Universität St.Gallen

A Theory of Taxation and Incorporation

Peter Egger, Christian Keuschnigg, and Hannes Winner

August 2010 Discussion Paper no. 2010-25

Department of Economics University of St. Gallen

Editor: Martina Flockerzi
University of St. Gallen
Department of Economics
Varnbüelstrasse 19
CH-9000 St. Gallen
Phone +41 71 224 23 25
Fax +41 71 224 31 35
Email vwaabtass@unisg.ch

Publisher: Department of Economics
University of St. Gallen
Varnbüelstrasse 19
CH-9000 St. Gallen
Phone +41 71 224 23 25
Fax +41 71 224 31 35

Electronic Publication: http://www.vwa.unisg.ch

A Theory of Taxation and Incorporation

Peter Egger, Christian Keuschnigg, and Hannes Winner

Author's address:

Prof. Christian Keuschnigg
IFF-HSG, Varnbüelstrasse 19
9000 St. Gallen
Tel. +41 71 224 25 20
Fax +41 71 224 26 70
Email christian.keuschnigg@unisg.ch
Website www.iff.unisg.ch

Prof. Peter Egger
ETH Zürich

Prof. Hannes Winner
University of Salzburg

Abstract

This paper provides a theory of incorporation and taxation that emphasizes the role of the corporate legal form in facilitating access to external capital and the potential advantages of limited liability. Incorporation relaxes financing constraints and makes corporations larger than comparable non-corporate firms. For the same reason, a tax on corporations imposes a smaller first order welfare loss than a tax on non-corporate firms. Shifting the tax burden from non-corporate to corporate firms raises welfare, justifying some double taxation of corporate profits under a classical system. We compare the role of taxes with other institutional reforms and discuss how the theoretical results of the paper can be tested empirically.

Keywords

Incorporation, corporate tax, external capital, limited liability.

JEL Classification

H25, H73, F23, C21.

1 Introduction

A substantial number of firms are run as a sole proprietorship or non-corporate firm. They tend to be small and are typically characterized by concentrated ownership. A single entrepreneur or only a few partners make the key decisions. Larger firms, in contrast, are mainly organized as corporations and are subject to much tighter company laws, accounting standards and book keeping regulations. For these reasons, corporate firms tend to be more transparent and are more easily evaluated by external investors and other stakeholders. Obviously, the tighter reporting requirements impose extra overhead costs and make this legal form more expensive. The larger administrative costs should be justified by economic benefits of incorporation. Yet, little is known about the precise nature of the latter. Economists mention limited liability and improved access to the capital market as main advantages of incorporation. It is rather unclear, however, how exactly the corporate form facilitates access to external financing and how, if at all, limited liability of the owners could promote the expansion of the firm. Our paper provides a microfoundation of the decision to incorporate and analyzes the welfare consequences of differential taxation of corporate and non-corporate firms.

The public economics literature has empirically analyzed the impact of taxes on the choice of organizational form (e.g. Gentry, 1994, Goolsbee, 2004, 1998, Gordon, 1998, Gordon and MacKee-Mason, 1994, 1990, MacKee-Mason and Gordon, 1997, de Mooij and Nicodème, 2008). However, this literature typically assumes an exogenous distribution across firms of the net benefits or losses from incorporation in reduced form. The focus is typically on the use of the corporate form as a means to save taxes which leads to a larger rate of incorporation. By incorporating, entrepreneurs might be able to avoid higher personal income taxes under the sole proprietorship and instead become liable to lower corporate taxation including dividend and capital gains taxes (the importance of income shifting is emphasized, for example, in Gordon and Slemrod, 2000, and Sividasan and Slemrod, 2008). This literature on the 'old view' on incorporation does not provide a deeper structural explanation of the economic determinants of the incorporation choice.

The law and economics literature has recently emphasized the importance of legal rules such as degrees of investor protection, reporting requirements, bankruptcy rules, etc., on economic performance.[1] This literature is mainly empirical and, and with the exception of Demirgüç-Kunt, Love and Maksimovic (2006), has not focussed on the choice of organizational form. We are not aware of any microfounded structural model of incorporation choice.

This paper develops a microfoundation of the decision to incorporate based on recent corporate finance theory along the lines of Holmstrom and Tirole (1997) and Tirole (2006), providing a 'new view' on the decision to incorporate at the interface of public finance and corporate finance.[2] The paper sets out to develop a theoretical framework of the main advantages and disadvantages of incorporation. We also explain how firms self-select into organizational forms. The analysis determines the decomposition of the business sector into corporate and non-corporate form, and the relative size and other characteristics of these two firm types.

Our theory formalizes two often cited advantages of incorporation: limited liability and access to external capital. Adopting the corporate form requires to implement tighter book keeping, accounting and reporting standards which imposes an overhead cost that is absent with a sole proprietorship or partnership. The advantage of these standards is increased transparency to external investors and other stakeholders. Therefore, the managerial discretion and autonomy of the entrepreneur is lower, the more transparent and tighter the reporting requirements are. Then, it becomes cheaper to incentivize

[1] See Armour and Cumming (2008), Berkowitz and White (2004), Crawford and Freedman (2007), Djankow et al. (2002), Fan and White (2004), and La Porta et al. (1997, 1998, 2000). Spamann (2010) and Martynova and Renneboog (2009) investigate the sensitivity of results in empirical law and finance research. Bushman et al. (2004) provide an accounting perspective on corporate transparency.

[2] The literature on corporate finance explains how the conflict of interest between entrepreneurs and outside investors bears on a firm's ability to raise external financing. Part of the literature explicitly addresses the role of transparency for corporate governance (see Hermalin and Weisbach, 2007, and Almazan, Suarez and Titman, 2009 for two very recent contributions). However, the choice of organizational form and its economic determinants and consequences have not been analyzed before in such a setting.

the entrepreneur. The firm's pledgeable income that may credibly be promised as a repayment to external investors increases. The entrepreneur is thus able to raise more external capital for any given amount of own equity. This formalizes the 'access to capital market' argument.

The other commonly stated advantage is limited liability. Typically, entrepreneurs not only dispose of financial assets that they inject as own equity in the firm, but are also endowed with 'private' assets such as one's own family house. Probably, the value of private assets is higher for the entrepreneur than for the bank because they provide an extra 'consumer surplus' (e.g., living in one's own house). We argue that banks can seize all assets of sole proprietors including private assets. In contrast, depending on bankruptcy rules, the corporate form protects a larger part of private assets on account of limited liability. We emphasize two opposing consequences of limited liability. The need to pledge all private assets sharpens incentives of sole proprietors and allows them to raise more external financing. However, entrepreneurs attach a higher value to their private assets than banks or the market do. They might thus be very unwilling to pledge the asset and to loose it in case of bankruptcy. The need to pledge private assets emphasizes the downside risk of sole proprietorships. If entrepreneurs have a sufficiently high valuation of the private assets and are thus highly risk-averse, they might want to protect it against the downside risk even if the asset could serve as collateral and raise borrowing capacity. Hence, sufficiently 'risk-averse' entrepreneurs with a high personal valuation of private assets prefer to protect them and may decide to incorporate to benefit from limited liability. However, it might also be the case that incorporated entrepreneurs voluntarily offer their private assets as collateral to facilitate external financing if they are not very averse to the downside risk. Hence, the value of limited liability is ambiguous.

The incorporation choice is most relevant for smaller firms. These are the most likely to be finance constrained.[3] When investment is constrained, firms earn a return in excess

[3]Beck, Demirgüç-Kunt and Maksimovic (2005, 2008) show that small firms, especially in poor institutional environments, are able to raise less external capital. As financial and institutional characteristics improve, the constraints become less tight. Small firms catch up and benefit the most.

of the user cost of capital, indicating unexploited investment opportunities.[4] Investment becomes sensitive to cash-flow and no longer depends on user cost. Our analysis reveals that a differential corporate tax, by eroding cash-flow, reduces investment and profits of corporate firms and, thereby, discourages incorporation. In contrast to traditional theory ('old view') on the incorporation choice, the tax imposes a first order welfare loss since it further reduces investment which is already financially constrained to a level smaller than the first best. The most novel result of our 'new view' on the incorporation decision relates to the optimality of differential corporate taxation. Note first that the corporate legal form is an institution that facilitates access to external capital. As a result, corporate firms are larger and financially less constrained compared to non-corporate firms that are identical in all characteristics other than the legal form. As a consequence, profit taxes are relatively less damaging to corporate firms. We find that welfare is increased when the tax burden is shifted from non-corporate to corporate firms. It is therefore not optimal to employ full tax neutrality towards organizational form, implying equal proportional taxation between both firm types. This result indicates that some double taxation, as under a classical system of corporate taxation, would be optimal, which, in turn, formalizes an old argument that a differential corporate tax could be justified in exchange for the economic advantages of the corporate legal form.[5]

Apart from taxes, we discuss how institutional reforms and other economic shocks affect incorporation and welfare. Specifically, we interpret an improvement of a country's accounting and reporting standards as policy devices that facilitate access to external finance and raise the benefits of incorporation. We find that better accounting standards raise the incorporation rate, make corporate firms larger and more profitable, and boost welfare. This result is consistent with the fact that accounting standards tend to

[4] Our theory is complementary to Chetty and Saez (2009) who emphasize agency problems in large firms to explain dividend behavior. In their model, non-dividend paying firms are constrained and also earn an excess return. Their focus is, however, on large dividend paying firms where managers might divert free cash-flow to finance less productive 'pet projects', instead of paying out dividends.

[5] See, for example, Musgrave (1959) and Atkinson and Stiglitz (1980: 131-2) for early contributions on this issue. See Kaplow (2008: 236-8) for a recent discussion.

be highly significant in cross-country growth regressions and that better standards favor the expansion of financially dependent industries (Rajan and Zingales, 1998). Demirgüç-Kunt, Love and Maksimovic (2006) find that incorporated businesses grow larger than unincorporated firms in countries with high quality legal systems and better financial institutions. Finally, relating to limited liability, we show that a higher value of private assets such as housing equity increases investment and profits. Even if corporate entrepreneurs pledge their private wealth as well, the higher collateral value tends to benefit non-corporate firms relatively more since they are more constrained, leading to a declining incorporation rate.[6]

The remainder of the paper is organized as follows. The subsequent section presents a stylized theoretical model of the decision to incorporate in the presence of taxes. Section 3 presents the key results by deriving the comparative statics and welfare effects of tax and institutional reforms. Section 4 discusses some ways to test the theoretical predictions of our model empirically. The last section concludes.

2 A Model of Incorporation

2.1 Overview of Model

There is a mass one of risk-neutral entrepreneurs. We abstract from entry and assume that all entrepreneurs start a firm endowed with a single risky project which is developed in two stages. The life-cycle of a firm consists of a start-up and an expansion stage. Early stage investment k is fixed and self-financed out of own assets A. Expansion investment I is variable and leveraged with external funds. The project may fail in each stage. Firms are assumed heterogeneous in their success probability of early stage investment and move with a firm specific probability $q' \in [0,1]$ from start-up to expansion stage.

[6]For instance, Chaney, Sraer and Thesmar (2010) found the investment enhancing role of collateral value to be important. According to their estimates, the sensitivity of investment to collateral value is stronger the more likely a firm is credit constrained.

This success probability is known to firms at the beginning of period, and characterizes a firm's type. The success probability of expansion stage investment is either high or low, $p > p_L$, depending on managerial effort, but is otherwise symmetric across firms. A firm of type q' fails and closes down at the early stage with probability $1 - q'$. Conditional on survival, it may fail with probability $1 - p$ (or $1 - p_L$) in the expansion stage. Output is produced only if both stages are successfully completed.

Let us use index n to refer to non-corporate firms and index c for corporations. The timing of events is as follows. (i) Given its type q', a firm chooses organizational form $j \in \{n, c\}$, and a fixed early stage investment k_j is sunk.[7] (ii) The firm either fails (with probability $1 - q'$) or continues with expansion investment. (iii) After self-financing k_j, the owner is left with equity $E_j \equiv A - k_j < I_j$. To go ahead, banks must lend an amount $I_j - E_j$. (iv) Expansion investment is sunk and the entrepreneur chooses effort. High effort (no private benefits) yields a high success probability p, low effort (consumption of private benefits or leisure) leads to $p_L < p$. (v) Investment yields an end of period value $I_j + f(I_j)$ if successful, and nothing if failed. If successful, the owner pays back credit and consumes. The net output function is increasing and concave, $f'(I_j) > 0 > f''(I_j)$. The expected net value of the firm is $V_j = q'\pi_j - k_j$, where π_j is the expected net of tax value of expansion investment. We normalize the fixed cost of non-corporate firms to zero ($k_n = 0$) so that $k_c = (1 - t_k) k$ is the private cost of early stage investment. The government may finance a part $t_k k$ by allowing tax deduction. A firm of type q' prefers the corporate legal form whenever $V_c > V_n$, i.e., $q'\pi_c - k_c > q'\pi_n$. The paper provides microfoundations of this discrete choice of organizational form.

After self-financing fixed costs or early stage investments k_j, firms are left with own funds $E_j \equiv A - k_j$. Assuming $I_j > E_j$, they need external funds $D_j = I_j - E_j$ to finance expansion investment. To cover losses from default, banks charge a loan rate i on risky debt in excess of a safe deposit rate (normalized to zero, $r = 0$). If successful, firms pay a

[7] Whether probability q is private information or not, does not matter. Since early stage investment is fully self-financed by assumption, there is no adverse selection problem in financing start-ups.

tax $T_j = t_j \left[f\left(I_j\right) - i\left(D_j + \left(1-\lambda\right) E_j\right)\right]$, where only external debt is deductible if $\lambda = 1$ as in the status quo. When both debt and own equity are deductible ($\lambda = 0$ as with an ACE tax), the tax liability is $T_j = t_j \left[f\left(I_j\right) - iI_j\right]$. Since it is not essential for our purposes, we assume $\lambda = 0$, simplifying our analysis. Hence, expected tax liability at the expansion stage amounts to

$$pT_j = t_j \pi_j^T, \quad \pi_j^T = p\left[f\left(I_j\right) - iI_j\right]. \tag{1}$$

We assume entrepreneurs to be endowed also with a private asset. The entrepreneur's consumption value H of the private asset (one's own family house) exceeds market valuation $L = \left(1-\beta\right) H$ by external investors. Hence, liquidation leads to a deadweight loss or transaction cost equal to βH. We interpret the loss of consumer surplus in case of bankruptcy as down-side risk-aversion.[8] The corporate form offers limited liability so that entrepreneurs can protect their private assets. As a matter of choice, they can pledge their private asset as a collateral L_c for repayment equal to the market value in the bad state, $L_c \in \{0, L\}$ and $H_c \in \{0, H\}$. In contrast, sole proprietors, by law, are fully liable with all private wealth so that $L_n = L$ throughout. Depending on choice and organizational form, banks can get a safe repayment of L_j and can thus issue a riskless amount of debt equal to L_j. Since the refinancing cost equal to the deposit rate is normalized to zero, a competitive bank breaks even by charging zero interest on safe debt. After getting safe debt, the firm still needs risky debt equal to $D_j = I_j - E_j - L_j$ which can be repaid only in case of success while a failed firm is unable to repay. Lending an amount D_j, the bank must thus charge a positive loan rate on risky debt to break even, $p\left(1+i\right) D_j \geqslant D_j$.

Noting the distinction between safe and risky debt and using $L_j = \left(1-\beta\right) H_j$, the

[8] Tirole (2006, p. 170) adopts the notation $L = \beta H$, leading to a deadweight loss $\left(1-\beta\right) H$. Our notion of downside risk-aversion also follows Tirole (2006, p. 145) where agents are risk-neutral in high consumption levels but a drop in consumption below a critical value creates a discrete utility loss. In our model, the bad state leads to a an additional loss of consumer surplus from loosing the private asset.

company's surplus is divided between the owner and the bank according to[9]

$$\begin{aligned} \pi_j^e &= p\left[I_j + f\left(I_j\right) - T_j - (1+i)\, D_j\right] - (1 - p\beta)\, H_j - E_j, \\ \pi_j^b &= p\,(1+i)\, D_j - D_j, \quad D_j = I_j - E_j - L_j, \\ \pi_j &= p\left[I_j + f\left(I_j\right) - T_j\right] - I_j - (1-p)\,\beta H_j, \end{aligned} \tag{2}$$

where $E_j \equiv A - k_j$ is own equity. Tax T_j is due only if the company succeeds, and depends on organizational form. If the venture succeeds, all debt is repaid, giving a repayment of $(1+i)\, D_j$ on risky debt and of L_j on safe debt. If the company fails, the bank gets repayment only on safe debt L_j by seizing the owner's private house with liquidation value L_j. A competitive bank charges no interest on safe debt since the deposit rate and, hence, the bank's refinancing cost is normalized to zero. Liquidation of the private asset results in a deadweight loss βH_j when the firm fails.

Competitive banks can do no better than break even. The participation constraint $\pi_j^b = 0$ leads to two consequences. First, given zero profits in banking, the owner appropriates the entire joint surplus, $\pi_j^e = \pi_j$, as long as she obtains external financing. Second, the zero profit (no-arbitrage) condition requires a positive lending rate on risky debt,

$$p\,(1+i) = 1. \tag{3}$$

Using this and the definition of tax liability in (1) yields a surplus of

$$\pi_j = p\left[f\left(I_j\right) - iI_j - T_j\right] - (1-p)\,\beta H_j = (1 - t_j)\,\pi_j^T - (1-p)\,\beta H_j. \tag{4}$$

Adding tax yields a social surplus equal to $\pi_j^* = \pi_j + pT_j = p\left[f\left(I_j\right) - iI_j\right] - (1-p)\,\beta H_j$. A company of type q' has net value $V_j = q' \cdot \pi_j - k_j$ at the beginning of period.

[9] Equivalently, $\pi_j^e = p\left[I_j + f\left(I_j\right) - T_j - (1+i)\, D_j - L_j\right] - (1-p)\, H_j - E_j$. The owner repays safe debt L_j in the good state, and looses the full consumption value of her house in the bad state. Bank profits are $\pi_j^b = p\left[(1+i)\, D_j + L_j\right] + (1-p)\, L_j - (I_j - E_j)$ where the last term is total debt. Repayment in the good state is $(1+i)\, D_j$ on risky and L_j on safe debt. In the bad state, only L_j is repaid upon liquidation of the collateral which leads to a deadweight loss of βH_j. Note that π_j^e is the surplus over financial wealth. Expected end of period utility is $\pi_j^e + E_j + H$, see section 2.4 below.

More investment raises the firm's surplus by

$$d\pi_j/dI_j = (1-t_j)\,\rho_j \gtrless 0, \quad \rho_j \equiv p\left[f'\left(I_j\right) - i\right]. \tag{5}$$

At low levels of investment, the firm would generate a return larger than the loan rate i and earn an 'excess return' ρ_j. Clearly, if the firm were unconstrained, it would maximize surplus by investing until all profitable investment opportunities are exhausted and the excess return is driven to zero, $\rho_j = 0$, leading to $f'\left(I^{FB}\right) = i$. According to the traditional theory, investment is driven by the user cost of capital i. Here, the profit tax has no impact on investment due to our assumption of $\lambda = 0$, see the discussion prior to (1). This will no longer be the case when firms are constrained. Note, finally, that the unconstrained investment level is independent of organizational form. To isolate the contribution of incorporation on firm performance, we wish to keep firms identical in all characteristics other than their legal form.

2.2 Credit Analysis

External financing is often restricted by moral hazard and managerial opportunism. Since effort is costly, entrepreneurs might shirk and enjoy private benefits if they gain little income by supplying full effort. The bank can break even only if high effort is guaranteed and repayment is likely.[10] For bank lending to be incentive compatible, entrepreneurs must keep a high enough stake for high effort to be worthwhile when effort is costly in terms of foregone private benefits $\gamma_j I_j$. Private benefits are assumed to rise linearly with the investment level. In raising the firm's success probability from p_L to p, more effort not only results in a higher expected end of period wealth but also reduces the risk of loosing the consumer surplus βH_j of the private asset. Writing the entrepreneur's surplus in (2) as $\pi_j^e = pv_j^e - H_j - E_j$, the incentive constraint requires that $pv_j^e \geqslant p_L v_j^e + \gamma_j I_j$, or $v_j^e \geqslant \gamma_j I_j/\left(p - p_L\right)$ where $v_j^e \equiv I_j + f\left(I_j\right) - T_j - (1+i)\,D_j + \beta H_j$ is end of period income in the good state. In case of failure, income is zero. Rewriting the constraint

[10] Assuming $p_L \to 0$ definitely excludes a viable equilibrium with low effort.

as $D_j \leqslant \left[I_j + f(I_j) - T_j + \beta H_j - \gamma_j I_j/(p - p_L)\right]/(1+i) \equiv D_j^+$ shows how the firm's ability to raise risky debt is limited by its pledgeable income. Entrepreneurs must keep a minimum income $\gamma_j I_j/(p - p_L)$ to guarantee high effort. The income going to the owner limits the company's debt capacity. Pledgeable income is equal to the total project value net of tax, $I_j + f(I_j) - T_j$, augmented by the consumer surplus βH_j of living in one's own house (the threat of loosing it strengthens incentives), minus the incentive income $\gamma_j I_j/(p - p_L)$. The firm's capacity to repay risky debt is exhausted by D_j^+.

Multiplying the constraint $v_j^e \geqslant \gamma_j I_j/(p - p_L)$ by p, using (3), and rewriting v_j^e yields

$$(1 - t_j)\, p\,(f(I_j) - iI_j) \geqslant \Gamma_j I_j - [A - k_j + (1 - \beta + p\beta) H_j], \quad \Gamma_j \equiv p\gamma_j/(p - p_L). \quad (6)$$

When the incentive constraint is binding, investment is constrained. The left-hand side of the weak inequality in (6) corresponds to the concave curve in Figure 1. The maximum of this curve would give the unconstrained investment scale. The right-hand side of the weak inequality in (6) is represented by the dashed lines in the Figure 1, where the term in the square brackets of the equation corresponds to A_j in the figure. Starting with low investment levels when the constraint is still slack, the constraint will be ultimately binding when the right-hand side of equation (6) grows faster with investment compared to the left-hand side. Credit rationing at $I_j < I^{FB}$ occurs when higher investment would be profitable because it earns an excess return of $\rho_j > 0$, but is not possible because it would violate the incentive constraint, $\Gamma_j > (1 - t_j)\,\rho_j$.

Proposition 1 ***(Credit Rationing)*** *Unconstrained investment requires* $f'\left(I^{FB}\right) = i$. *Constrained firms invest* $I_j < I^{FB}$ *and earn an excess return of* ρ_j, *satisfying* $\Gamma_j > (1 - t_j)\,\rho_j > 0$.

When firms are constrained, investment is implicitly determined by the binding incentive constraint (6), $I(t_j, E_j, \Gamma_j, H_j)$. In contrast to the traditional theory, investment is sensitive to own assets or accumulated cash-flow E_j, to collateral H_j, and to governance standards, Γ_j. Taking the differential of the incentive constraint yields

$$dI_j = -\frac{\pi_j^T}{m_j} \cdot dt_j - \frac{I_j}{m_j} \cdot d\Gamma_j + \frac{1}{m_j} \cdot dE_j + \frac{1 - \beta + p\beta}{m_j} \cdot dH_j, \quad (7)$$

where $m_j \equiv \Gamma_j - (1 - t_j)\,\rho_j > 0$, see Proposition 1. Unlike in the literature on the 'old view' on incorporation, the effect of tax does not operate via the user cost channel but via the cash-flow channel. Even though the tax would be neutral in an unconstrained equilibrium (see the discussion following (5)), it still reduces investment of constrained firms because it drains internal funds. Similarly, more own equity E_j or an increase in the value of private assets H, if offered as a collateral, would relax the financing constraint and boost investment. This could be illustrated in Figure 1 by a downward shift of the incentive line $\Gamma_j I_j - A_j$.

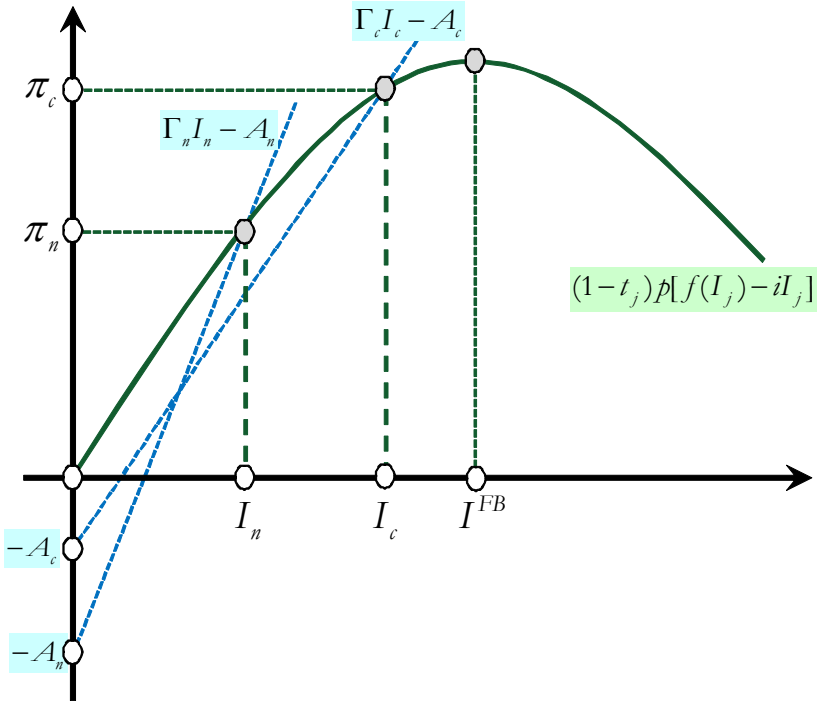

Fig. 1: Incorporation and Access to Capital

The main benefit of incorporation is improved access to capital markets, i.e., external financing. Tighter book keeping and accounting rules imposed by the corporate legal form make firms more transparent and managers more accountable. The reporting requirements thus reduce private benefits of shirking, $\Gamma_c < \Gamma_n$. In Figure 1, the incentive line of a corporate firm is, for this reason, flatter than the one of a non-incorporated firm. On the other hand, the higher fixed cost of incorporation drains internal funds $E_j = A - k_j$ that are available for self-financing part of the expansion investment. Incorporation thus raises

the firm's surplus if the value-increasing effect of transparency dominates over the higher fixed cost. The surplus of a constrained firm changes by $d\pi_j = (1-t_j)\,\rho_j dI_j$. The fixed cost of incorporation drains own funds and reduces investment while a smaller agency cost resulting from higher transparency boosts investment. Starting with a symmetric situation where $\Gamma_c = \Gamma_n$ and $k_c = k_n = 0$, and noting how investment I_c depends on k_c and Γ_c, one finds that $d\pi_c > 0 \Leftrightarrow d\Gamma_c/dk < -(1-t_k)/I_c$. Investing in corporate transparency must result in a suitably large reduction of agency costs for incorporation to raise net firm value. This yields parameters $\Gamma_c < \Gamma_n$ and $k_c > 0$ such that corporate firms can raise more external funds and invest at a larger scale, $I_c > I_n$, and, for this reason, are also more profitable than non-corporate firms, $\pi_c > \pi_n$. A larger investment scale means that corporate firms earn a lower excess return and are less constrained than non-incorporated ones.

Proposition 2 ***(Access to Capital)*** *Corporate firms are less constrained, raise more debt, invest at larger scale, and earn higher profits. Their excess return is smaller than that of a unincorporated firms,* $\rho_c < \rho_n$.

Corporate owners enjoy limited liability and choose whether to pledge their private asset as a collateral. When doing so, the firm is able to relax the financing constraint and to expand investment, see (7). Since a constrained firm earns an excess return, a larger investment scale boosts the firm's surplus, $d\pi_c = (1-t_c)\,\rho_c dI_c - (1-p)\,\beta dH_c$. On the negative side, collateralizing the private asset leads to a loss of consumer surplus when it must be liquidated in case of default. The net effect is

$$\frac{d\pi_c}{dH_c} = (1-t_c)\,\rho_c \frac{1-\beta+p\beta}{m_c} - (1-p)\,\beta = \frac{(1-t_c)\,\rho_c - (1-p)\,\beta\Gamma_c}{m_c}. \tag{8}$$

If $d\pi_c/dH_c|_{H_c=H} > 0$, the corporate owner prefers to pledge the private asset as a collateral and sets $H_c = H$, while $d\pi_c/dH_c|_{H_c=0} < 0$ leads her to set $H_c = 0$ and deny collateral.

Proposition 3 ***(Limited Liability)*** *If firms are very constrained (large* ρ_c*) and/or owners enjoy little consumer surplus from private assets (*β *small), corporate owners prefer to pledge private assets and do not take advantage of limited liability.*

2.3 Incorporation

In the early stage, a firm must decide whether to incorporate or not. Incorporation increases value by improving access to capital, leading to a larger surplus from expansion investment under the corporate legal form, $\pi_c > \pi_n$, as indicated in Figure 1. The cost of incorporation is the differential fixed cost $k_c = (1 - t_k)\, k$ which is required to install the more elaborate accounting system. This cost is invested before the firm enters the expansion stage, i.e., before the early stage is completed. Firms are heterogeneous in the early stage success probability $q' \in [0, 1]$. The cumulative distribution is $G(q) = \int_0^q g(q')\, dq'$. Establishing a corporation yields a net expected value of $V_c(q') = \pi_c q' - k_c$. When the same firm were a sole proprietorship, it would have a net value of $V_n(q') = \pi_n q'$ instead. Clearly, less successful firms with a small expected surplus $\pi_j q'$ will not find it worthwhile to incorporate and invest the fixed cost. Value maximization requires to choose the organizational form with the higher net value V_j. The cut-off value determining business segmentation into the two types of legal form is given by $q\pi_c - k_c = q\pi_n$, or

$$q = (1 - t_k)\, k / (\pi_c - \pi_n)\,. \tag{9}$$

Figure 2 illustrates.

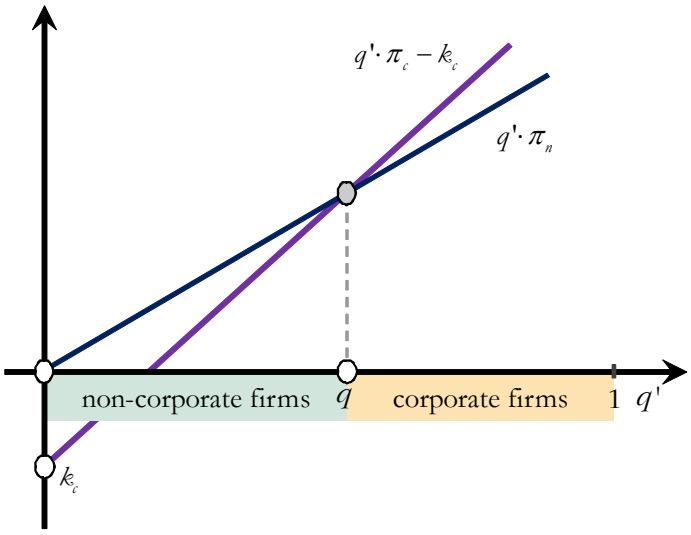

Fig. 2: Incorporation Decision

2.4 Welfare

Knowing their type q', firms choose organizational form. Entrepreneurs with highly valuable ventures $q' > q$ choose to incorporate, all other types remain a sole proprietor. The cut-off value in (9) yields a share n of non-corporate firms of which only $s_n < n$ survive the start-up period. Similarly, only $s_c < 1 - n$ corporations arrive at the expansion stage. Due to business failure, $s_n + s_c < 1$,

$$s_n = \int_0^q q' dG(q') < n = \int_0^q dG(q'), \quad s_c = \int_q^1 q' dG(q') < 1 - n. \tag{10}$$

A consistent welfare analysis must take account of the fiscal budget constraint. Let us assume that the government collects taxes and distributes a per-capita transfer z at the end of period,[11]

$$z = \textstyle\sum_j s_j t_j \pi_j^T - (1-n) t_k k. \tag{11}$$

Aggregate end-of-period welfare, including the value H of private assets (e.g., the private home of the agent), is $W = \int_0^1 [q'\pi^e(q') + E(q') + H] dG(q') + z$, where $E(q') = E_c$ for $q' \geqslant q$ and E_n else. Firms failing in the start-up phase are left with $E_j = A - k_j$. With probability q', the entrepreneur survives the early stage and enjoys expected end-of-period wealth $\pi_j^e + E_j + H$ (excluding transfers) which yields $I_j + f_j - T_j - (1+i) D_j - L_j + H$ in the good state, and zero in the bad state if the private asset is liquidated. Substituting tax revenue z, noting $\pi_j^e = \pi_j$ with zero bank profits, and using $\pi_j + pT_j = \pi_j^*$, one can write expected end-of-period welfare as

$$W = \textstyle\sum_j s_j \pi_j + A - (1 - t_k)(1-n) k + H + z = \sum_j s_j \pi_j^* + A - (1-n) k + H. \tag{12}$$

Welfare equals end-of-period wealth since no private managerial benefits are consumed in equilibrium. The Appendix closes the model and derives the GDP identity.

[11] We assume that transfers are received in the private sphere and can not be pledged by constrained firms. In reality, business taxes and transfers are paid and received by rather different groups.

2.5 First Best Investment

When the incentive constraint is slack, investment is first best. In Figure 1, the incentive line would then cut the profit curve to the right of I^{FB}. Unconstrained firms invest according to $f'\left(I^{FB}\right) = i$. Investment scale and gross profits are then independent of the tax rate, undistorted, and also identical for both types of legal form, I and π^T. The surplus $\pi_j = (1-t_j)\,\pi^T - (1-p)\,\beta H_j$ leads to an unconstrained firm's net value $V_j\left(q'\right) = \pi_j q' - k_j$. Banks have access to private assets by law, $H_n = H$, if firms remain unincorporated. Corporate owners, in contrast, are protected by limited liability. They choose $H_c = 0$ to maximize the surplus from expansion stage investment. Offering the private asset as a collateral yields no gain in terms of facilitating investment when firms are unconstrained. It only leads to liquidation costs and an expected loss $(1-p)\,\beta H$ in the event of failure. The discrete choice condition for organizational form in a frictionless capital market is then $\left[(t_n - t_c)\,\pi^T + (1-p)\,\beta H\right] q = (1-t_k)\,k$. One may then distinguish four cases, depending on the configuration of parameters H and k.

First, consider a situation where investment in corporate transparency is costless ($k = 0$, there is no reason to invest in it when there are no capital market frictions) and entrepreneurs do not have any private assets ($H = 0$). Tax neutrality towards organizational form then requires $t_n = t_c$. In this case, all firms irrespective of type q are indifferent with regard to organizational form in the absence of tax, and remain so when subject to tax. If $t_n \neq t_c$, either none or all firms choose to incorporate.

Second, if $k > 0$ and $H = 0$, no firm would ever want to incorporate in the absence of tax since it would be costly without any benefit in return. Tax neutrality in the sense of not changing the incorporation decision $q = 1$ then requires a larger tax rate on sole proprietorships, $t_n > t_c$, to compensate for the disadvantage of corporations in terms of fixed cost. But the tax rate for unincorporated firms, t_n, must also not be too large to not turn around the incorporation decision in the absence of tax, $t_c < t_n \leqslant t_c + (1-t_k)\,k/\pi^T$.

Third, if $H > 0$ and $k = 0$, then $V_c > V_n$ for all q'. Incorporation is costless and all firms incorporate in the absence of tax to benefit from limited liability under the

corporate legal form and protect the private property of the entrepreneur. This corner solution is unaffected and taxes are neutral towards organizational form as long as $t_n < t_c \leqslant t_n + (1-p)\,\beta H/\pi^T$. The effective corporate tax rate, t_c may exceed the personal tax rate to the extent that incorporation brings about the advantage of limited liability, but it must be not too large to turn around the incorporation decision.

Finally, if both H and k are positive with $(1-p)\,\beta H > k$ to assure an interior solution with some firms incorporated and others not, organizational choice in the absence of tax is given by $(1-p)\,\beta H \cdot q^{FB} = k$. Only the more successful firms, namely those ones with an early stage success probability $q' > q^{FB}$, will then find it profitable to invest in an accounting and reporting system to exploit the advantage of limited liability. This allocation can be replicated if tax rates are chosen to satisfy $(t_c - t_n)\,\pi^T \cdot q^{FB} = t_k k$ or, equivalently, $t_c = t_n + t_k\,(1-p)\,\beta H/\pi^T > t_n$. As long as $t_k > 0$ (with $t_k = t_c$ being the natural case), tax neutrality requires $t_c > t_n$. Equal tax rates, for example, would lead to excessive incorporation by reducing the cut-off value q below the first best value q^{FB}. The upshot is that even in a frictionless capital market, a somewhat larger effective corporate tax rate (some degree of double taxation as under a classical system) could be justified to make firms pay for the advantage of limited liability under the corporate legal form.[12] Disregarding case 2 above as a degenerate case (incorporation is costly without any advantage at all), we have

Proposition 4 ***(First Best)*** *(i) In a frictionless capital market, when there are no private assets for collateral and no fixed costs of incorporation, the tax system is neutral towards choice of organizational form if tax rates are uniform ($t_c = t_n$). (ii) If entrepreneurs are endowed with private assets and if only the corporate legal form offers limited liability, tax neutrality requires a higher effective tax rate for corporations ($t_c > t_n$).*

[12] One should add that different legal rules for limited liability across organizational forms do not make sense with a frictionless capital market.

3 Tax Policy and Institutional Reform

For the remainder of the paper, we concentrate on the case where corporate owners willingly do not take advantage of limited liability and prefer to pledge private assets as a collateral to overcome financing problems. We thus assume that β and, thus, the private valuation in excess of liquidation values is small,

$$(1-t_j)\,\rho_j > (1-p)\,\beta\Gamma_j, \tag{A1}$$

leading to $H_c = H$ in (8). This case emphasizes the 'access to capital' argument in favor of incorporation. It also allows us to consider the implications of higher valuation of private assets H (e.g., through a housing price boom) for investment and choice of organizational form, without this being an obvious advantage for non-corporate firms.

The following subsection discusses the implications of institutional reform towards better accounting and reporting regulations, leading to $d\Gamma_c < 0$, and of an increase in collateral value, $dH > 0$. We also calculate the excess burden of taxes. Subsection 3.2 turns to revenue neutral tax reform that shifts the tax burden from non-corporate to corporate firms, leading to some 'double taxation' of corporate profits as under a classical system. In all scenarios, we start out with equal tax rates $t_n = t_c = t_k$ and no difference in limited liability. Hence, a firm's surplus differs across types of organizational form by $\pi_c - \pi_n = (1-t)\left(\pi_c^T - \pi_n^T\right)$. The discrete choice condition (9) then reduces to $(1-t)\left(\pi_c^T - \pi_n^T\right) q = (1-t)\,k$, implying $\pi_c^T - k > q\pi_c^T - k = q\pi_n^T > 0$ as a useful restriction in the following analysis.

3.1 Investment, Profits and Welfare

The intensive investment response was discussed in equation (7) of subsection 2.2. Using semi-elasticities $\varepsilon_{t,j} \equiv \frac{\pi_j^T}{m_j I_j}$, $\varepsilon_{H,j} \equiv \frac{1-(1-p)\beta}{m_j I_j}$, $\varepsilon_{\Gamma,c} \equiv \frac{1}{m_c}$ and $\varepsilon_{k,c} \equiv \frac{k}{m_c I_c}$, all defined positive,

investment of corporate and non-corporate firms reacts according to

$$\begin{aligned} dI_c &= -\varepsilon_{t,c} I_c \cdot dt_c + \varepsilon_{k,c} I_c \cdot dt_k - \varepsilon_{\Gamma,c} I_c \cdot d\Gamma_c + \varepsilon_{H,c} I_c \cdot dH, \\ dI_n &= -\varepsilon_{t,n} I_n \cdot dt_n + \varepsilon_{H,n} I_n \cdot dH. \end{aligned} \tag{13}$$

Although we focus on the case of $dt_c = dt_k$, it is instructive to consider the separate effects of subsidizing early stage investment with the tax subsidy t_k and taxing ex post profits at rate t_c. Note first that subsidizing a fixed cost is akin to providing a lump-sum subsidy to the firm which could not affect investment in the traditional theory. In contrast, when firms are constrained, investment is sensitive to cash-flow. Since the subsidy boosts cash-flow, it also raises expansion investment. A tax on ex post profits drains cash-flow and reduces investment. The net effect of raising the corporate tax rate with full deductibility of upfront investment is negative, $dI_c = -\left(\varepsilon_{t,c} - \varepsilon_{k,c}\right) I_c \cdot dt_c = -\frac{\pi_c^T - k}{m_c} \cdot dt_c < 0$. Furthermore, higher collateral value facilitates investment by relaxing the financing constraint. Better institutions ($d\Gamma_c < 0$) similarly improve access to capital and boost investment of corporate firms which flows from the assumption that an improvement of book keeping rules and accounting standards benefits corporate firms only.

The response of the incorporation rate depends on how shocks affect the surplus of firms with alternative legal status. The mechanical and behavioral effects on the surplus per firm are $d\pi_j = -\pi_j^T \cdot dt_j + (1-t)\,\rho_j \cdot dI_j - (1-p)\,\beta \cdot dH$. Note that the envelope theorem no longer applies. When firms are constrained, investment yields an excess return. Larger investment thereby boosts profits. Substituting (13) yields

$$\begin{aligned} d\pi_c &= -\left[\pi_c^T + \pi_c \frac{\rho_c}{m_c}\right] \cdot dt_c + (1-t)\,\frac{\rho_c}{m_c}\left[k \cdot dt_k - I_c \cdot d\Gamma_c\right] + \varphi_c \cdot dH, \\ d\pi_n &= -\left[\pi_n^T + \pi_n \frac{\rho_n}{m_n}\right] \cdot dt_n + \varphi_n \cdot dH. \end{aligned} \tag{14}$$

We have assumed that the collateral value of pledging one's private asset boosts investment and the firm's surplus by more than the potential deadweight loss of liquidating the asset in case of failure. Hence, $\varphi_j \equiv (1-t)\,\rho_j \frac{1-\beta+p\beta}{m_j} - (1-p)\,\beta = \frac{(1-t)\rho_j - (1-p)\beta\Gamma_j}{m_j} > 0$ by (A1), so that a higher price of private assets boosts the surplus of firms.

The change in the cut-off value of the pivotal firm that is indifferent in the incorporation decision, follows from the differential of (9), $(\pi_c - \pi_n)\, dq + q\,(d\pi_c - d\pi_n) = -k dt_k$. Upon substitution of (14), the share of non-corporate firms changes by $dn = g\,(q) \cdot dq$,

$$dn = \eta_c \cdot dt_c - \eta_k \cdot dt_k - \eta_n \cdot dt_n + \eta_\Gamma \cdot d\Gamma_c + \eta_H \cdot dH, \tag{15}$$

where coefficients are

$$\begin{aligned}
\eta_c &\equiv \frac{\pi_c^T + \pi_c \rho_c / m_c}{\pi_c - \pi_n} g\,(q)\, q, \quad \eta_n \equiv \frac{\pi_n^T + \pi_n \rho_n / m_n}{\pi_c - \pi_n} g\,(q)\, q, \\
\eta_k &\equiv \frac{1 + q\,(1-t)\,\rho_c / m_c}{\pi_c - \pi_n} k g\,(q)\,, \quad \eta_\Gamma \equiv \frac{(1-t)\,\rho_c / m_c}{\pi_c - \pi_n} I_c q g\,(q)\,, \\
\eta_H &\equiv (1-t) \left[\frac{\rho_n}{m_n} - \frac{\rho_c}{m_c} \right] \frac{1 - \beta + p\beta}{\pi_c - \pi_n} q g\,(q)\,.
\end{aligned}$$

Raising the personal relative to the corporate tax rate would clearly induce more firms to incorporate since it reduces surplus under non-corporate status. In Figure 2, the expected value line for non-corporate firms would rotate downwards, indicating a larger share of corporate relative to unincorporated firms. The net effect of a higher corporate tax rate $dt_c = dt_k$ is clearly positive, $dn/dt_c = \frac{\left[q\pi_c^T - k\right] + \left[\pi_c^T - k\right](1-t) q \rho_c / m_c}{\pi_c - \pi_n} g\,(q) > 0$, since both square brackets in the numerator are positive. Better accounting standards benefit corporations only and raise the incorporation rate, $dn < 0$. Finally, if incorporation is effective in raising investment and reducing ρ_c, so that $\rho_n / m_n > \rho_c / m_c$, a higher collateral value benefits non-corporate firms relatively more. They are more constrained and earn a higher excess return so that additional investment induced by higher collateral value generates a larger gain in surplus. In consequence, more firms choose to remain unincorporated.

Taking the differential of (10) shows how the effect on the incorporation rate changes the composition of mature firms in the expansion state,

$$ds_n = -ds_c = q \cdot dn. \tag{16}$$

Calculating the excess burden requires the change in tax revenue as stated in (11). For this purpose, we define an effective tax on incorporation, $\tau_n \equiv \left(t_c \pi_c^T - t_n \pi_n^T\right) q - t_k k$, which collects the impact on the public budget when more firms switch to corporate

status, $dz = -\tau_n \cdot dn$. When tax rates are uniform, the incorporation decision satisfies $(1-t)\left[\left(\pi_c^T - \pi_n^T\right) q - k\right] = 0$, which reduces the effective tax to zero, $\tau_n = 0$, and has no impact on revenue. Separating mechanical and behavioral effects therefore yields

$$\begin{aligned} dz &= s_n \pi_n^T \cdot dt_n + s_c \pi_c^T \cdot dt_c - (1-n)\, k \cdot dt_k + \textstyle\sum_j t_j \rho_j s_j \cdot dI_j, \\ dz &= \textstyle\sum_j \left[s_j \pi_j^T - t_j \rho_j s_j \varepsilon_{t,j} I_j\right] \cdot dt_j - \left[(1-n)\, k - t_c \rho_c s_c \varepsilon_{k,c} I_c\right] \cdot dt_k \\ &: \quad -t_c \rho_c s_c \varepsilon_{\Gamma,c} I_c \cdot d\Gamma_c + \textstyle\sum_j t_j \rho_j s_j \varepsilon_{H,j} I_j \cdot dH. \end{aligned} \tag{17}$$

The second and third lines result when substituting the behavioral response.

Differentiating the welfare measure (12) yields a term $\left[(\pi_c - \pi_n)\, q - (1-t_k)\, k\right] \cdot dn = 0$, due to organizational choice, leaving $dW = \sum_j s_j \cdot d\pi_j + (1-n)\, k \cdot dt_k + dH + dz$. Substitute the change in the surplus prior to (14) and the investment response in (13). Collecting terms yields a welfare change equal to

$$\begin{aligned} dW &= dz - \textstyle\sum_j \left[s_j \pi_j^T + (1-t)\, \rho_j s_j \varepsilon_{t,j} I_j\right] \cdot dt_j \\ &: \quad + \left[(1-n)\, k + (1-t)\, \rho_c s_c \varepsilon_{k,c} I_c\right] \cdot dt_k - (1-t)\, \rho_c s_c \varepsilon_{\Gamma,c} I_c \cdot d\Gamma_c \\ &: \quad + \left[1 - (1-p)\, \beta \textstyle\sum_j s_j + \sum_j (1-t)\, \rho_j s_j \varepsilon_{H,j} I_j\right] \cdot dH. \end{aligned} \tag{18}$$

This expression will be useful to analyze revenue neutral policy changes in the next subsection. To calculate the excess burden, one must substitute the change in tax revenue. Canceling tax terms results in

$$\begin{aligned} dW &= -\textstyle\sum_j \rho_j s_j \varepsilon_{t,j} I_j \cdot dt_j + \rho_c s_c \varepsilon_{k,c} I_c \cdot dt_k - \rho_c s_c \varepsilon_{\Gamma,c} I_c \cdot d\Gamma_c \\ &: \quad + \left[1 - (1-p)\, \beta \textstyle\sum_j s_j + \sum_j \rho_j s_j \varepsilon_{H,j} I_j\right] \cdot dH. \end{aligned} \tag{19}$$

There are first-order welfare changes on the intensive margin, proportional to the excess return ρ_j on investment of constrained firms. There is no tax distortion on the extensive margin even with positive tax rates. Since tax rates are assumed all to be equal in the initial equilibrium, the tax wedge on the discrete choice τ_n is zero. However, after raising the corporate rate to a level of $t_c = t_k > t_n$ implies that the new equilibrium involves a positive effective tax on incorporation, $\tau_n > 0$. In the new equilibrium, the discrete choice

condition is $(1-t_c)\left(q\pi_c^T - k\right) = (1-t_n)\, q\pi_n^T$. Hence, $t_c > t_n$ implies $q\pi_c^T - k > q\pi_n^T$, so that the tax wedge $\tau_n = t_c\left(q\pi_c^T - k\right) - t_n q\pi_n^T$ becomes positive.

An increase in the corporate tax rate $t_c = t_k$ reduces welfare by taxing ex post profits at rate t_c and reducing cash-flow which further constrains investment. In contrast, the tax credit t_k on the fixed cost strengthens own funds and boosts investment and welfare. Using the investment elasticities and noting $\tau_n = 0$ shows that the net effect is negative, $dW = -\left(\pi_c^T - k\right) s_c\left(\rho_c/m_c\right) \cdot dt_c < 0$. The welfare consequences of the other shocks are unambiguous. An increase in collateral value, for example, boosts welfare when τ_n is small since $1 > (1-p)\,\beta$ implies $1 > (1-p)\,\beta \sum_j s_j$, a fortiori. We can thus summarize the results of this subsection by stating

Proposition 5 ***(Corporate Tax)*** *Starting with uniform tax rates, a differential increase in the corporate tax reduces investment and profits of corporate firms, discourages incorporation and imposes a first-order welfare loss.*

For a proof, see the results discussed in equations (13)-(15) and (19). Trivially, raising the tax on non-corporate firms similarly reduces investment, profits, and welfare, but obviously encourages more incorporation. Such a tax on non-corporate profits probably leads to an even larger first-order welfare loss than the one on corporate firms, since non-corporate firms are more heavily constrained in their investment scale and earn a larger excess return.

Proposition 6 ***(Institutional Quality)*** *In countries with better accounting and reporting standards (i.e., lower Γ_c), corporate firms invest at a larger scale, earn higher profits and have a lower excess return relative to non-corporate firms. The rate of incorporation and welfare are higher in these countries.*

Better accounting standards selectively favor corporate firms. In boosting investment, an institutional reform improving accounting standards relaxes financing constraints and

allows corporate firms to implement unexploited investment opportunities with an above-average return so that welfare rises.

Proposition 7 ***(Collateral Value)*** *Given (A1), an increase in the value of private assets H boosts investments and profits of both types of firms and raises welfare. If non-corporate firms are relatively more constrained such that $\rho_n/m_n > \rho_c/m_c$, a higher collateral value benefits them relatively more and discourages incorporation.*

The last condition refers to η_H in (15) and is fulfilled if incorporation is effective in relaxing the financing constraint and substantially reduces the excess return ρ_c. Parameter Γ_c can be chosen small so that the intersection point in Figure 1 yields $I_c < I^{FB}$ but is relatively close to the unconstrained level, $I \to I^{FB}$ and $\rho_c \to 0$.

3.2 Revenue-Neutral Reform

With regard to the choice of legal forms, much of the tax reform debate postulates neutrality in the sense that incorporated and unincorporated firms should be treated equally from a tax perspective.[13] In this section, we argue that it might be welfare enhancing to deviate from uniform taxation and to move towards some double taxation of corporate profits as, for example, under a classical corporate tax system. The intuition is already evident in the discussion of Proposition 5. Since incorporation relaxes a financing constraint and facilitates access to external capital, corporations end up being less constrained compared to non-corporate firms. With investment being closer to the first-best, raising tax from corporations is less damaging than levying the same tax on non-corporate firms.

To show this, consider the following revenue-neutral policy change: starting with positive, but uniform rates, we raise the corporate tax rate $t_c = t_k$ and cut the personal

[13] For instance, the proposals of the Meade Committee (1978: 227) aimed at eliminating the differential taxation of both firm types. See also the U.S. blueprints for basic tax reform (Department of Treasury 1977: 68). The Mirrlees report provides a comprehensive and recent discussion on this issue (see Institute for Fiscal Studies 2010).

income tax rate on non-corporate firms to an extent that keeps tax revenue constant. As in the previous subsection, the effective tax τ_n is zero prior to the policy change. Evaluating (17) and substituting ε-coefficients links the changes in tax rates by

$$\left[1 - t\rho_n/m_n\right] s_n \pi_n^T \cdot dt_n = -\left[s_c \pi_c^T - (1-n)\, k - t\frac{\rho_c}{m_c}\left(\pi_c^T - k\right) s_c\right] \cdot dt_c. \tag{20}$$

Evaluate the welfare change in (18) with $dz = 0$, substitute ε-coefficients and use (20) to cancel some terms which leaves

$$dW = -\frac{\rho_n}{m_n} s_n \pi_n^T \cdot dt_n - \frac{\rho_c}{m_c}\left(\pi_c^T - k\right) s_c \cdot dt_c. \tag{21}$$

Substituting the revenue-neutral cut in the personal income tax from (20) yields

$$\frac{dW}{dt_c} = \frac{s_c \pi_c^T - (1-n)\, k}{1 - t\rho_n/m_n}\left[\frac{\rho_n}{m_n} - \frac{\rho_c}{m_c} \cdot \frac{s_c \pi_c^T - s_c k}{s_c \pi_c^T - (1-n)\, k}\right]. \tag{22}$$

Note that $\pi_c^T - k > 0$, as argued in the introduction of Section 3. Using the definition of s_c, we have $s_c > (1-n)\, q$,[14] implying $\left[s_c \pi_c^T - (1-n)\, k\right] > (1-n)\left(q\pi_c^T - k\right) > 0$. Since $s_c < 1 - n$, the factor multiplying with ρ_c/m_c in the square brackets is larger than unity. The condition for the square bracket to be positive is now slightly stronger than the one noted in Proposition 7. But in the same vein, if incorporation is sufficiently effective in relaxing the firm's finance constraint, it drives the excess return of corporate firms close to zero, $\rho_c \to 0$, leading to a welfare gain in (22).

Proposition 8 ***(Justification of Differential Corporate Tax)*** *If incorporation is sufficiently effective in relaxing the finance constraint, an increase in the corporate tax and a revenue-neutral cut in the tax on non-corporate firms increases welfare.*

The corporate legal form creates access to external capital. As a result, corporate firms are less constrained and are able to invest close to the efficient scale. In other words, the under-investment resulting from a financing constraint is more severe with non-corporate firms. A tax on these firms imposes a larger welfare cost than a tax on less constrained,

[14] Write $s_c = \int_q^1 q' dG\left(q'\right) > q \cdot \int_q^1 dG\left(q'\right) = q \cdot (1-n)$.

corporate firms. Hence, the tax burden should be shifted from non-corporate to corporate firms. This formalizes an old argument that justifies a differential corporate tax as a 'fee' for the advantages of the corporate legal form.

4 Possible Avenues for Empirical Analysis

The 'old view' on taxation and entity choice suggested the incorporation decision to depend on two fundamental variables: capital stocks (or investments) and user cost of capital (including taxes) as an incorporated versus an unincorporated firm. The 'new view' proposed in this paper suggests a number of additional fundamental variables which affect this decision beyond and in interaction with the original ones. Among such variables, we could mention accounting and reporting standards, the extent of limited liability, other governance variables which are related to the extent of the agency problem, and the degree of credit constraints for unincorporated firms. When considering taxation and incorporation choice, data are required for a sufficiently large number of jurisdictions and firms or fractions of firms. Certainly, a credible study would rather rely on panel rather than cross section data. At this point, such data are not readily available. However, we will describe available data-sets which could be used for a preliminary assessment and their limitations, and point to 'ideal' data for empirical inference.

Information on incorporation choice is available at the country-by-industry level for a number of years from the European Statistical Office's (EUROSTAT) *Business Demography Survey (BDS)*. The on-line version of that survey provides annual data for 25 European countries in a large number of industries for the period 1997-2006. An earlier version of the data-set has been used by de Mooij and Nicodème (2008) in their study of income shifting from the personal to the corporate income tax base. For our purpose, a main drawback of that data-set is that the researcher can not associate the provided groups of legal forms with tax rates to be paid by the firms contained (for instance, in some countries certain types of unincorporated firms are subject to corporate rather than

personal income taxation, and vice versa; see Egger, Keuschnigg, and Winner, 2009). Moreover, since the data are aggregated to the industry level, it is impossible to condition on and control for neither 'old view' firm-specific characteristics such as the capital stock or user cost of capital nor 'new view' characteristics such as determinants of finance and governance, and, eventually, even firm-specific determinants of the agency problem. Another drawback is that the number of countries covered is fairly small and focused on western Europe so that variation in profit and income tax rates is relatively small. de Mooij and Nicodème (2008) use this data-set to provide robust evidence for the 'old view' of incorporation choice, namely that the tax gap between personal and corporate tax rates makes a firm's incorporation more likely. Yet, since they do not include financial or governance variables, their analysis does not provide conclusions about the 'new view'.

The World Bank collected data on more than 4,000 small, medium-sized, and large firms in 52 countries in 1999 through the *World Business Environment Survey (WBES)*, a firm-size-stratified random survey. Among obstacles to firm operation, size, and growth the survey also contains information about whether a firm operates as an unincorporated business (a sole proprietorship or a partnership) or a corporation (see Demirgüç-Kunt, Love and Maksimovic, 2006). Certainly, the relatively bigger cross-country variation in the data provides for a bigger variance in user cost of capital in general and profit tax rates in specific as determinants of the incorporation decision. However, a drawback of this data-set is that it ensures stratification at the level of firm size but not legal form so that estimated parameters may be prone to a selection bias of firms with a certain type of legal form. Demirgüç-Kunt, Love and Maksimovic (2006) use this data-set to shed light on the importance of a firm's business environment – including governance variables such as the development of local financial sectors, the efficiency of legal systems, the strength of shareholder and creditor rights, the level of regulatory burdens, the efficiency of bankruptcy processes, and the level of the corporate tax rates (but not personal income tax rates). Their findings point to fewer financing, legal and regulatory obstacles for incorporated than for unincorporated firms, especially in countries with more developed institutions and more favorable business environments. The results in Demirgüç-Kunt,

Love and Maksimovic (2006) suggest that financial, legal, and other governance indicators have a significant impact on the incorporation choice, which lends some support to the 'new view' on entity choice.

Finally, data on legal form as well as financial and balance sheet data for a large number of firms in 43 European countries are available from Bureau van Dijk's AMADEUS data-base. The financial and balance sheet data are available in panel form with annual information (from the early 1990s onwards until 2009 at this point), but the information on a firm's legal form is only cross sectional. Hence, there are two drawbacks when using this data-set for inference about the new versus the old view on incorporation choice: on the one hand, inference has to rely on the cross section dimension of the data with the usual concern of omitted variables bias; on the other hand, tax and corresponding user cost of capital effects have to be estimated from only 43 cross sectional observations at the country level. Egger, Keuschnigg, and Winner (2009) use this data-set to provide some preliminary insights into the empirical support for the 'old view' versus the 'new view' on incorporation choice in an earlier version of this manuscript, and find that, beyond tax rates on corporate profits and top tax rates on personal income, governance variables such as creditor rights, accounting standards, and anti-director rights affect the probability of incorporation along the lines hypothesized in the above theoretical model. Again, this may be interpreted as some support for the 'new view' on incorporation choice beyond the fundamentals acknowledged by the 'old view'.

However, the ideal data-set of incorporation choice would contain panel data for a relatively large number of countries without any selection at the level of firm size or legal form. Such a data-set is currently not available, but it would allow the researcher to control for time-invariant firm-specific characteristics which likely influence governance, finance, and the agency problem at the firm level, and it would support an identification of the tax as well as the governance and finance variables from changes across time, thereby reducing the likelihood of parameter bias accruing to omitted determinants of the incorporation choice.

With an ideal data-set at hand, the above model could be tested as follows. First, we would have to estimate the probability and degree of being financially constrained for each firm and period, inter alia as a function of incorporation. The reason is that the gain from incorporation for a firm depends on both the degree of financial constraints as well as on other elements determining the benefits and costs of incorporation ($\pi_c - \pi_n$ and k_c). According to our model, $\pi_c - \pi_n$ depends on investment and output, both of which are affected by finance constraints of (corporate relative to) non-corporate firms, the lending rate, and the tax rate differential, $t_c - t_n$. The empirical counterpart to the incorporation decision, $P(c|\pi_c - \pi_n, k_c)$, could involve a firm-by-time-specific disturbance term, υ, which might include fixed firm and time effects. One option for empirical analysis would be to formulate $P(c|\pi_c - \pi_n, k_c)$ as a reduced form, being a function of estimated or measured productivity, estimated or measured costs k_c, differences in finance constraints at the firm level (e.g., approximated by Tobin's q, cash-flow, or past growth of revenues, see D'Espallier and Guariglia, 2010), measured institutional quality of the banking sector and book keeping transparency at the country level (e.g., by using data from the World Bank's Doing Business Survey), measured or estimated bankruptcy risk and the level of risk-exposed assets, and measured corporate profit to (top) personal income tax differences. Such a reduced-form model may employ main effects as well as interactive terms between those explanatory variables of the incorporation decision. An alternative route to go would be structural analysis by imposing the functional form of the model on the data. Since the financial constraint is endogenous in our model, structural implementation would entail estimating a system of (bivariate binary) equations where the latent process determining the net gains from incorporation and the one determining financial constraints would be estimated jointly.

5 Conclusions

This paper provided a microfounded theory of taxes and firms' incorporation decision. We have analyzed a model where firms decide whether to adopt a corporate or non-corporate

legal form. In particular, we have studied two main arguments in favor of incorporation that are often informally recognized in the literature: limited liability and access to capital. We have derived these arguments in an agency model where firm transparency constrains managerial opportunism and thereby facilitates externally financed investment. We have found that better access to external capital is an important benefit of the corporate form when firms are finance constrained while the effect of limited liability on the incorporation decision is generally ambiguous. The theory has policy implications. First, as in standard empirical analysis, a higher differential corporate tax discourages incorporation. More novel results are that taxation of constrained firms is costly and imposes first order welfare losses. Taxes are more damaging to firms that are more constrained and have substantial unexploited investment opportunities with a high excess return on investment. Since the corporate status facilitates access to capital, corporate firms are less constrained and their excess return on investment is smaller. We therefore found that shifting the tax burden from non-corporate to corporate firms is welfare improving, if incorporation is effective in creating access to the capital market. As a result, at least some minor double taxation of corporate profits as under a classical system should be optimal for this reason. Corporations would thereby pay a 'fee' in exchange for the advantages of the corporate status. We have also shown that institutional reform towards better accounting and reporting standards or higher collateral value should help to relax finance constraints and yield important welfare gains.

Appendix

To derive the GNP identity, we first distinguish consumption of goods and private assets which are supposed to yield a separate amenity such as living in one's family house. Substituting π_j^* into (12) yields $W = C + \left[H - (1-p)\sum_j s_j \beta H_j\right]$ where goods consumption is $C = \sum_j s_j p\left[f\left(I_j\right) - iI_j\right] + A - (1-n)\,k$. From all entrepreneurs in organizational form j with a private asset H, a part $(1-p)\,s_j$ fails in the expansion stage and needs to liquidate the house to repay the safe loan. However, aggregate H-consumption and

welfare is reduced only by the consumer surplus or transaction cost βH_j from liquidating the private asset. After liquidating, the house is sold to someone else with valuation L which is part of the 'housing consumption' in the square bracket above.

The GNP identity follows upon noting capital market clearing. International markets yield a safe interest normalized to zero. Given net foreign debt A^f, and using $A - (1-n)\,k = \sum_j n_j E_j - (1-n)\,t_k k$ as well as $I_j = D_j + L_j + E_j$, the market for loanable funds is $A^f = \sum_j s_j I_j + (1-n)\,k - A$, or

$$A^f + \sum_j (n_j - s_j)\,E_j = \sum_j s_j\,(D_j + L_j) + (1-n)\,t_k k. \tag{A.1}$$

The supply of loanable funds comes from foreigners plus failed start-up entrepreneurs who are left with E_j. Demand stems from firms (raising safe and risky debt) and the government which issues debt to cover tax losses from deductions of fixed costs. Using the equation prior to (A.1) and noting (3) yields the GNP identity where domestic end of period consumption equals (gross) output minus repayment of foreign debt, $C = \sum_j s_j p\,[I_j + f\,(I_j)] - A^f$. At the end of period, there is no new investment, the entire capital stock is disinvested and paid out.

References

[1] Almazan, Andres, Javier Suarez and Sheridan Titman (2009), Firm's Stakeholders and the Costs of Transparency, *Journal of Economics & Management Strategy 18,* 871-900.

[2] Armour, John and Douglas Cumming (2008), Bankruptcy Law and Entrepreneurship, *American Law and Economics Review* 10, 303-350.

[3] Atkinson, Anthony B. and Joseph E. Stiglitz (1980), *Lectures on Public Economics*, McGraw Hill.

[4] Beck, Thorsten, Asli Demirgüç-Kunt and Vojislav Maksimovic (2005), Financial and Legal Constraints to Growth: Does Firms Size Matter?, *Journal of Finance* 60, 137-177.

[5] Beck, Thorsten, Asli Demirgüç-Kunt and Vojislav Maksimovic (2008), Financing Patterns around the World: Are Small Firms Different?, *Journal of Financial Economics* 89, 467-487.

[6] Berkowitz, Jeremy and Michelle J. White (2004), Bankruptcy and Small Firms' Access to Credit, *RAND Journal of Economics* 35, 69-84.

[7] Bushman, Robert M., Joseph D. Piotroski and Abbie J. Smith (2004), What Determines Corporate Transparency?, *Journal of Accounting Research* 42, 207-252.

[8] Chaney, Thomas, David Sraer and David Thesmar (2010), *The Collateral Channel: How Real Estate Shocks Affect Corporate Investment*, NBER Working Paper No. 16060.

[9] Chetty, Raj and Emmanuel Saez (2009), Dividend and Corporate Taxation in an Agency Model of the Firm, *American Economic Journal: Economic Policy*, forthcoming.

[10] Crawford, Clair and Judith Freedman (2007), *Small Business Taxation*, Special Study in Selected Issues Undertaken for the Mirrlees Review, Oxford University.

[11] D'Espallier, Bert and Alessandra Guariglia (2010), Does the Investment Opportunities Bias Affect the Investment-Cash Flow Sensitivities of Unlisted SMEs?, unpublished working paper presented at the Annual Meeting of the Royal Economic Society at University of Surrey.

[12] de Mooij, Ruud A. and Gaëtan Nicodème (2008), Corporate Tax Policy, Entrepreneurship and Incorporation in the EU, *International Tax and Public Finance 15,* 478-498.

[13] Demirgüç-Kunt, Asli, Inessa Love and Vojislav Maksimovic (2006), Business Environment and the Incorporation Decision, *Journal of Banking and Finance* 30, 2967-2993.

[14] Department of Treasury (1977), *Blueprints for Basic Tax Reform*, Department of the Treasury.

[15] Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer (2002), The Regulation of Entry, *Quarterly Journal of Economics* 117, 1-37.

[16] Egger, Peter, Christian Keuschnigg and Hannes Winner (2009), *Incorporation and Taxation: Theory and Firm-level Evidence*, CESifo Working Paper No. 2685.

[17] Fan, Wei and Michelle J. White (2004), Personal Bankruptcy and the Level of Entrepreneurial Activity, *Journal of Law and Economics* 46, 543-568.

[18] Gentry, William M. (1994), Taxes, Financial Decisions and Organizational Form. Evidence from Publicly Traded Partnerships, *Journal of Public Economics* 53, 223-244.

[19] Goolsbee, Austan (2004), The Impact of the Corporate Income Tax: Evidence from State Organizational Form Data, *Journal of Public Economics* 88, 2283-2299.

[20] Goolsbee, Austan (1998), Taxes, Organizational Form, and the Deadweight Loss of the Corporate Income Tax, *Journal of Public Economics* 69, 143-152.

[21] Gordon, Roger H. (1998), Can High Personal Tax Rates Encourage Entrepreneurial Activity?, *IMF Staff Papers* 45, 49-80.

[22] Gordon, Roger H. and Jeffrey K. MacKie-Mason (1994), Tax Distortions to the Choice of Organizational Form, *Journal of Public Economics* 55, 279-306.

[23] Gordon, Roger H. and Jeffrey K. MacKie-Mason (1990), Effects of the Tax Reform Act of 1986 on Corporate Financial Policy and Organizational Form, in: Joel Slemrod (ed.), *Do Taxes Matter? The Impact of the Tax Reform Act of 1986*, Cambridge: MIT Press, 91-131.

[24] Gordon, Roger H. and Joel B. Slemrod (2000), Are "Real" Responses to Taxes Simply Income Shifting Between Corporate and Personal Tax Bases?, in Joel B. Slemrod (ed.), *Does Atlas Shrug? The Economic Consequences of Taxing the Rich*, New York: Russell Sage Foundation and Cambridge, MA: Harvard University Press, 240-280.

[25] Hermalin, Benjamin E. and Michael S. Weisbach (2007), Transparency and Corporate Governance, *NBER Working Paper* No. 12875.

[26] Holmstrom, Bengt and Jean Tirole (1997), Financial Intermediation, Loanable Funds and the Real Sector, *Quarterly Journal of Economics* 112, 663-691.

[27] Institute for Fiscal Studies (2010), *Dimensions of Tax Design: The Mirrlees Review*, Oxford University Press.

[28] Kaplow, Louis (2008), The Theory of Taxation and Public Economics, Princeton University Press.

[29] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny (1997), Legal Determinants of External Finance, *Journal of Finance* 52, 1131-1150.

[30] — (1998), Law and Finance, *Journal of Political Economy* 106, 1113-1155.

[31] — (2000), Investor Protection and Corporate Governance, *Journal of Financial Economics* 58, 3-27.

[32] MacKie-Mason, Jeffrey K. and Roger H. Gordon (1997), How Much Do Taxes Discourage Incorporation?, *Journal of Finance* 52, 477-505.

[33] Martynova, Marina and Luc Renneboog (2009), *A Corporate Governance Index: Convergence and Diversity of National Corporate Governance Regulations*, unpublished working paper.

[34] Meade Committee (1978), *The Structure and Reform of Direct Taxation*, George Allen & Unwin (cited as 'Meade Report').

[35] Musgrace, Richard A. (1959), *The Theory of Public Finance*, McGraw Hill.

[36] Rajan, Raghuram G. and Luigi G. Zingales (1998), Financial Dependence and Growth, *American Economic Review* 88, 559-586.

[37] Sivadasan, Jagadeesh and Joel Slemrod (2008), Tax Law Changes, Income-Shifting and Measured Wage Inequality: Evidence from India, *Journal of Public Economics 92*, 2199-2224.

[38] Spamann, Holger (2010), The "Antidirector Rights Index" Revisited, *Review of Financial Studies 23*, 467-486.

[39] Tirole, Jean (2006), *The Theory of Corporate Finance*, Princeton University Press.