Discussion of "Taxation and The Life Cycle of Firms"

by Andrés Erosa and Beatriz González

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Abstract

"Taxation and The Life Cycle of Firms" by Erosa and González provides a coherent framework to study the effects of different forms of taxing capital income on the life cycle of firms. In the quantitative part, the paper evaluates macroeconomic effects of eliminating the corporate income tax and replacing it with the uniform tax on all other forms of capital income. In this discussion I raise two issues. First, I point to the limitations of the modelling approach, which focuses only on entities subject to the corporate income tax. Second, I discuss recent evidence from firm-level data suggesting that privately-held firms and publicly-traded firms differ substantially, which is contrary to the implicit assumption made in the paper.

Keywords: Firm Dynamics, Taxation, Firm Heterogeneity, Pass-through Businesses

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1   Introduction

This paper by Andrés Erosa and Beatriz González studies how different forms of taxing capital income affect investment and financing decisions of firms over their life cycle, as well as the creation of new firms (firm entry), aggregate capital accumulation and aggregate output. Furthermore, the paper evaluates quantitatively the effects of a tax reform that eliminates the tax on corporate income and replaces the lost revenue with a common tax rate on all other form of capital income. The paper builds upon Hopenhayn and Rogerson (1993) framework and introduces four fiscal instruments: dividend income tax, interest income tax, corporate profit tax and capital gain tax.

Erosa and González start their analysis with a simple version of the economy with a deterministic fixed level of firm's productivity determined upon entry. In this simplified framework they provide a qualitative discussion of the effects of various taxes on the life cycle of a firm. These effects are presented compactly in Figure 1 of the paper and can be summarized as follows. The dividend income taxation does not distort investment and dividends paid by the mature firms, however it diminishes the optimal amount of initial equity issued by firms. As a result, the dividend income tax reduces the initial size of firms, increases the age at which firms reach maturity (optimal size) and diminishes entry. The taxation of the capital gains, on the one hand, encourages newly created firms to issue equity in order to reduce tax payments levied on accumulated internal funds over the life cycle. As a result time to reach maturity shortens. However, on the other hand, the optimal size is reduced since the taxation of capital gains increases the cost of equity financing. Reduction of the optimal size translates to the lower market value of mature and young firms, which diminishes the initial size of young firms. Thus, the effect on the size of entrants is ambiguous. Corporate income taxation reduces the optimal size and dividend payments of the mature firms, which stems from the fact that this instrument effectively distorts the capital accumulation. Lower dividend payments reduce the market value of the firm, hence the initial size is smaller. Lower market value impacts young and mature firms asymmetrically. The corporate income tax makes it harder for firms to accumulate retained earnings, which delays the age at which firm reaches the optimal size. As a result the market value of young firms is more negatively affected by the corporate income tax, relative to the value of already matured firms. This asymmetry lies at the heart of the quantitative results of the paper.

In the quantitative section of the paper Erosa and González consider the version of the model with stochastic firm productivity and adjustment costs in capital. They discipline the key model parameters by targeting the following statistics: average annual employment

growth, the volatility of investment rate, the autocorrelation of investment rates, the ratio of equity issuance by incumbent firms to investment and the size distribution of businesses. The size distribution is based on the Business Dynamics Statistics (BDS) data set and includes firms with more than 50 employees, whereas the other targets are based on the Compustat data. The main quantitative exercise in the paper is a tax reform that eliminates taxation of corporate income while keeping constant the tax revenue, which is achieved by finding the common tax rate on all other forms of capital income, i.e. dividends, interest income and capital gains. The key economic idea behind this reform follows directly from the logic presented in the simplified version of the model. Abolishing the corporate income tax shifts the tax burden from liquidity constrained firms (on average young ones) towards firms which already achieved their optimal size and which are distributing dividends. Such reform benefits disproportionately young firms and increases the value of entry more than the value of incumbent businesses. The aggregate output increases by 12.2 percent and aggregate TFP rises by 4.6 percent following the reform. These numbers are largely driven by the entry margin since the mass of entrants rises by 34.5 percent. The paper conducts sensitivity analysis with regards to the elasticity of entry and finds that the smaller it is the smaller are the quantitative effects of the reform.

My discussion will focus on two issues. First, I will inspect more closely how large is the set of firms that the theory presented in the paper applies to. I will shed light on how well does it describe the life cycle of an average U.S. firm. Second, I will critically examine some modelling choices in the paper and the calibration strategy that the authors follow. In particular I will comment on the crucial implicit assumption that authors make i.e. that characteristics of privately- held businesses are very similar to the ones of the public companies.

2   Not all U.S. businesses are taxed the same way

How well does the theory presented in the paper describe the life cycle of an average firm in the US? I will argue that most of the U.S. businesses are unlike the firms in this model. They and their shareholders do not pay dividend income and corporate income taxes. More importantly, from the standpoint of the economic mechanism operating in the model, most entrants in the U.S. are not subject to theses two taxes. Finally, I will show that tax reforms induce changes in the legal forms of business organization, which affects the way firms are taxed and hence changes the tax base via extensive margin. My conclusion from this part of discussion is that qualitative findings from Erosa and González analysis should be taken with

a grain of salt, since they apply to a relatively narrow set of firms and the analysis misses an important channel of switching between legal forms of business organization.

Business owner in the United States may organize her entity in one of the six main forms: (1) Sole proprietorship (2) Partnership (3) Limited Partnership (4) Limited Liability Company (LLC) (5) S corporation (6) C corporation. Legal forms of business organization differ across each other mostly in terms of liability protection, restrictions on the number and type of owners, transferability of interest and most importantly in terms of taxation of profits. C corporations pay corporate income tax on their profits at the entity level. Then, whenever the after-tax profits are distributed to the shareholders in forms of the dividends the shareholders pay dividend income tax. If business is unincorporated (forms (1) to (4)) or organized as S corporation then the firm does not pay the corporate income tax on it's profits. Instead, they are passed through to the owners, who pay individual income tax on them. The profits are taxed independently on whether they were actually distributed or not. Businesses that pass their income to the owners and that are not subject to the corporate and dividend income taxation are commonly called pass-throughs or pass-through businesses.

Table 1 presents the distribution of number of firms and employment across size bins and legal forms of business organization in the United States in 2015. The data comes from the Statistics of the U.S. Businesses (SUSB). A couple of observations emerge from Table 1. First, most of the U.S. businesses are actually small; 89.3 percent of firms employ less than 20 employees. At the same time, the size distribution of firms is heavily right-skewed; the largest 0.5 percent of firms accounts for 52.5 percent of employment. Second, 76 percent of the businesses, which accounts for 41.6 percent of employment is organized as pass-through entity, and hence is not subject to the corporate income tax and the owners of these businesses do not pay dividend income taxes. C corporations account only for 16.9 percent of firms in the United States, but their employment share is 44.2 percent. The average C corporation in U.S. is 4.8 times larger than the average pass-through entity. This discrepancy is driven mainly by the very large C corporations, which becomes clear by comparing the average size of the C corporation in the 500+ employees bin (4143.1 employees) with the average size of the pass-through business in this bin (1141.3 employees). As I will argue in the next section, this difference among legal forms in the largest size bin is mostly due to the difference between privately-held and publicly-traded companies.

The observations from Table 1 are informative about the set of firms to which the theory proposed by Erosa and Gonázlez applies to. The corporate income tax and dividend income tax is paid by at 16.9 percent of firms, which accounts for 44.2 percent of employment. Hence,

Table 1: Distribution of firms and employment by size and legal form of organization

	Employment Bins				Total
	< 20	$20 - 99$	$100 - 499$	$500+$	
C corporations					
Number of firms (%)	14.3	1.9	0.4	0.2	16.9
Employment (%)	3.0	3.6	3.8	33.8	44.2
Average Emp (employees)	4.5	39.2	184.8	4143.1	55.1
Pass-throughs					
Number of firms (%)	68.8	6.1	0.9	0.2	76.0
Employment (%)	12.4	11.1	7.6	10.5	41.6
Average Emp (employees)	3.8	38.3	174.9	1141.3	11.5
Government and Other					
Number of firms (%)	6.2	1.0	0.3	0.1	7.5
Employment (%)	1.4	1.9	2.7	8.2	14.2
Average Emp (employees)	4.7	42.0	201.0	2025.1	39.9
All Firms					
Number of firms	89.3	9.0	1.6	0.5	100
Employment	16.8	16.6	14.1	52.5	100
Average Emp	3.9	39.2	195.6	3347.1	21.0

Source: Own calculations from Statistics of U.S. Businesses (SUSB) for 2015

the theory applies to a relatively small set of large businesses. The paper leaves aside the impact of different types of taxes on the life cycle of pass-through businesses, which constitute majority of firms in the U.S. This concern is even more serious once one take into account the distribution of legal forms of organization by age, since the key mechanism of the paper hinges on reallocation of resources from mature, unconstrained firms towards the young, liquidity constrained firms. While, the SUSB does not provide the data on distribution of legal forms of organization by age, Dyrda and Pugsley (2018) document using the Longitudinal Business Dynamics (LBD) data set that 83 percent of entrants in 2011 were organized as pass-through businesses. Thus pass-throughs are even more dominant among entrants relative to the whole population of firms, which further questions the applicability of the theory presented in the paper. Finally, Erosa and González abstract from the choice of the legal form organization both at the entry level and for the incumbent firms. Again, firm-level evidence from the

LBD data presented in Dyrda and Pugsley (2018) indicate that flows between legal forms of business organization, especially following the tax reforms episodes, are substantial and have implications for employment dynamics at the firm level. For example following the Tax Act Reform of 1986, which reduced mostly top income rates for individual income, 6.1 percent of all existing C corporations (13.6 percent once weighted with payroll) switched their legal form of organization to pass-through in 1986. Similar flows are documented for the Economic Growth and Tax Relief Reconciliation Act of 2001 reform and some anecdotal evidence about the flows into the opposite direction (from pass-through to C corporation) is available for the Tax Cuts and Jobs Act in 2017[1].

3   Public companies vs. privately-held firms

In the quantitative part of the paper Erosa and Gonazlez calibrate the model to match the size distribution of firms in the BDS data and at the same time to match employment growth, volatility and autocorrelation of investment rates and ratio of equity issuance by incumbent firms computed from the Compustat data. This is somehow inconsistent, since the samples of firms and their characteristics in the BDS and Compustat are very different. Compustat includes only publicly-traded companies, while the BDS includes almost all businesses in the US. Thus, the paper implicitly assumes that with regards to employment growth, investment rates and equity issuance privately-held businesses and publicly-traded companies are alike. In the light of the recent evidence provided by Dinlersoz, Kalemli-Ozcan, Hyatt, and Penci-akova (2018) this assumption is dubious. Dinlersoz et al. (2018) construct a new, unique data set for the U.S. matching the LBD data to Orbis and Compustat data sets. Hence, they are able to analyze the panel data covering large sample of privately-held and all publicly-traded companies, which include financial variables as well as employment.

The main conclusion from the analysis in Dinlersoz et al. (2018) is that listed firms are substantially different from the private ones, which is summarized in Table 3 of their paper. According to their findings listed firms are 62 times larger than the private ones and twice as old. They are more profitable, and have higher collateral and financial leverage. Private firms also have higher equity over total assets, which could reflect their higher reliance on internal equity relative to listed firms. Dinlersoz et al. (2018) apply the standard empirical methodology to study the dependence of leverage and firm growth. They show that leverage and firm growth are strongly positively correlated for private firms in the cross section both

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[1]For example private equity firm KKR & Co announced in March 2018 that it would convert from a partnership to a C corporation after U.S. tax reform made the tax code more favorable for C corporations.

during normal times and during the crisis. By contrast, public firms' growth is negatively related to their short-term leverage in normal times and this relation is not affected by the economic crisis. This result is consistent with public firms not being financially constrained, but rather slow-growing large public firms being leveraged.

The set of evidence on differences between private firms and listed firms in terms of the levels as well as growth rates of economic variables poses a challenge for the modelling choices and the calibration strategy pursued by Erosa and González. In the proposed environment firms do not have access to debt instrument, hence the notion of leverage is undefined in the model. It turns out though that in the data differences in leverage are crucial to account for disparity between privately-held firms and listed companies. The lack of debt market seems to be an important shortcoming of the modelling approach, restricting the relevance of the proposed theory. Moreover, in the light of presented evidence the implicit assumption about similar behavior of listed and private firms is likely to be false. Thus, my interpretation of the quantitative part of the paper is that it provides, leaving the lack of debt market aside, a theory of the publicly-traded C corporations, which form only the subset of all C corporations in the economy. While publicly-traded firms account for an important share of the U.S. economy, privately-held firms account for the majority of employment (74%) and gross output (56%)[2] and the paper in my opinion is not informative about the effects of tax reform on their behavior and hence on the aggregate macroeconomic outcomes.

4   Conclusions

Putting the two sets of comments together, I conclude that Erosa and González provide a coherent and new framework to study the effects of corporate income taxes, dividend income taxes and capital gains taxes for the life cycle of a relatively narrow set of firms in the U.S.: publicly-traded companies. Though, the theory proposed in the paper has limitations even with regards to this group of firms. A comprehensive study of the impact of various taxes on the life cycle of the universe of firms and hence on the aggregate economic outcomes would require taking seriously into account the choice of the legal form of organization both upon entrance and further over the life cycle as well as modelling the differences in taxation between C corporation and pass-through businesses. Moreover, any sound quantitative theory should in my opinion be consistent with the differences between privately-held and public companies, which arise from the recent analysis of the firm-level data.

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[2]Data on employment share and output share are from Dinlersoz et al. (2018).

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