0.317$.

As discussed above, we assume that *z* follows a semi-logarithmic density function, where $\ln(z) \sim N\left(\mu, \sigma^2\right)$, but we follow Guner et al. (2008) in order to select a top managerial ability, and impose a truncated distribution; this distribution accounts for the vast majority of firms with a total mass of $1 - f_{max}$. The remainder of the distribution f_{max} is for the top managerial ability $z_{max} > z$, which is responsible for much of the demand of factors. For example, as it is shown in Table 10, firms with 100 employees or more are responsible for 42.4% of total employment.

Calibration procedure. The calibration procedure is as follows: (i) We propose values for the parameters α_3, μ and σ where μ, σ are the parameters of the log normal. (ii) we propose a wage *w* and *R* is determined in the model with a value of $R = ((1 + g)/\beta) - (1-\delta)$, as in Guner et al. (2008). (iii) For each *z* it is decided whether each person is an administrator or an employee. (iv) Each firm decides the quantities of *k* and *n* to hire. (v) If $N^s > N^d$, the amount of labor supply is greater than labor demand, the wage is adjusted downwards and the algorithm returns to step (iii). If $N^s < N^d$ wage is adjusted upwards and the algorithm returns to step (iii). If $N^s = N^d$ the algorithm continues. (vi) If the distribution of establishments is not in conformity with U.S. distribution, the proposed parameters are amended and the algorithm returns to the stage (i). If the distribution fits the distribution of U.S. establishments, calibration is completed. The calibration results are presented in Table 6.

Table 6
Adjusted parameter values

Parameter	Guner, Ventura and Xu	This model
Returns to scale ($\alpha_1 + \alpha_2$)	0.802	0.790
Average managerial ability of the population (μ)	-0.367	0.96
Dispersion of managerial ability (σ)	2.302	3.63
Higher managerial ability (z_{max})	3360	221597
Mass of population with the higher managerial ability (f_{max})	0.00144	0.00127

Table 7 shows data for the U.S. economy for the 2002 Economic Census, including a correction for self-employment. These data are the target for the calibration. The right column shows the results obtained by our model. The average number of workers in firms of 100 or more employees for the U.S. is approximately 309 employees, our model gives 332 employees.

Table 7
Statistics of objectives and results of the model

Statistical	Data	Model
Mean size	15.57	16.09
Mean size including managers	8.02	8.76
Share of capital	0.317	0.317
% of firms at		
Self-employees	51.9	51.7
2–4 employees	26.1	26.5
5–9 employees	9.25	8.97
10–19 employees	6.01	5.61
20–49 employees	4.17	4.28
50–99 employees	1.41	1.78
100+ employees	1.12	1.12
Share of employment at		
100+ employees	42.4	42.45

Taxes and other model parameters. We use a capital tax $\tau_k = 32.03\%$, labor taxes $\tau_L = 35\%$ and taxes on sales of Repecos $\tau_r = 2.14\%$. We consider that the parameters β, δ, g, α_1, α_2 and α_3 are similar for Mexico and the U.S. In the case of α_1, the capital share, using the Mexican Economic Census we estimate it at 33.6%, which is similar to 31.7% used by Guner et al. (2008).

4. Results

This section presents the results of the application to the U.S. economy of the Mexican taxes on labor and capital, transaction costs, tax evasion, the Federal Labor Law and the Repecos regime. We first discuss the behavior of the model, then we examine the predictions for the Repecos regime and last we examine whether the Repecos regime is still generating the predicted changes in the Mexican economy.

a. Model behavior

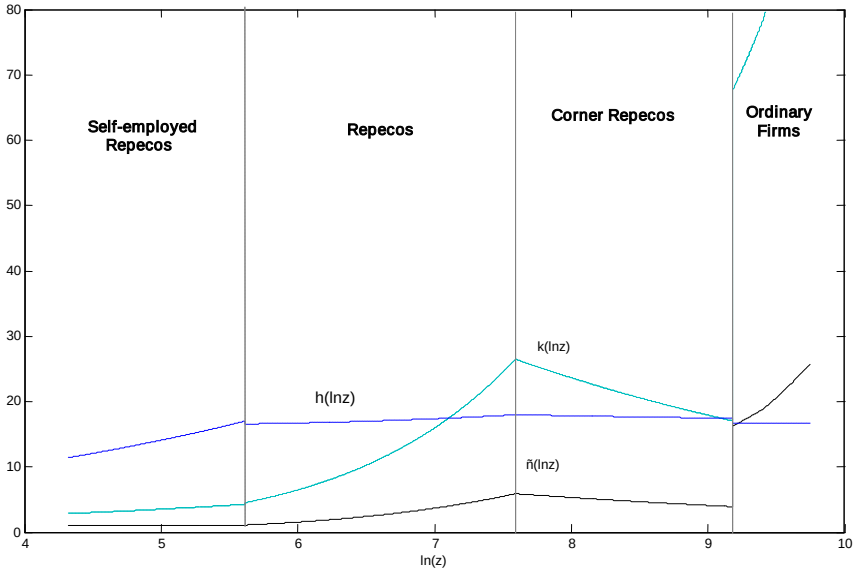
This section discusses the model behavior. First, we present the results for the demand for labor and capital and the capital labor ratio *h*, after including taxes on labor and capital, transaction costs, tax evasion and the Repecos regime. Second, we compare the structure of firms by size predicted by the model with the real Mexican structure of firms.

Labor, capital and capital labor ratio h. The effects on the demand for labor, capital and the capital-labor ratio are shown in Figure 3. A brief description of this Figure follows. In the case of self-employment, where labor is held in one unit, the demand for capital and *h* increases as *z* increases. After some point, the manager will hire labor and the demand for labor and capital will increase as *z* increases. Corner Repecos appear when y = $\overline{y}$, which is the point where production and sales are 2 million pesos. The demand for capital and labor at that level of production decreases with *z* because as *z* increases more skillful managers are able to produce $\overline{y}$ with fewer inputs. When firms cease to be Repecos and become ordinary firms, y > $\overline{y}$, there is a discontinuity in the demand for capital and labor. This discontinuity is due to the change of a 2% sales tax to a 32.03% tax on capital, as we already observed in Figure 2.

The capital labor ratio *h* is constant for firms with employees in the model without distortions. However, when we include the distortions, for Repecos with employees, the capital labor ratio is determined by $h_r = h(1 + \rho_l \tau_l)$ as shown in Table 5. As *z* increases, the

proportion of tax compliance ρ_l increases; this rise increases the price of labor, decreases the labor demand and increases h_r. In the step from Repeco to ordinary firm, h_e rises because ordinary firms pay capital taxes and thus capital becomes more expensive. For ordinary firms, h_e increases with z because ρ increases with z, $\tau_l > \tau_k$ and $\rho < 1$. Note that Figure 3 is cut around $\ln(z) = 10$, $\tilde{n} = 27$, to emphasize the changes that occur from self-employed Repecos, to Repecos employers and to ordinary firms: $\ln(z)$, k and $\tilde{n}$ take much greater values.

Figure 3.
Labor, capital and capital labor ratio in the model



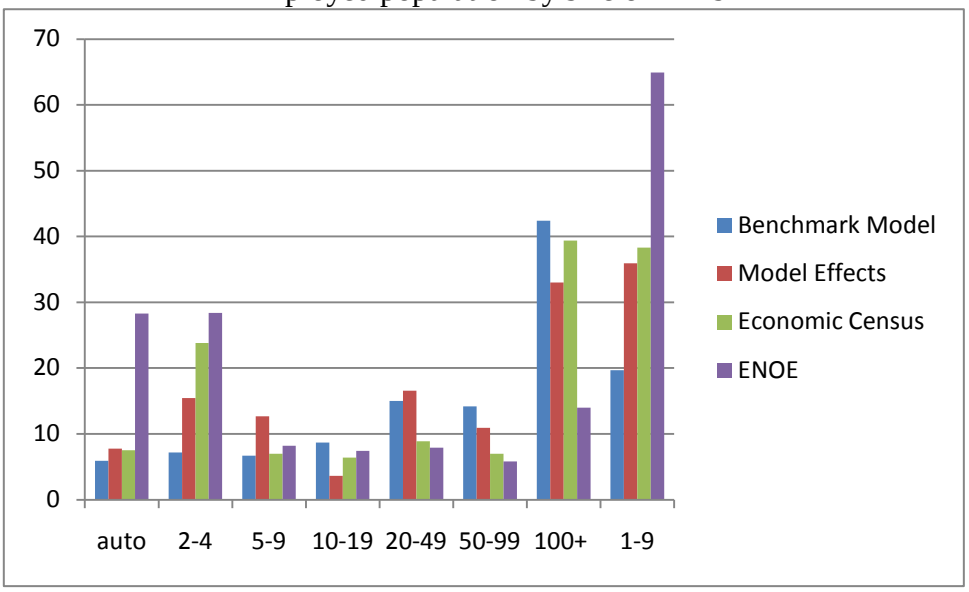
Comparison of the predictions of the model with the Mexican structure of firms by size. We calibrated the U.S. economy, we introduced the taxation and tax evasion characteristics of the Mexican economy and we built a model that allows us to make predictions about the structure of firms by size. We use the histograms by size of firm in Figure 4 to compare these predictions with the Mexican structure of firms by size.

In each histogram, the first bar represents the benchmark for the U.S. employed population. The second bar presents the predictions of the model when Mexican taxes and tax evasion are included. The information about the Mexican structure of firms is presented in the third

and fourth bar. The third bar contains firms' information of the Mexican Economic Census and the fourth bar contains household information of the ENOE.

The model, including Mexican legislation and tax evasion (second bar), seems to approximate reasonably well the Economic Census (third bar). However, the model does not fit properly the ENOE (fourth bar) data, in regard to the proportion of self-employment, nor in firms with two to four staff. Part of the underestimation of the population employed in small firms observed for the ENOE is that the ENOE overestimates self-employment and population in small firms as discussed in section 2. Another part of the underestimation of these proportions can be attributed to the formation of small family businesses that are partially exempt from the FLL and were not modeled in this work.

Figure 4.
Employed population by size of firms



We derive two main results from the histograms. (i) The model shows that legislation and tax evasion in Mexico generate a reallocation of resources from large to small firms: the model increases the population employed in firms with fewer than 10 persons from 19.7% to 35.9%. Since the ratio of capital to work k/n should be increased when changing from Repecos to ordinary firms (the capital is cheaper for Repecos because they do not pay taxes on capital) not only the labor migrates from more productive to less productive firms but also the capital. This goes against the growth process of a country, which is based on cost

reduction, as discussed in Harberger (1998), because low values of *z* require more resources to produce goods than high values of z[5]. (ii) The model shows that the proportion of employment decreases in firms with 5–9 and 10–19 employees. This is an effect of the Repecos regime, as shown in Figure 1.

b. Results for the Repecos regime

To analyze the effects of the Repecos regime, we consider what would happen if, after imposing on the U.S. economy the Mexican economic distortions (that include the Repecos regime), we drop the Repecos regime. Besides, we consider what would happen if we increase $\overline{y}$ and with it the Repecos regime. Table 8 shows the results in four columns: the first column refers to the benchmark of the US economy, the second column shows the results after imposing the Mexican economic distortions that include the effects of the law and the effects of the fiscal evasion, the third column shows the effects of removing the Repecos regime and the fourth shows the effects of increasing $\overline{y}$ to $2\overline{y}$. The table has three panels, panel A for the industrial structure, panel B for the structural change and panel C for macroeconomic variables.

Dropping the Repecos regime. In Panel A we can see that if we drop the Repecos regime the proportion of people in small firms, of 1–9 employees, would decrease and employers would change the average number of employees from 8.5 to 14.4. As Repecos firms should not produce above $\overline{y}$ (our approximation variable for the 2 million pesos per annum sales limit), we drop this restriction if we drop the Repecos regime, the proportion of firms with 10–19 employees increases (from 3.6% to 13.8%). This is a relevant change because it is related to the discontinuity in the use of factors of production, labor and capital, as shown in Figure 3, and which also appears in Figures 1 and 4.

The size of the discontinuity between ordinary firms and Repecos firms is shown in Panel B. The corner Repeco with the greater managerial ability and production equal to $\overline{y}$, will use 3.9 units of labor and 68.2 units of capital. This Repeco firm, in order to become an

[5] For example, Baily et al. (1992) found that nearly half of productivity growth in manufacturing in the U.S. in the eighties was due to the reallocation of resources from low productivity firms to high productivity firms.

ordinary firm, would require the hiring of 16.2 employees and 270.5 units of capital. This is a change[6] that could discourage the growth of Repecos firms into ordinary firms.

Table 8.
Results for Repecos

Employment share	Benchmark	With the Mexican Economy Distortions	Without Repecos Regime	Increasing the Repecos limit from $\overline{y}$ to 2 $\overline{y}$
Panel A: Industrial Structure				
Self-employment	5.9	7.7	11.1	7.7
2–4	7.2	15.5	7.3	13.1
5–9	6.7	12.7	12.0	17.9
10–19	8.7	3.6	13.8	9.4
20–49	15.0	16.6	15.8	8.8
50–99	14.2	10.9	9.1	10.5
100+	42.4	33.0	30.9	32.5
Sum	100.0	100.0	100.0	100.0
1–9	19.7	35.9	30.4	38.8
Employees (%)	88.6	82.4	83.0	82.5
Employeers (%)	5.5	9.9	5.9	9.8
$N^s/(N^e)$	16.5	8.5	14.4	8.5
Panel B: Structural Change				
n Repeco with highest *z*	0	3.9	0	7.5
n ordinary firm with lowest *z*	0	16.2	0	31.1
k Repeco with highest *z*	0	68.2	0	137.4
k ordinary firm with lowest *z*	0	270.5	0	521.2
Panel C: Macroeconomic Variables				
Production	10.4	9.3	9.4	9.4
Consumption	8.7	6.6	6.6	6.7
Investment	1.7	1.3	1.3	1.3
Government	0	1.4	1.5	1.3
Capital/Labor (K)	22.1	16.7	16.9	17.1
TFP Change	100.0	98.2	98.8	97.8

The predicted changes in some macroeconomic variables are shown in Panel C of Table 8. Note that these are small changes, because in our model all firms, Repecos and ordinary firms, are confronting the same prices and optimizing their output. The effect of dropping

[6] The precise size of all these changes varies with the value of $\overline{y}$ and with the assumptions of the model.

the Repecos regime would be to increase the relation of capital to labor, *h* (*K/L*, with *L* =1), increasing the total factor productivity (TFP) of the economy and increasing the government income.

Changing the Repecos regime. When the model drops the Repecos regime, it only leaves the regime for ordinary firms. his effect is particularly important in the case of self-employment because, as shown in the first order conditions in Table 5, h_{RS} does not depend on the labor tax τ_L. To isolate this effect, we change the Repecos limit $\overline{y}$ to $2\overline{y}$ in order to see the effects of the Repecos regime without changing the rule for self-employment labor taxes.

When we increase the Repecos limit from $\overline{y}$ to $2\overline{y}$, the saddle form that is shaped around the firms with 10–19 employees when using $\overline{y}$, a share of 3.6% of total employment, moves to the firms of 20–40, with a share of 8.8%, when $2\overline{y}$ is the restriction. As self-employment does not change, the effect on the structure of firms of the Repecos regime is the saddle form that was shaped around the 10-19 employees firms and is now shaped around the 20-49 employees firms. The government income decreases but consumption and total capital increases. The TFP decreases because there are more firms paying Repecos prices for capital. In panel B we see that the structural change occurs at levels with n = 7.5 and k = 137.4, showing that there are more Repecos firms in the economy.

c. Changes in the Mexican structure of firms and the Repecos regime

In this section we ask ourselves whether the Repecos regime is generating observable changes in the structure of the Mexican economy, even when (i) the restriction for Repecos sales $\overline{y}$ is arbitrary and it could change from industry to industry, (ii) the calibrated economy is that of the U.S. with Mexican taxes and (iii) the Repecos regime is substituted with other regimes for small firms. The results shown in Panels A and B of Table 8 and Figure 1 lead us to study specifically the group of firms with 10 to 19 employees. As the information of the National Employment Survey (ENE) only gives us information on the group of firms with 11 to 15 employees, we focus on that group.

To do this we take two industries; manufacturing and retail trade. We use retail trade because one of the objectives of the Repecos regime is to capture fiscal income from informal firms, and retail trade accounts for 32% of the informal sector in Mexico, as shown in Chapa et al. (2007). We will look for a time tendency that changes the share of employment in firms with 11 to 15 employees using regressions and we will observe the effects on fiscal evasion.

To look for changes in the industrial structure of the Mexican economy, we use information from the ENE and from the ENOE (National Occupation and Employment Survey), which are surveys taken at the household level. The ENE was taken in the second quarter of years 1995 to 2004 and the ENOE has been taken quarterly since 2005; so, we use the series of data of second quarters from years 1995 to 2010. The ENE and the ENOE have different definitions of establishment; the difference being that the ENOE breaks down large firms into establishments.

We use seemingly unrelated regressions because the dependent variables are the proportion of employment by size of firm and these proportions add to one. In order to capture the changes in the industrial structure through time we use the variable *year*. Besides, we use a dummy variable since 2005, *y2005*, to control for the survey change.

The results are presented in Table 9. For the manufacturing sector we find a statistical significant negative sign in firms with 10–15 employees. This result is consistent with the results of the model. For the retail trade we find a statistical significant negative sign in firms with 2–4 employees, and significant positive signs for firms with 16–50 and 100 and more employees. Then, we find the model predicted changes for the Repecos regime in the manufacturing sector but not in the retail trade.

Table 9.

Results for Manufacturing and Retail Trade.

	2-5	6-10	11-15	16-50	51-100	101 and more
			Manufacturing			
year	0.119	-0.016	-0.161**	-0.091	-0.132	0.287
	(0.117)	(0.024)	(0.037)	(0.063)	(0.045)	(0.195)
y2005	1.007	1.154**	1.381**	2.554**	2.955**	-9.589**
	(1.101)	(0.225)	(0.351)	(0.599)	(0.431)	(1.860)
constant	-219.9	38.4	324.4**	192.8	271.1*	-523.7
	(231.2)	(47.3)	(73.6)	(125.9)	(90.6)	(390.5)
"R^2"	0.43	0.82	0.55	0.68	0.83	0.77
			Retail Trade			
year	-0.914**	0.030	-0.035	0.183**	0.022	0.703**
	(0.174)	(0.042)	(0.030)	(0.046)	(0.028)	(0.143)
y2005	4.092*	2.218**	1.586**	3.650**	2.379**	-13.961**
	(1.677)	(0.406)	(0.291)	(0.443)	(0.268)	(1.377)
constant	1886.7**	-49.9	73.3	-358.3**	-42.1	-1387.6**
	(347.1)	(84.0)	(60.3)	(91.8)	(55.5)	(285.2)
"R^2"	0.73	0.89	0.82	0.97	0.95	0.90

Standard errors in parentheses. ** 1% significance; * 5% significance; n = 16.

In Table 10 we present the rates of fiscal evasion (measured as percentages of employed people without access to IMSS in private non-rural firms) for manufacturing and retail, for the years 1995, 2004 and 2010. In manufacturing, we see that the rate of evasion in firms with 10–15 employees increased from 46% to 59%. Not only did the share of firms of this size decrease in manufacturing, but the remaining firms increased their rate of evasion. We do not see a similar effect on retail trade.

Table 10.

Rates of evasion for Manufacturing and Retail Trade. 1995, 2004 and 2010.

Year	Rate of evasion for industry %		Rate of evasion for firms with 10–15 employees. %	
	Manufacturing	Retail	Manufacturing	Retail
1995	31	66	46	52*
2004	38	67	54	30
2010	38	61	59	30

* The rate of evasion for Retail Trade in 1996 was 35.2%. These rates of evasion are measured as percentages of population.

From both results, we conclude that the Repecos regime is affecting the structure of firms in the manufacturing sector; however, these changes are not found in the retail sector which

is the major source of informality. Apparently, the Repecos regime has very different effects than those desired by the lawmakers.

Conclusions

We use a general equilibrium model to address the Repecos regime effects on industrial structure by firm size and on macroeconomic variables. We calibrate the U.S. economy and impose on it certain characteristics of the Mexican economy in taxes, tax evasion and transaction costs. We consider two tax regimes; a sales tax of 2.14% for firms with annual sales of 2 million pesos or less, and a 32.03% tax on capital for firms with sales of more than 2 million pesos. We refer to the first type of firms as Repecos, and the Repecos regime, and the second type we call ordinary firms. In addition, we model lower transaction costs for Repecos than for ordinary firms. In the first regime the rents of the managers of the firms are not taxed meanwhile in the second regime they are taxed.

To incorporate information on tax evasion of firms in Mexico, we used data from the National Survey of Employment and Occupation (ENOE). This survey is taken at the household level and provides information on whether private sector employees either have right or not to use the services of the *Instituto Mexicano del Seguro Social* (IMSS), information we use to approximate firms' tax evasion.

The prediction of the model, in the context of the Mexican fiscal evasion, is that the Repecos regime will generate a predicament for small firms, with 5 to 20 employees, about being Repecos or being an ordinary firm, since there is a great difference in investment between the most skilled Repeco and the smallest ordinary firm. Firms that choose to be Repecos will become smaller with the consequence that a gap, in firm size, is formed between the two types of firms. The results of our model suggest that the laws for ordinary firms constitute a brake on growth of Repecos firms, because ordinary firms have higher taxes and higher transaction costs. In our economy the family' firms do not tend to disappear, as in the Lucas (1978) model.

To see if that kind of gap is still forming in the Mexican economy, we take ENOE information, divided by firm size, and generate a time series for the years 1995 to 2010, and we find that in manufacturing, the proportion of firms with 10 to 19 employees tends to decrease. We also review the case of tax evasion and find that in this group of companies, 10 to 19 employees, tax evasion tends to increase over time. These results are consistent with the predictions of our model. The Repecos regime creates incentives that not only affect the size of firms but apparently also their potential growth.

There are some advantages to dropping the Repecos regime. If we abandon it there will be more self-employment but also more employment in firms with 10–19 employees, the proportion of employment in firms with 10 or more employees will increase and the average number of employees per firm will increase

However, to make policy recommendations we have to consider that the Repecos regime exists because it is very difficult for a small firm to comply with all the legal requirements and taxes of ordinary firms. What is required is to design a tax regime where every firm, ranging from giant corporations to the self-employed, complies with the law. The taxes related to the Income Tax Law should be collected by the same authority and all firms should be allowed to deal with each other. Tax evasion should be punished even for small firms. These are basic objectives that are unattainable because of existing laws.

One of the limits of our study is that we do not randomize the evasion function and so the inputs prices that the firms are paying are predetermined. Hsieh and Klenow (2009) studying the cases of China and India, observe a great number of prices inside each industrial class and find large effects on the TFP. We do not incorporate in our model the fact that every Repecos firm is paying different taxes as they pay fixed fees that depend on each Federal State. Neither do we incorporate in the model the fact that the proportion of evasion for each firm size should be random; therefore we do not find large effects on the TFP.

References

Amaral, P. S., and Quintin, E. (2006). A Competitive Model of the Informal Sector. *Journal of Monetary Economics, 53*(7), 1541-1553.

Baily, M. N., Hulten, C., Campbell, D., Bresnahan, T., and Caves, R. E. (1992). Productivity Dynamics in Manufacturing Plants. *Brookings Papers on Economic Activity. Microeconomics, 1992*, 187-267.

Bergman, M. (2006). Half of U.S. Businesses Are Home-Based, Majority of Firms Self-Financed, Census Bureau Reports. *Newsroom* (CB06-148).

Cunningham, W. V., and Maloney, W. F. (2001). Heterogeneity among Mexico's Microenterprises: An Application of Factor and Cluster Analysis. *Economic Development and Cultural Change, 50*(1), 131-156.

Chapa Cantú, J. C., Flores Curiel, D., and Valero Gil, J. N. (2007). *La economía informal. Estimaciones, comportamiento y potencial recaudatorio (*The informal economy. Revenue estimates, behavior and potential tax collection) (1st edn). México, D.F.: Ed. Trillas.

Gatti, R., and M. Honorati (2008). Informality among Formal Firms: Firm-level, Cross-country Evidence on Tax Compliance and Access to Credit. *Policy Research Working Paper*. Washington, D.C., The World Bank: 37.

Gobierno del Distrito Federal. (2009). *Declaración para el pago en una sola cuota de los impuestos sobre la renta, al valor agregado y empresarial a tasa única al Distrito Federal en el Régimen de Pequeños Contribuyentes (*Statement for payment in one installment of income, value added and business taxes in Mexico City, for small taxpayers*)* Available from: http://www.finanzas.df.gob.mx/documentos/formatoPequenosContrib_ISR.pdf.

Gobierno del Estado de Baja California. (2009). *Pequeños Contribuyentes* (Small Taxpayers). Available from: http://www.bajacalifornia.gob.mx/bcfiscal/2008/talleres/repecos.pdf.

Gobierno del Estado de Tabasco. (2009b). *Tarifas de cuota bimestral integrada ISR IVA IETU Pequeños Contribuyentes Ejercicio 2009 (*Integrated monthly rental quotas for Income Tax, Value Added Tax and Business Tax, Small Taxpayers, 2009*)*. Available from: http://saf.tabasco.gob.mx/contribuyentes/archivos/tabla_2009.pdf.

Gollin, D. (2008). Nobody's Business but My Own: Self-employment and Small Enterprise in Economic Development. *Journal of Monetary Economics, 55*(2), 219-233.

González, D. (2006). *Regimenes Especiales de Tributaciòn para Pequeños Contribuyentes en América Latinak* (Special tax regimes for small taxpayers in Latin America.). Washington, D.C., Interamerican Development Bank.

Guner, N., Ventura, G., and Xu, Y. (2008). Macroeconomic Implications of Size-dependent Policies. *Review of Economic Dynamics, 11*(4), 721-744.

Harberger, A. C. (1998). A Vision of the Growth Process. *The American Economic Review, 88*(1), 1-32.

Hart, K. (1973). Informal Income Opportunities and Urban Employment in Ghana. *Journal of Modern African Studies 11*, 61-89.

Hopenhayn, H. A. (1992). Entry, Exit, and Firm Dynamics in Long Run Equilibrium. *Econometrica, 60*(5), 1127-1150.

Hsieh, C.-T., and Klenow, P. J. (2009). Misallocation and Manufacturing TFP in China and India. *Quarterly Journal of Economics, 124*(4), 1403-1448.

INEGI. (2005). Encuesta Nacional de Ocupación y Empleo (National Survey of Occupation and Employment). In INEGI (Ed.), *Indicadores estratégicos de ocupación y empleo* (Strategic indicators of occupation and employment) (2005-III). Aguascalientes: Instituto Nacional de Estadística Geografía e Informática (National Institute of Statistics, Geography and Informatics).

INEGI. (2007). *Censos Económicos 2004. Sistema Automatizado de Información Censal. SAIC 5.0*.(2004 Economic Census. Automated Information System Census. SAIC 5.0) Published by: Instituto Nacional de Estadística, Geografía e Informática (National Institute of Statistics, Geography and Informatics).

INEGI. (2009a). *Ingresos públicos estatales por entidad federativa* (State government revenue by federal state). Instituto Nacional de Geografía y Estadística (National Institute of Statistics, Geography and Informatics). Available from: http://inegi.org.mx/est/contenidos/espanol/rutinas/ept.asp?t=fipu10&s=est&c=5104.

INEGI. (2009b). *Producto Interno Bruto por entidad federativa* (Gross Domestic Product by State) Instituto Nacional de Geografía y Estadística (National Institute of Statistics, Geography and Informatics). http://dgcnesyp.inegi.org.mx/cgi-win/bdieintsi.exe/NIVM150022005000500070#ARBOL.

Jeong, H., and Townsend, R. M. (2007). Sources of TFP Growth: Occupational Choice and Financial Deepening. *Economic Theory, 32*(1), 179-221.

Kehoe, T. J., and Ruhl, K. J. (2010). Why Have Economic Reforms in Mexico Not Generated Growth. *Journal of Economic Literature 48*(4): 1005-1027.

La Porta, R., and Shleifer, A. (2008). *The Unofficial Economy and Economic Development*. Cambridge, Mass., National Bureau of Economic Research (pp. 275-352).

Levy, S. (2008). *Good Intentions, Bad Outcomes. Social Policy, Informality, and Economic Growth in Mexico* (1st edn). Washington, D.C., Brookings Institution Press.

Lucas, Robert E. (1978). On the Size Distribution of Business Firms. *The Bell Journal of Economics, 9*(2), 508-523.

Maloney, W. F. (2004). Informality Revisited. *World Development, 32*(7), 1159-1178.

Marcouiller, D., Ruiz de Castilla, V., and Woodruff, C. (1997). Formal Measures of the Informal-Sector Wage Gap in Mexico, El Salvador, and Peru. *Economic Development and Cultural Change, 45*(2), 367-392.

Perry, G. E., Maloney, W. F., Arias, O.S., Fajnzylber, P., Mason, A.D. and Saavedra-Chanduvi, J. et al. (2007). *Informality: Exit and Exclusion*, World Bank Latin American and Caribbean Studies. Washington, D.C., The World Bank.

Restuccia, D. (2008). *The Latin American Development Problem*. University of Toronto, Department of Economics.

Restuccia, D., and Rogerson, R. (2008). Policy Distortions and Aggregate Productivity with Heterogeneous Establishments. *Review of Economic Dynamics, 11*(4), 707-720.

SHCP. (2009). *Participaciones e incentivos económicos pagados de enero a diciembre de 2008* (Shares to the states and economic incentives paid from January to December 2008). Table 21. Secretaría de Hacienda y Crédito Público (Ministry of Finance and Public Credit). Obtained from: http://www.apartados.hacienda.gob.mx/ucef/participaciones/2008/diciembre/52_cuadro21.pdf.

Straub, S. (2005). Informal Sector: The Credit Market Channel. *Journal of Development Economics, 78*(2), 299-321.

Taymaz, E. (2009). Informality and Productivity. Productivity Differentials between Formal and Informal Firms in Turkey. *Country Economic Memorandum (CEM).* Department of Economics, Middle East Technical University, Ankara, 61.

U.S. Census Bureau (2006). *Characteristics of Business Owners*. *2002 Economic Census*. Available at: http://www.census.gov/prod/ec02/sb0200cscbo.pdf.

U.S. Census Bureau. (2009). *2002 Nonemployer Statistics*. Available at: http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=D&-ds_name=NS0200A1&-_lang=en.

Appendix Table 1
Procedures for initiation of businesses

Bureaucratic Permit	Authority
Incorporation of company with the inistry of Foreign Affairs (SRE)	Ministry of Foreign Affairs
Notice of use of Permits of Company Incorporation	Ministry of Foreign Affairs
Opening Statement	Ministry of Foreign Affairs
Register with the Federal Taxpayers Office	Ministry of Finance and Public Credit
Formation of the Joint Commission (firm and union) for Workers Training	Ministry of Labor and Workers Welfare
Health and Safety Commission in the workplace	Ministry of Labor and Workers Welfare
Approval of plans and training programs for workers	Ministry of Labor and Workers Welfare
Business registration with the IMSS, INFONAVIT and SAR	Federal (Social Security)
Notice of demonstration Statistics INEGI	Federal (Statistics)
Environmental impact authorization	Federal State
Register stationary water sources and wastewater discharge	Federal State
Contract for the supply of drinking water	Federal State
Registration for payroll tax	Federal State
Public registry of property and commerce	Federal State
License for use of municipal land.	Municipal government
Security clearance (Civil Protection)	Municipal government
Municipal Technical decision for the establishment, distribution or posting of advertisements	Municipal government
Street advertisement license	Municipal government
Endorsement of water	Municipal government
Law of industrial activity	Municipal government