THE CORPORATE VEIL REVISITED

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Resumo

Lucros Retidos ao Invés de Dividendos Afetam a Poupança Privada? Um Estudo Macroeconômico sobre o Véu da Empresa nos EUA.

Há hoje um consenso nos EUA sobre a necessidade de se aumentar a taxa de poupança privada. Uma das questões em discussão é se existe ou não o véu da empresa (*corporate veil*). O véu da empresa existe se, dada a riqueza constante, uma redução na poupança das empresas não é totalmente contrabalançada pelo acréscimo da poupança pessoal, deixando inalterados a poupança privada e o consumo das famílias. A existência desse véu implicaria que a reforma tributária de 1986 nos EUA – a qual entre várias outras mudanças transferiu parcela da carga tributária das pessoas físicas para as empresas – faria a poupança privada cair ainda mais. Discute-se a literatura e procedem-se testes econométricos usando-se dados agregados. A principal conclusão da parte empírica é que há indicações da existência do véu da empresa, embora uma resposta definitiva não possa ser obtida com dados agregados. Ao final, propõe-se uma extensão deste artigo utilizando-se dados desagregados por famílias.

Palavras-chaves: Véu da empresa, dividendos, poupança, consumo.

Abstract

The need to boost the saving rate in the U.S. brought renewed attention to the corporate veil topic. If the mere fact of carrying wealth through the corporate threshold can affect private saving and personal consumption, then tax changes, as the 1986 tax reform, may have very deleterious effects. The issue in question is whether a $1 reduction in corporate saving, given constant wealth, is matched exactly by a $1 increase in personal saving, leaving private saving and personal consumption unchanged. The literature is surveyed and one extension using aggregate data is carried out. Unfortunately, no clear cut answer can be obtained with the use of aggregate data due to theoretical and empirical problems. A proposal to further investigate the topic using micro data is outlined.

Key Words: Corporate veil; dividendos; saving; consumption

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I thank Orazio Attanasio, Robert Hall, Fabio Giambiagi, Andrew Bernard, Peter Klenow, an anonymous referre and especially John Shoven for many helpful comments. James Poterba kindly provided one of the data sets used in this paper. This paper was written as part of the second year requirements of the Economics Department Ph.D. program at Stanford University. Financial support from CNPq and BNDES are gratefully acknowledged.

1. Introduction.

The decline of the saving rate of the US economy in the 80's has brought renewed attention to the topic of the determinants of saving. If greater saving rates are believed necessary to sustain higher long term growth, tax policies should promote saving. Among the several componentes of the research agenda on the determinants of saving, the corporate veil issue has received a great deal of attention because of its dramatic implications in the public finance and macroeconomic fields. If cash payments from corporations to individuals, which decrease corporate saving, are not counterbalanced by increased personal saving, then the tax treatment of corporate income, specifically how it differentiates between dividends and retained earnings, is of paramount importance in the determination of private saving. The issue in question is whether a US$1 reduction in corporate saving, given constant wealth, is matched exactly by a US$1 increase in personal saving, leaving private saving and personal consumption unchanged.[1]

In the next section we review the literature on the corporate veil topic. Two papers receive special attention, Auerbach and Hasset (1989) and Poterba (1989). In the third section we consider an extension of those works using aggregate data. Due to the noise generated by aggregation across all wealth classes of the population and due to econometric difficulties, no clear cut answer can be obtained with aggregate data. Conclusions are presented in the last section, as well as a proposal to extend the pesent study using the available micro data.

2. Survey of the literature.

The corporate veil topic belongs to the literature on the determinants of saving. More specifically, it deals with questions of how much information is taken into account by agents when they are making saving (consumption) decisions, and what is the

[1] As Auerbach and Hasset (1989) put it: "... a corporate veil would exist if a shift in the distribution of *an individual's* wealth among corporate and noncorporate forms, holding his overall wealth constant, affected that individual's consumption. We therefore rule out changes in relative asset values that also affect aggregate wealth or the distribution of aggregate wealth among individuals as useful in the search for a corporate veil" (Auerbach and Hasset (1989), pp.3, emphasis mine).

relevant time span for this decision. Standard economic theory tells us that a pure change in the timing of payments – i.e., **for a given profit level** whether a corporation decides to pay later (keep retained earnings), rather than sooner (pay dividends) – should have no effect in the present discounted value of household's income from corporations, and therefore should **not** affect private saving (although it will probably affect personal saving) and personal consumption.[2] Share repurchases and leveraged buy-outs (LBO's), as long as they do not change the agent's valuation of his assets, fall in this same neutrality or Ricardian Equivalence proposition.

A thorough exposition of why the neutrality proposition would fail may be found in Poterba (1987). For the neutrality proposition to hold, we require that households have equal marginal propensity to consume (mpc) out of changes in the present discounted value of either labor income, capital gains or dividend payments (this, in turn, requires that households face no liquidity constraints, and perceive changes in equity values as permanent shocks). If these mpc's differ, alternative forms of corporate veil will arise. If the mpc out of the present discounted value of labor income differs from the other two, a revenue-neutral change from personal to corporate tax is likely to affect private saving and personal consumption. If the mpc out of the present discounted value of the dividend stream differs from the one out of the corporate gains stream, the best known form of the corporate veil shows up. It is commonly referred to as the "bird-in-the-hand" effect, and corresponds to the anecdotal evidence that stock-holders would consume more when they receive a check in

[2]This is not true if liquidity constraints are present. However, it is very implausible to have liquidity constraints among stockholders that could be relaxed by dividend payments, because the assets could be sold in the first place or used as collateral to borrow and relax the constraints. The distribution of share ownership is very concentrated among wealthy individuals (see Curtin, Juster and Morgan (1989)), making liquidity constraints implausible aggregate restrictions within this group.

Another consideration is that taxation on realization rather than accrual reduces the effective tax burden. If the statutory capital gains tax rate were equal to tax rate on dividends, and the investor's discount rate did not exceed the rate of return, the present discounted value of household's income from corporations would **increase** when profits are retained (and the stock not sold) instead of distributed as dividends.

the mail than they would if the corporation decided to retain the profits and they had to sell the stocks themselves to realize the capital gains. Furthermore, to guarantee the absence of a corporate veil we also require the net change in the market value of corporate equity not to diverge from the net change in corporate taxes.

On the corporate side, two counteracting effects may cause the net change in the market value to depart substantially from the net change in corporate taxes. If managers invest retained earnings in projects yielding below-market returns, then tax-induced shocks to free cash flow will decrease share values by less than the full increase in corporate taxes.[3] On the other hand, "... if internally and externally financed projects yield different returns not because managers misappropriate funds, but because the imperfect observability of new project quality leads external financiers to demand rates of return *above'* the investors' discount rates to compensate for the risk of being lured into unprofitable projects, then higher corporate tax burdens compound a preexisting distortion" (Poterba (1987), pp.495). Which of these two effects, if any, predominates is a matter of empirical testing. This test, however, would require a complete model of corporate behavior, since actual tax changes are not lump sum levies, affecting incentives for investment and many other aspects of corporate behavior.

On the household side, two effects are also believed to be important. Firs, if households do not consider change in the market value of the assets to be as "permanent" as dividend payments, the marginal propensity to consume out of such perceived transitory wealth will be lowr than that out of changes in dividends. When one thinks of an informed maximizing agent, it is hard to imagine why the gains or losses in the stock-market would be perceived as "transitory."[4] For when there are gains, the agent can

[3] "An increase in corporate taxes will be partly financed by lower levels of managerial misappropriation, so higher corporate taxes combat a preexisting distortion in the market for corporate control. Even if households exhibit equal marginal propensities to consume out of capital gains and disposable income, a revenue-neutral increase in corporate tax burdens could therefore raise consumption" (Poterba (1987), pp.494/5).

[4] In his comments to Poterba (1989), Hall mentions the possible existence of a similar effect, which can be explained by standard economic theory. He refers to the case of forced realizations from merger and related activity. "If the

always sell the stocks and transform the "transitory" gains in permanent ones. *Abstracting from taxes and transaction costs*, there is no reason why a $1 retained (and reflected in the stock price) would affect consumption any differently from a $1 distributed as dividend. If there are losses, the "transitoriness" claim would lead us to believe that a greater fall in consumption would come about when the firm choose to reduce its "expected" dividends (as long as the dividends paid are nonnegative) than when the firm chooses to decrease its value. For example, suppose that a firm suffers an unexpected loss of $100 in a given year, which it is not presumed to repeat itself in the future. The firm could either reduce the customary dividend paid for its 100 shares by $1, or keep these dividends constant and let the price of its stocks fall by $1 each. If the "transitoriness" effect holds, shareholders will decrease consumption more if dividends fall. So, if the firm let prices fall by $1 instead of reducing dividends by the same amount, shareholders that perceive this loss as "transitory" will not fully adjust as they would if dividends fell. But if this happens, it must be the case that the shareholder believes that the stock price is undervalued, i.e., that the $ 1 fall was "too much". However, if this is the case, the shareholder faces a positive change in his investment opportunity set (the stock price is less than the perceived value), which induces him to invest (save) more and consume less. How important this latter effect is depends on the model considered, in particular on the utility function chosen.[5] In any case, this effect would tend to make the investor react in the same direction as if

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wealth variable in the consumption function measures the change in wealth associated with buyouts correctly, then the coefficient on the actual buyout proceeds should be zero, his null hypothesis. Even when the buyout occurs at a large premium to immediate past market value, consumption should respond only to the resulting incrase in total wealth. However, in an economy where corporations are valued persistently far below their breakup values, there is room for a difference between shareholders' valuations and market value. Waves of buyouts, stimulated by changes in laws and regulations, could well enter the Ando-Modigliani consumption function because they raise shareholders' valuations in relation to current market value. Hence Poterba's null hypothesis is not obviously a correct characterization of rational consumer behavior" (Poterba (1989), pp.5). Since the investor's valuation of his corporate wealth is not observable, no test in the literature has so far accounted for the possibility mentioned by Hall.

[5] Iflog utility is assumed, consumption-investment decisions are invariant with respect to changes in the investment opportunity set.

dividends were reduced, i.e., save more.

However, nothing that was said above really has the flavor of the informal argument that is invoked to justify investor's inertia with respect to their portfolios when the stock market changes. The informal argument seems to rely more on lack of information of the portfolio behavior. So, when the investor receives dividends, it works as if he were receiving information that his wealth had increased. If management uses dividend payments as a way of signaling its evaluation of the present and future performance of the firm, this may very well be an explanation. Dividends are known to be highly stable. Unless a "permanent" or "repeatable" change has occurred, management will prefer not to change the habitual dividends. Nevertheless, it is farfetched to invoke an explanation based on the assumption that a large number of investors rely mainly on the level of dividends to extract information on the corporation's performance.

The second effect on the household side is completely accounted for in standard economic theory. A revenue-neutral tax reform will most likely redistribute wealth among households. If such redistribution benefits households with lower (higher) marginal propensities to consume, private saving will rise (fall), even when all households pierce the corporate veil.[6]

Many authors invoke irrational behavior or myopia (people do not see far enough in the future) as possible explanations for

[6] "Interhousehold differences in saving propensities may arise from factors that affect saving propensities at all ages as well as from life-cycle considerations. Variation in rates of time-preference or bequest motives could explain saving differences that persist throughout the life-cycle. Households with lower time-preference rates will consume less in their early years and acquire a larger stock of wealth at the peak of the life-cycle trajectory than will households with higher time-preferences rates. Asset holders will therefore have a higher saving rate than recipients of labor income, as in the growth models developed by Nicholas Kaldor and others. Revenue-neutral increases in corporate taxation will therefore reduce private saving, since they place higher burdens on high-saving households. Life-cycle differences is saving behavior may alter this result. Most assets are held by older individuals, who might be expected to have a low marginal propensity to save. A corporate tax increase that reduces the value of the corporate capital stock therefore transfers wealth away from households with high marginal propensities to consume, potentially raising saving. The net effect of a revenue-neutral reform depends on the distribution of equity ownership and the magnitude of the differences in consumption propensities" (Poterba (1987), pp.496/7).

the corporate veil. Several empirical studies have attempted to test the neutrality proposition (for example, that it does not matter for private saving whether profits are retained or distributed as dividends), with mixed results. This body of modern empirical literature can be traced down to Denison's (1958) observation that gross private saving was more stable than either personal or corporate gross saving. Other papers followed, trying to test whether there is total or only partial offsetting between corporate and personal saving (for references, see footnote 56, in Poterba (1987), pp.497).

The first empirical issue is to determine the variables that will enter the test. While the whole motivation of the study has to do with private saving, unavoidable problems of how to split private saving between corporate and personal saving make private saving a very problematic concept to deal with. Poterba (1987) has a lengthy exposition of such problems. He raises three main problems. The first one is the treatment of corporate pensions. The second is the national account's failure to adjust corporate saving for inflationary gains on corporate debt. However controversial, solutions that provide a fairly high degree of consistency among definitions can be found for these two problems; for example in Poterba (1987). Unfortunately, this is not the case for the third problem. As Poterba clearly states: "... it is impossible to avoid some inconsistency in distinguishing personal from corporate saving. Distinguishing stock repurchases from other types of asset purchases, including purchase of stock in other companies, would link the corporate saving rate to the type of assets purchased by corporations. Treating share repurchases and dividends alike would led to inconsistencies between asset transactions that transferred cash from firms to households. If a household were to sell a patent or equity in a partnership to a corporation, the sale would not alter measured corporate saving, while selling corporate stock back to the firm would. Moreover, if share repurchases were considered net dissaving, then debt-financed common stock repurchases would affect measured saving, evey though, these transactions simply exchange one security for another. In principle, corporate saving could be measured net of all asset transactions. It would then correspond to gross capital formation within the corporate sector. But that is not the concept that the national income accountants, concerned with the share of corporate in-

come that is reinvested within the corporate sector, attempt to measure" (Poterba (1987), pp. 461/2).

Since the existing empirical literature on this topic has dealt basically with aggregate data, a natural step to solve the problem above is to restate the model in terms of effects on personal consumption, instead of on private saving.[7] This change, however, may generate other problems. Saving (and wealth) is much more concentrated than consumption. Stock ownership, in particular, is very concentrated (the 1983 Survey of Consumer Finance shows that 51.3% of the total holdings of common stock and mutual fund shares belongs to the 0.8% upper classs; see Curtin, Juster and Morgan (1989), table 10.8, pp.504).Mankiw and Zeldes (1989) provide empirical evidence that stockholders behave much more like intertemporal utility maximizers than non-stockholders do. Therefore, substituting personal consumption for private saving as the dependent variable amounts to changing from a variable that is basically determined by the top 10% of income distribution to one that is determined by a much larger fraction of the population. This may lead to problems when interpreting the econometric coefficients. A hypothetical example is given below of a situation where such problems may occur.

Imagine that the majority of the population has its consumption expenditures constrained by liquidity considerations. This portion of the population contributes negligibly to personal saving. On the other hand, the wealthier portion of the population is responsible for most of the saving, and does not have liquidity constraints. Assume also that there is a corporate veil, and that dividends payments are positively correlated with income, but not

[7] In his comments to Poterba's (1987) paper, Hall says: "Although Poterba sees the ultimate issue as the effect of financial decisions upon consumption, the paper actually operates within the traditional framework of splitting saving into corporate and personal components and then asking if there is complete offset in personal saving when financial policies change corporate saving without any change in corporate fundamentals. As a result, much of the early part of the paper is the struggle of a well-trained economist with the elusive concept of saving. Poterba follows in the footsteps of Irving Fisher, Milton Friedman, and Franco Modigliani in finding that the definition of saving is inherently arbitrary. But rather than restating the question to avoid dealing with saving (the solution adopted by his predecessors), Poterba works with various arbitrary definitions in spite of his full recognition of their defects" (Poterba (1987), pp.504).

with wealth. If we could legitimately regress private saving against dividend payments and other variables, the estimated coefficient on dividends would be negative and significant, indicating the existence of the corporate veil. On the other hand, when personal consumption is used as the dependent variable, two factors will hide this fact. First, personal consumption is largely determined by current income, because the liquidity constrained households are responsible for most of aggregate consumption, especially so if durables are excluded from consumption. So, the effect of dividend payments on consumption is small when compared to the effect of income. Second, since dividends and income are collinear, the standard error of the dividend coefficient will increase, giving very low power to the test (the dividend coefficient will probably show up positive, as it should be, but statistically insignificant). Therefore, the use of aggregate personal consumption as the dependent variable may veil the corporate veil.[8] Needless to say, this is an aggregation problem. With the above assumptions, the problem is the existence of two types of agents: the "typical" saver, whose consumption decisions obey an intertemporal maximization problem constrained only by lifetime wealth; and a "typical" consumer, whose consumption decisions are bounded also by liquidity constraints. Were it feasible to observe these decisions at the level of the household, or at least at a lower level of aggregation where one could differentiate the "typical" saver from the "typical" consumer, we would not incur in this aggregation problem.

Despite the caveat above, most modern studies on the corporate veil issue use an aggregate model to derive some test of how wealth-neutral corporate cash payments to individuals (usually dividends) affect consumption (saving). As we saw above, economic theory says that no effect should occur. The key point is the wealth neutrality of the cash payments, because if the consumption feasibility set is altered, so are consumption expenditures. If dividends are positively correlated with wealth, standard economic theory predicts a positive and statistically significant coefficient of dividends in a regression with personal consump-

[8] If the true model is that no corporate veil exists, the problem is not so severe. This is because the dividend coefficient will have its standard error inflated, but its value will still be around zero.

tion as the dependent variable. This is a problem of econometric endogeneity; both consumption and dividends are driven by an omitted variable, for example, a very good crop or a technological breakthrough that increases wealth. Therefore, only movements in dividends that are orthogonal to wealth are of interest in a test for the corporate veil.

Finding wealth neutral changes is not an easy task. Share repurchases and LBO's are believed to raise significantly the market and investors' valuation of the stocks, therefore expanding the consumption feasibility set. To conclude that consumption rises when stockholders have their stocks converted into cash in a LBO may simply mean that wealth has increased.

To circumvent the endogeneity problem, Poterba (1987 and 1989) calculated the tax preference parameter θ_t, which is a weighted average across shareholders of after-tax income associated with dividend payout, divided by the after-tax income associated with undistributed profits:

$$\theta_t = \sum_{i=1}^{S} w_{it} \cdot \frac{(1 - m_{it})}{(1 - z_{it})(1 - \tau_t^{\nu})} \qquad (1)$$

where S is the number of distinct shareholder classes in the analysis,

w_{it} is the weight of investors in class i,

m_{it} is the marginal dividend tax rate on investors in class i,

z_{it} is the accrual-equivalent capital gains tax rate, and

τ_t^{ν} is the rate of tax on undistributed profits.

Poterba (1987) shows that the relative tax burdens on dividends and capital gains affect the fraction of corporate earnings that are distributed to shareholders. If this tax preference parameter, θ_t, is orthogonal to wealth, it can be used as the identifying assumption in the econometric model. Although the orthogonality between θ_t and wealth seems to be plausible, there is no firm theoretical ground for such assumption.

Another way to avoid the joint endogeneity problem is to invoke rational expectations. Changes in dividends that **are anticipated** should not have any effect on consumption. Auerbach and Hasset (1989) use this approach to build their test of the corporate veil.

We shall now concentrate on these two ways of testing for the presence of a corporate veil with aggregate data. Given the objections mentioned above to the use of saving as the variable to construct the test, we shall analyze only the two papers that account both for the joint endogeneity problem and use consumption instead of saving: Auerbach and Hasset (1989) and Poterba (1989).

2.1. Auerbach and Hasset (1989).

Auerbach and Hasset (1989) test two implications of the permanent income hypothesis (PIH) related to the presence of the corporate veil. The first testable implication from the PIH analyzed by the authors is that "... the changes in dividend policy that are anticipated, and hence provide no new information to shareholders in estimating their wealth, do not affect aggregate consumption" (Auerbach and Hasset (1989), pp.7). Following the tradition initiated by Hall (1978), they derive the testable implication from the Euler equation of a representative agent intertemporal optimization problem. They assume a CES utility function, and that a fraction λ of the agents in the economy are liquidity constrained (following the modeling of Campbell and Mankiw (1987)). The estimated equation is:[9]

$$\Delta C_t = \mu' + \sigma' r_t^e + \lambda_1 \Delta y l_t^e + \lambda_2 \Delta y k_t^e + \lambda_3 \Delta d_t^e + e_t' \qquad (2)$$

where

$\Delta C_t =$ first-difference of consumption (excluding durables);
$\mu' =$ constant term;
$r_t^e =$ expected real rate of return;
$\Delta y l_t^e =$ first-difference of expected labor income;
$\Delta y k_t^e =$ first-difference of expected capital income (excluding dividends);
$\Delta d_t^e =$ first-difference of expected dividend income.

If PIH holds, $\lambda_i = 0$, $i = 1,2,3$. The estimation for quarterly data is done by instrumental variables. The instruments are

[9] They also estimate other forms of the same equation without decomposing the income term. See equation 7, Auerbach and Hasset (1989), pp.11.

the second, third and fourth lags of consumption and income (labor, capital ex-dividends and dividends), the second lag of the six month T-Bill rate, and second, third and fourth lags of pre-tax corporate profits and the after-tax return to shareholders of a dollar distributed versus a dollar retained (θ_t). The main empirical finding is that the **no** veil hypothesis ($\lambda_3 = 0$) cannot be rejected.

Three main qualifications must be highlighted when analyzing this result: two concerning the modeling, the third concerning the estimation process. In what concerns the modeling, there is no a priori reason to believe that the proportion λ of people that are liquidity constrained remains fixed over time. The econometric implication of such simplification is the following. Suppose the true model is (2a).

$$\Delta C_t + \text{ (other variables) } + \lambda_t \Delta d_t^e + e_t \qquad (2a)$$

We can always rewrite (2a) as (2b).

$$\Delta C_t = \text{(other variables) } + \lambda \Delta d_t^e + [e_t + (\lambda_t - \lambda)\Delta d_t^e] \qquad (2b)$$

So, $(\lambda_t - \lambda)\Delta d_t^e$ will be incorporated in the error term. Since the instruments are lagged two periods, no inconsistency is likely to arise from this fact. However, the test will certainly lose power.

The second qualification concerning the modelling is that their null hypothesis states that an increase in expected dividends does not relax liquidity constraints and, by doing so, spur consumption. Adherents of the corporate veil view usually have in mind other mechanisms, as myopia or irrationality, to justify their beliefs. Concerning the estimation, the use of two-quarter lagged instruments, necessary to correct for the MA(1) error term, makes very implausible that an already weak effect (the corporate veil) will survive the instrumenation.[10]

[10] In his comments ot Auerbach and Hasset (1989), Deaton says: "In order to avoid time-aggregation effects,
are used in the regressions, but for many of the variables, such instruments have only very poor explanatory power. In consequence the standard errors are large, so that in the conclusion that anticipated dividends do not significantly affect changes in consumption, it is the word "significantly" that ought to be emphasized, not the words "do not". While it is true that the significance of the income term [λ_1] survives the instrumentation, it is a good deal larger to start with, larger than we would expect the dividend term to be, even if we accepted (...) that dividends get spent" (Deaton (1989), pp.2).

The second testable implication from the PIH analyzed by the authors is that "... the response of changes in consumption to changes in different forms of wealth (corporate versus non-corporate) are equal" (Auerbach and Hasset (1989), pp.7). The difference between this implication and the first one is that, in the later model, no wealth neutrality (including the requirement of keeping wealth distribution unchanged) is required.

The test is based on the theoretical implication of the PIH that consumption should be a constant fraction of wealth, if interest rates are held constant. Therefore, consumption and wealth should be co-integrated, and the error term from equation (3) below should be stationary.[11]

$$C_t = \mu(A_t + H_t) + e_t \tag{3}$$

where A_t = non-human wealth;

H_t = human wealth.

The authors do not find e_t to be stationary, and therefore reject the hypothesis of co-integration. When income is included in the relation, see equation (4) below, the hypothesis of co-integration cannot be rejected. This is interpreted as further evidence of liquidity constraints.

$$C_t = k + \mu_1 H_t + \mu_2 NCW_t + \mu_3 CW_t + \lambda_1 YD_t + \lambda_2 D_t + \varepsilon_t \tag{4}$$

where k = constant;

NCW_t = non-corporate wealth;

CW_t = corporate wealth;

YD_t = current income (ex-dividends);

D_t = current dividend income.

The regressions are carried out both in levels and in first-differences. The major finding of this part of the paper is that the aggregate marginal consumption out of corporate equities is very close to zero. The authors point out that this puzzling result may follow simply from the highly concentrated distribution of corporate wealth among households associated with the higher propensity to save from these wealthy households. Therefore, it would be desirable to redo the analysis with a dataset in which

[11] See equation (9), Auerbach and Hasset (1989), pp.21.

we could separate the upper fraction of the income distribution to see if this results still held.

In this comments to the paper, Hall questioned the general model specification. The traditional consumption function can be characterized as

$$C_t = \alpha(r, \sigma)(A_t + H_t) \tag{5}$$

where α = fraction of current wealth at time t;
r = rate of return;
σ = intertemporal elasticity of substitution.

The literature suggests that σ is close to zero. Therefore, the authors should use $\alpha(r,0) = r$, meaning that there is no intertemporal substitution. Hence, the consumption function can be rewritten as

$$C_t = r_t A_t + r_t H_t \tag{6}$$

The authors proxied for $r_t H_t$ with a measure of labor income, y_t^H, although they did that because H_t cannot be measured directly. What Hall seems to disagree with is the use of A_t in the regression, instead of a proxy for $r_t A_t$, as capital income, y_t^K. He suggests that the zero coefficient on corporate wealth may be due to this fact. A test for this hypothesis is presented later in this paper.

2.2. Poterba (1989).

The aim of the paper is to investigate "... the effects of increased cash payout, and of 'forced realization' of capital gains in corporate control transactions, on the aggregate level of aggregate consumption" (Poterba (1989), pp.1). He uses data for Britain, Canada and the U.S..

Poterba's consumption function is

$$C_t = \alpha_0 + \alpha_1 A_t + \alpha_2 H_t + \alpha_3 SHR65_t + \alpha_4 D_t + \varepsilon_t \tag{7}$$

where $SHR65_t$ = fraction of the population aged 65 or greater (see equation (1), Poterba (1989), pp.6).

The variables A_t and H_t are measured at the beginning of the period. The null hypothesis (no corporate veil) is that α_4 should be zero, provided that the source of variation on D_t is uncorrelated with other news that may affect consumption. The identification assumption is that θ_t affects D_t, but cannot affect

consumption in any other way.[12] If θ_t indeed affects D_t, as a previous work (Poterba (1987)) shows to be true for the U.S. data, then an equivalent test can be constructed by replacing D_t by θ_t in the regression, instead of applying instrumental variables. Equation (8) (see equation (4), Poterba (1989), pp.8) is the estimated equation, and the null hypothesis is $\alpha_5 = 0$ (no corporate veil).

$$C_t = \alpha_0 + \alpha_1 A_t + \alpha_2 H_t + \alpha_3 SHR65_t + \alpha_5 \theta_t + \varepsilon_t \qquad (8)$$

No the that Poterba's specification is quite similar to Auberbach and Hasset's (see equation (4)). Like them, Poterba uses labor income as a proxy for human wealth, but includes property wealth (A_t) instead of capital income in the regression. Poterba then extends the test to include the cash payments to shareholders in corporate control transactions, the idea being that those cash payments are involuntary conversions of stocks to cash. He acknowledges that the level of corporate takeovers may lead to asset revaluations, and tries to control for this effect by replacing A_t by A_{t+1} in equation (9).

This however may lead to inconsistent estimates, since A_{t+1} and ε_t are most likely correlated.

$$C_t = \alpha_0 + \alpha_1 A_t + \alpha_2 H_t + \alpha_3 SHR65_t + \alpha_5 \theta_t + \alpha_6 CASHMERG_t + \varepsilon_t \qquad (9)$$

where $CASHMERG_t$ = cash payouts in control transactions.

A caveat is required here. If there are significant transaction costs, involuntary cash realizations can indeed spur consumption. One does not have to invoke myopia or irrationality to explain the increase in consumption in this case.[13] This is particularly true

[12] "This assumption is open to question since much of the variation in the relative tax burden on dividends, especially in the United States, is due to systematic tax reforms which also affect the tax burdens on other types of capital income. Evidence from Hall (1988) and other studies, however, suggests that changes in after-tax asset returns are virtually uncorrelated with time-series movements in consumption growth. The identifying assumption is therefore unlikely to be seriously violated" (Poterba (1989), pp.33/4).

[13] Given constant wealth, if one expects to receive an amount of cash in excess of his needs of current consumption (it does not matter whether this cash comes as dividend income or as forced realizations), and there are costs to recompose the portfolio, the "rational" reaction will involve an increase in consumption.

in the case of forced realizations, when supposedly shareholders would receive a significant amount of cash that they had preferred to keep in the form of stocks (or at least they did not act before to sell the stocks). Although Poterba mentions this possibility, he does not investigate it in the empirical part, maybe because he is more concerned with the final effect on consumption than with the mechanism that drives it. It may be worthwhile to try to determine empirically the relevance of this "excess liquidity" effect.

Poterba's results may be interpreted in the following way The PIH falls short of explaining all the movements in consumption. The residual noise is a low-frequency series, and is highly correlated with many other time-series, among them θ_t. Poterba conclude that this correlation is corroborative evidence for the corporate veil view. This can be seen in his results by noting that α_5 falls whenever a slow-moving time-series (as a time-trend) is included in the regression. The same happens when $SHR65_t$ is included in the regression.

Two results need further investigation. First, the coefficient of $SHR65_t$ is astonishingly high. Since $SHR65_t$ is a slow moving process, it must be serving as a proxy for some other effect that was omitted in the regressions. Second, α_5 for the U.S. is of one order of magnitude greater than for Britain or Canada. There is no theoretical reason why dividends should be that much more relevant in the U.S..

Regarding the estimation strategy, Poterba does the regressions both in levels and in differences. First-differencing kills a lot of explanatory power of low- frequency series, such as θ_t. And the whole test relies precisely on this variable. Therefore, Poterba's best results are in the regressions in levels. However, in this case, he is vulnerable to the spurious regression criticism. Therefore, Poterba's results can at best be marginally indicative of a corporate veil.

The main conclusion of this section is that aggregate tests are inconclusive on the corporate veil issue. This is because:

- The variable private saving cannot be split into corporate and private saving in a consistent way. This creates a problem because the "typical" saver, in which we are interested, may not behave in the same way the "typical" consumer does, mainly because the later is believed

to be constrained by liquidity considerations;

- When consumption is used as the dependent variable, other effects, as the existence of liquidity constraints, may contaminate the coefficient of the dividend variable;
- The econometric problems are very difficult to overcome: when a rational expectations approach is used, the two-period lagged instrumentation makes it very difficult to capture the possible corporate veil effect, even if it indeed exists; when the variable θ_t is used directly in the test, its slow moving character make its coefficient very easily disturbed by the inclusion of other slow moving variables, such as a time trend.

The following section presents some empirical tests using aggregate data intended to solve some of the problems just reviewed.

3. Empirical tests using aggregate time-series.

3.1. The model.

The model draws heavily on Sargent's (1987, chapter 3) exposition of Hall's (1978) consumption function. There is a representative agent who maximizes lifetime utility. The utility function is time-separable and has the following quadratic form:

$$U(C_t) = C_t - bC_t^2, \qquad 0 < b < 1 \tag{10}$$

R_t is the real gross rate of return. In this model, the random process (R_t) is degenerate, i.e., $R_t = R = 1 + r > 1$, for all t, with certainty. Labor income (y_t^H) is assumed to be an uncontrollable random process, evolving according to a stochastic process that the agent cannot affect, so that no joint determination of consumption and labor supply is allowed. Consumption decision at time t (C_t) is made without observing labor income at $t(y_t^H)$. Given these assumptions, the maximization problem at $t = 0$ is:

$$MAX\, E_0 \sum_{t=0}^{\infty} \beta^t U(C_t), \qquad 0 < \beta < 1 \tag{11}$$

$$\text{s.t.} \quad E_0 \sum_{t=0}^{\infty} C_t R^{-t} = A_0 + E_0 \sum_{t=0}^{\infty} y_t^H R^{-t} \tag{12}$$

where β is the discount rate (constant), and

A_t is property wealth.

The Euler equation is, therefore:

$$E_t C_{t+1} = \frac{2b\beta R - 1}{2b\beta R} + \frac{C_t}{\beta R} \tag{13}$$

We assume further that $\beta = R^{-1}$, and denote human wealth by H_t:

$$H_t = E_t \sum_{i=0}^{\infty} y_{t+1}^H R^{-i} \tag{14}$$

Substituting the Euler equation in the lifetime budget constraint we get the following closed form solution for consumption.[14]

$$C_t = \frac{r}{R}(\neg K + A_t + H_t) \tag{15}$$

$$K = \frac{2b-1}{2b} \sum_{t=0}^{\infty} R^{-t} t = \frac{2b-1}{2b} \left[R(1-R^{-1})^2\right]^{-1} \tag{16}$$

Following Hall's suggestion in his comments to Auerbach's paper, we proxy $[(r/R)A_t]$ by capital income (y_t^K), and $[r/R(H_t)]$ by labor income (y_t^H). In a model in which expected aggregate income does not grow, these simplifications amount to making the two concepts of income equation to the amount that could be consumed without altering the respective wealth concept (when there is growth, the approximation is still valid, but the coefficient of income will be affected). With these approximations, equation (15) becomes:

$$C_t = a + y_t^K + y_t^H \tag{17}$$

From this equation, we construct our test for the corporate veil by splitting capital income between dividend income and the other components of capital income. Furthermore, to focus only on those variations of dividend payments that are orthogonal to wealth, we instrument the dividends income with the variable θ_t.

[14] If $\beta R \neq 1$, then the coefficient of wealth is $\frac{\beta R^2 - 1}{\beta R^2}$.

As mentioned before, Poterba (1987) shows that the variable θ_t has good explanatory power for dividend payments in the U.S.. Following Poterba (1989), we directly replace the dividend income in the equation by the tax dividend bias variable (θ_t), instead of instrumenting with θ_t (this is because we are only interested on the t statistic, which is the same in both procedures, not on the level of coefficient itself). The equation we estimate is equation (18). Note that γ_1 and γ_2 are not assumed to equal 1 as in equation (17), because it may be the case that the discount rate differs from the inverse of the interest rate (see footnote 16) and this formulation also accommodates the general case of expected growth. The error term in equation (18) may be interpreted as being generated by the use of actual income as a regressor. The ideal regressor would be the certainty equivalent of income, which proxies for [(r/R) Wealth]. We assume that actual income differs from its certainty equivalent by a white noise error term.

$$C_t = \gamma_0 + \gamma_1 y_t^H + \gamma_2 y_t^K + \gamma_3 \theta_t + \eta_t \qquad (18)$$

If there is a corporate veil, γ_3 should show up positive and significant. To provide comparability with Poterba's (1989) results, we also estimate this equation adding a timetrend and the percentage of the population above the age of 65 ($SHR65_t$). Unlike Poterba, we do not correct for serial correlation in the errors using the Newey-West (White) procedure. This is because there is no *a priori* reason to believe that the errors will not be white noise. The low Durbin-Watson statistics that Poterba (1989) gets for the regression in levels come from the fact that he is dealing with I(1) variables. If equation (18) is not a co-integrating regression, the correction for auto-correlation in the errors will not provide the asymptotically correct test.[15]

The theoretical reason for expecting equation (18) to be a co-integrating regression comes from the PIH. If the PIH held,

[15] "While there are other consistent estimates of α [the unknown parameter in the co-integrating regression], several apparently obvious choices are not. For example, regression of the first differences of x_1 [one of the I(1) variables] on the differences of x_2 [the other I(1) variable] will not be consistent, and the use of Cochrane Orcutt or other serial correlation correction in the co-integrating regression will produce inconsistent estimates" (Engle and Granger (1987), pp.264).

we would expect that in the long-run consumption corresponds to a fraction of wealth. Given the assumptions and simplifications carried out so far, a test of the existence of this long-run equilibrium is a test of whether equation (18) is indeed a co-integrating regression. We perform this test in the next section.

3.2. Empirical results.

We estimate equation (18) with annual and with quarterly data. The annual data used is the same used in Poterba (1989). Capital income is constructed in from the Citibase nominal series, deflated by the implicit deflator for personal consumption expenditures on nondurables (GDCN). For consistency with the test, our measure of after-tax capital income excludes dividend payments. The quarterly data used is also from Citibase.

Tables 1 and 2 present the results for annual data. The critical values for the Dickey-Fuller (D.F.) and Augmented Dickey-Fuller (A.D.F.) tests are from Engle and Yoo (1987).[16] For the 10% significance level, the critical values of those tests are reported on the tables following the respective statistic.

On table 1, where consumption includes expenditures on durables, the only specification for which the coefficient of θ_t has the expected (positive) sign and is also significant is the third one (third column), which includes the time-trend and the percent of the population above 65. This specification variance-encompasses all the others.[17] However, if consumption does not include durables (table 2), the coefficient of θ_t is never signficant. For the third specification in tables 1 and 2, one of the co-integration tests (the D.F.) accepts co-integration (the Durbin-Watson is also higher than for the other specifications). The inclusion of durables in the consumption variable is controversial. This is because the purchase of durable consumption good may also be interpreted as a form of saving. The right consumption measure, however, should include the flow of services from the durables. We did not compute such a measure. Therefore, table 2 should be given somewhat more weight than table 1. With this caveat in mind, the results with annual data are only indicative of the existence of a corporate veil.

[16]The A.D.F. has four lags, i.e., $p = 4$ in the notation of Engle and Yoo (1987).

[17]I thank the anonymous referee for emphasizing this point.

Tables 3 and 4 present the results for quarterly data. Now, the coefficient of θ_t shows up positive and significant whenever either or both of the variables time trend or $SHR65_t$ is included in the regression. This result, however, is difficult to interpret. First, because in all regressions in which the coeffficient of θ_t is significant, the coefficient of capital income shows up with the wrong sign and significant. Second, because the A.D.F. test, which is the relevant test for this case where we are dealing with quarterly seasonally adjusted data, accepts the **non** co-integration hypothesis for all cases, but the last one.[18] As commented before, there is not a clear theoretical reason why the variable $SHR65_t$ should be included in the model.

Regarding the puzzle found by Auerbach and Hasset (1989) – that the aggregate marginal propensity to consume out of corporate wealth is near zero – we found that the annual results indicate that the marginal propensity to consume out of property wealth is indeed near zero.[19] The quarterly results, however, are mixed. When the time-trend and $SHR65_t$ are not included, the coefficient of capital income increases significantly with respect to the annual results. When either or both of those variables are included, the coefficient has the wrong sign. As pointed out by Auerbach and Hasset (1989), this result is likely due to the combined effect of aggregation across the different wealth classes of the population and the fact that property wealth is overwhelmingly owned by wealthy people with greater saving propensities.

In summary, the empirical results are indicative of the existence of a corporate veil. This result, however, is not fully conclusive, given the caveats discussed above. In the last section we propose another avenue of research using micro data that we hope will shed more light on the topic.

4. Conclusion.

The need to boost the savings rate in the U.S. has brought renewed attention to the corporate veil topic. If the mere fact of carrying wealth through the corporate threshold can affect private

[18]The first especification is also barely significant at the 10% level in table 4.
[19]Since we are using capital income as a proxy for [(r/R) property wealth], the coefficients cannot be interpreted as the aggregate marginal propensity to consume.

Table 1.
Total consumption, U.S., annual data, 1950-1987

Dependent Variable:	Per-Capita Total Consumption Spending (Levels, 1982 US$ per person)			
Constant	.263 (.651)	.200 (.758)	-8.77 (1.40)	-2.43 (1.06)
Per-Capita After-Tax Labor Income	1.05 (.051)	1.07 (.123)	1.26 (.0845)	.890 (.0697)
Per-Capita After-Tax Capital Income(*)	.167E-02 (.198E-03)	.171E-02 (.27E-03)	.403E-03 (.258E-03)	.803E-03 (.338E-03)
Dividend Tax Preference θ_t	-.410 (1.22)	-.416 (1.24)	2.90 (.938)	.938 (1.18)
Time-Trend		-.283E-02 (.164E-01)	-.091 (.0167)	
$SHR65_t$			89.4 (13.1)	34.5 (11.4)
R^{-2}	.99367982	.99349417	.99727328	.99490891
S.E.E.	.13474190	.13670653	.088503054	.12093258
D.W.	.61215039	.62646433	1.34013952	.50295246
D.F.	2.826645	2.847033	6.232852	3.369694
Critical Value (10%)	3.28	3.28	3.28	3.28
A.D.F.	2.518661	2.535057	2.730394	2.323686
Critical Value (10%)	2.90	2.90	2.90	2.90

Standard Errors in parentheses. All equations estimated by OLS.
(*) Does *not* include dividend payments.

saving and personal consumption, then tax changes, such as the 1986 tax reform, may have very deleterious results.

The literature on the corporate veil topic was surveyed. Two studies received special attention: Auerbach and Hasset (1989) and Poterba (1989). Since there is no consistent way of splitting private saving into corporate and personal saving, those studies focus on the effect of changes in dividend payments on aggregate personal consumption. Because consumption is determined by a much larger fraction of the population than saving, and because the "typical" consumer is believed to be liquidity constrained un-

Table 2.
Consumption (non-durables & services), US, annual data, 1950-1987

Dependent Variable:	Per-Capita Consumption Spending (Non-Durables and Services) (Levels, 1982 US$ per person)			
Constant	.992 (.428)	1.57 (.453)	-2.99 (.990)	-1.67 (.564)
Per-Capita After-Tax Labor Income	.907 (.0336)	.731 (.0737)	.827 (.0598)	.750 (.0369)
Per-Capita After-Tax Capital Income(*)	.126E-02 (.130E-03)	.982E-03 (.160E-03)	.320E-03 (.182E-03)	.403E-03 (.179E-03)
Dividend Tax Preference θ_t	-1.04 (.803)	-.989 (.741)	.698 (.663)	.289 (.627)
Time-Trend		.0258 (.00979)	-.0189 (.0118)	
$SHR65_t$			45.4 (9.24)	34.0 (6.02)
R^{-2}	.99582531	.99644559	.99791304	.99781306
S.E.E.	.088505719	.081666288	.062577184	.064058653
D.W.	.96418845	.77284028	1.12439804	.88317477
D.F.	3.599108	3.474712	5.631453	5.023323
Critical Value (10%)	3.28	3.28	3.28	3.28
A.D.F.	2.359575	2.219623	2.698022	2.350231
Critical Value (10%)	2.90	2.90	2.90	2.90

Standard Errors in parentheses. All equations estimated by OLS.
(*) Does *not* include dividend payments.

like the "typical" saver, the use of consumption instead of saving as the dependent variable may substantially increase the noise-to-signal ratio. Econometric difficulties added to the this problem and prevented those authors from reaching clear cut conclusions about the existence of a corporate veil.

The empirical part of this paper implemented tests for the corporate veil using aggregate time-series data. These tests solve some of the conceptual and econometric problems with the previous tests. The empirical results were indicative of the existence of a corporate veil, although they were not fully conclusive due to

Table 3.
Total consumption, U.S., quarterly data, S.A., 1947:1-1986:1

Dependent Variable: Natural Log of Per-Capita Total Consumption Spending				
Constant	1.69 (.122)	6.13 (.470)	5.09 (.594)	3.01 (.174)
Per-Capita After-Tax Labor Income	.705 (.029)	.335 (.045)	.434 (.0565)	.620 (.0254)
Per-Capita After-Tax Capital Income(*)	.122 (.026)	-.123 (.0328)	-.144 (.0330)	-.112 (.0331)
Dividend Tax Preference θ_t	.215 (.122)	.390 (.0982)	.482 (.102)	.542 (.105)
Time-Trend		.389E-02 (.4034E-03)	.242E-02 (.662E-03)	
$SHR65_t$			3.84 (1.39)	7.91 (.861)
R^{-2}	.98620236	.99138460	.99174374	.99107349
S.E.E.	028181551	.022268976	.02179988	.02266749
D.W.	.14094646	.13961053	.16840007	.20620513
D.F.	2.896819	3.404908	3.816599	3.956380
Critical Value (10%)	3.03	3.03	3.03	3.03
A.D.F.	2.626580	2.666454	2.904581	3.117552
Critical Value (10%)	2.91	2.91	2.91	2.91

Standard Errors in parentheses. Variables in logs of per-capita levels. All equations estimated by OLS.
(*) Does *not* include dividend payments.

unavoidable aggregation problems.

Micro panel data could provide definitive evidence for the corporate veil topic. Ideally, we would like to be able to merge household consumption information with complete financial information about the household's portfolio. This requires getting the Social Security number of the members of the households interviewed in the Consumer Expenditure Survey and obtaining access to their tax return files. This would allow us to actually observe how agents act when they receive dividends as opposed to when profits are retained. Unfortunately, we are not in the position of doing so.

Table 4.
Consumption (non-durables & services), U.S., quarterly data, S.A., 1947:1-1986:1

Dependent Variable:	Natural Log of Per-Capita Consumption Spending in Non-Durables and Services			
Constant	2.05 (.110)	6.65 (.384)	6.70 (.498)	3.17 (.163)
Per-Capita After-Tax Labor Income	.654 (.027)	.272 (.0366)	.267 (.0473)	.582 (.0238)
Per-Capita After-Tax Capital Income(*)	.130 (.0239)	-.124 (.0268)	-.123 (.0276)	-.0687 (.0310)
Dividend Tax Preference θ_t	.0763 (.111)	.257 (.0803)	.252 (.0853)	.353 (.0979)
Time-Trend		.402E-02 (.329E-03)	.410E-02 (.555E-03)	
$SHR65_t$			-.206 (1.16)	6.71 (.807)
R^{-2}	.9890959	.99334886	.99330619	.99094376
S.E.E.	.025534924	.018201457	.01825974	.021238896
D.W.	.13506201	.11553560	.11504690	.15642813
D.F.	2.988684	4.189561	4.172991	3.794145
Critical Value (10%)	3.03	3.03	3.03	3.03
A.D.F.	2.927852	2.873944	2.864494	3.158556
Critical Value (10%)	2.91	2.91	2.91	2.91

Standard Errors in parentheses. Variables in logs of per-capita levels. All equations estimated by OLS.
(*) Does *not* include dividend payments.

The feasible approach is to use only the consumption and financial information contained in the Consumer Expenditure Survey (CES). The drawback of that dataset is that we will not be able to observe the composition of household's portfolios of stocks, only their total amount (and there is only one observation for each household's total stockholdings, preventing first-differencing). Therefore, we would have to rely on a strong theoretical assumption to find a proxy for each household's retained earnings. We could assume, following the CAPM's results, that all households hold the same portfolio of risky assets, and therefore

use the average retained earnings from some broad portfolio (Standard and Poor's 500, Dow Jones, etc.) to all households. Such procedure would give us a noisy proxy of the actual retained earnings. Given the empirical evidence against the proposition that everybody holds the same diversified portfolio of risky assets, it is doubtful that such procedure would generate results acceptable by the profession. Another drawback is that the CES has been run on a regular basis only since 1980 (see Attanasio,Koujianou and Weber, 1989). The richness of the dataset is in the cross-section dimension. Our aim is to be able to disentangle the effects that combined at the aggregate level did not allow previous studies to provide a clear answer to whether there is or not a corporate veil.

Another possibility would be finding datasets in other countries that provided both financial and consumption information on the household.We are unaware of any such dataset, and would be very much grateful if any existing one were brought to our attention.

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(Originais recebidos em Dezembro de 1989. Revisto em Fevereiro de 1990)