

Capital Gains Taxation and Entrepreneurship

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Abstract

The taxation of capital gains is a perennial issue in tax policy. One critical aspect for understanding the overall effects of capital gains taxation is how these taxes affect entrepreneurs. While many analyses focus on the disincentive effects created by capital gains taxes for investors in large corporations, these disincentives may be even more important for entrepreneurs. This paper discusses several mechanisms through which capital gains taxes can affect entrepreneurs' decisions. First, capital gains taxes may create an additional level of taxation on successful entrepreneurs. Second, asymmetric taxation of capital gains and losses (in which gains are taxed more heavily than losses) may be an especially important issue for entrepreneurs; the asymmetries in the tax system may discourage entrepreneurs from taking risk. Third, much like the commonly-referenced lock-in effect of capital gains taxes on investments in stock, entrepreneurs may become locked into closely-held businesses; this lock-in effect may distort whether firms are owned by the most efficient manager for the firm. Fourth, capital gains taxes can affect the cost of capital for entrepreneurs.

To document the potential importance of capital gains taxation on entrepreneurs, I analyze household portfolios, the composition of unrealized capital gains held by households, and whether capital gains taxes are related to disbursements by venture capital partnerships. I present three main findings. First, active business assets – the types of assets that are likely to be associated with capital gains for entrepreneurs – play an important role in the aggregate portfolio of household assets. According to the 2007 Survey of Consumer Finances (SCF) from the Federal Reserve Board, 11.1 percent of households hold active business assets, and these assets account for 19 percent of household portfolios; by comparison, stocks held directly or in mutual funds (but outside of retirement accounts) are 11.7 percent of household wealth. Second, the stock of unrealized capital gains associated with privately held businesses is large. The SCF data suggest that aggregate unrealized capital gains on active business assets are almost six times larger than aggregate unrealized capital gains on corporate stock. The magnitude of unrealized capital gains on active business assets suggests that capital gains tax rate could play an important role in whether and when these assets are sold. Third, I examine whether capital gains tax rates affect the disbursements of venture capital funds using state-aggregate data from 1969-2007. Regression analysis suggests that higher capital gains tax rates are associated with a reduction in state-level disbursements from venture capital funds. Since many of the sources of venture capital funding are not subject to capital gains taxation, I interpret this finding as suggestive of a demand side effect: in states with higher capital gains tax rates, fewer entrepreneurs are starting businesses that seek venture capital funding.

Given the theoretical and empirical importance of capital gains taxes for entrepreneurial decisions, entrepreneurship should play a prominent role in the tax policy debate about designing and reforming the taxation of capital gains.

Capital Gains Taxation and Entrepreneurship

I. Introduction

The taxation of capital gains is a perennial issue in United States tax policy. The 2008 presidential campaign was no exception. Senator McCain proposed retaining the 15 percent tax rate on individuals' long-term capital gains introduced by the Jobs and Growth Tax Relief Reconciliation Act of 2003. Senator Obama argued for an increase in the long-term capital gains tax rate to at least the 20 percent tax rate that was in effect before 2003; however, he also pledged to eliminate capital gains taxes for small businesses and start-up firms.¹ President Obama's budget proposal for 2011 includes both an increase in the overall capital gains tax rate for individuals with incomes above \$200,000 and married couples with incomes above \$250,000 and an exemption for gains on qualified small businesses.² While much analysis has been undertaken on the general issue of capital gains tax rates, less attention has been paid to the concern that the capital gains tax has especially negative consequences for entrepreneurial activity.

Entrepreneurship plays an important role in economic growth. Baumol, Litan, and Schramm (2007) coin the term "entrepreneurial capitalism" to emphasize that not all forms of capitalism are equally conducive to growth. They argue that a mix between "big-firm" and "entrepreneurial" capitalism fosters economic growth.³ In discussing what features in an economy give rise to entrepreneurial capitalism, they include "avoiding onerous taxation" of productive entrepreneurship. Their discussion of onerous taxation is quite general; while they do not specifically mention the taxation of capital gains, it is one form of taxation that may be

¹ Source: Bob Drogin, "McCain and Obama have Contrasting Economic Plans," *Los Angeles Times*, June 11, 2008.

² Source: "Budget of the United States Government, Fiscal Year 2011" U.S. Office of Management and Budget, February 2010.

³ In contrast, "state-guided" and "oligarchic" capitalism tend to yield less economic growth as they tend to allocate resources less effectively to new innovation.

particularly onerous for entrepreneurs. Exploring whether capital gains taxes have particularly negative effects on entrepreneurs relative to larger firms is a goal of this paper.

In the context of large firms, research has focused on three aspects of the effects of capital gains taxation. First, capital gains taxes can affect investors' portfolio decisions, especially regarding the timing of when they sell assets with capital gains; notably, capital gains taxes can cause a lock-in effect by which investors delay the sale of assets with gains. Second, capital gains taxes can affect the amount of risk-taking undertaken by investors; the asymmetric treatment of losses plays an especially important role in whether capital gains taxation encourages or discourages risk-taking. Third, capital gains taxation can affect firms' investment decisions by affecting the cost of equity capital.

These same effects apply to entrepreneurial firms. However, the economic impact of these effects may be larger for small firms than for publicly-traded firms. In terms of the lock-in effect, when shareholders delay the sale of shares in publicly-traded firms due to the tax, the tax affects government revenue but probably has little effect on the economic decisions made by the firm. Presumably, the trading patterns of shareholders (at least those with small stakes in the firm) do not affect managerial decisions. Thus, the distortions caused by the tax lie in the portfolio imbalances of households; however, if households can invest in many different firms, then these portfolio imbalances probably have relatively modest effects on economic well-being. In contrast, the lock-in effect associated with taxing capital gains of generated by owning privately-held businesses may very well affect the firms' managerial decisions since the owners often have some say in these decisions. The social cost of this lock-in effect may include businesses not being sold to the owners who could manage the assets with maximal efficiency.

In terms of the effects of capital gains taxes on risk-taking, entrepreneurial businesses may be more likely to be hampered by rules that limit the tax refunds paid on losses than are the shareholders of large, publicly-traded firms. The lack of diversification of many entrepreneurs means that the capital gains tax may create a form of asymmetric ‘success tax’ in which the government taxes the upside returns to investment but does not share symmetrically in projects that fail. In contrast, shareholders in publicly-traded firms can hold a diversified portfolio of stocks, and this diversification may mitigate the importance of loss limitations on capital losses. Thus, for shareholders in publicly-traded firms, the capital gains tax may actually encourage risk-taking but, for entrepreneurs, the capital gains tax may discourage risk-taking due to the asymmetric treatment of gains and losses. This possible reduction in risk-taking may reduce the amount of innovation generated by entrepreneurs.

The capital gains tax can affect the cost of capital of publicly-traded firms by changing the rate of return required by a firm’s shareholders. Faced with higher capital gains taxes, shareholders may require a higher hurdle rate of return for investments. This same affect applies to private firms. However, if entrepreneurs rely more heavily on financing sources that face the capital gains tax (i.e., equity provided by taxable investors as opposed to debt or equity provided by tax-exempt or foreign investors), then these effects can be relatively more important for entrepreneurial firms than for established firms.

In addition to discussing the potential effects of capital gains taxes on entrepreneurs, I present some basic facts on the potential importance of capital gains taxation to entrepreneurs. Despite the claim that the taxable capital gains associated with entrepreneurial ventures are a modest portion of total capital gains,⁴ the unrealized gains associated with households’ holdings

⁴ For example, Auerbach (2007) claims that “only a miniscule fraction of the economy’s capital gains are associated with new ventures.”

of entrepreneurial ventures are quantitatively important both in absolute terms and relative to capital gains from holding equity in public companies. As described in more detail below, data from the Federal Reserve's *Survey of Consumer of Finances* from 2007 indicates that entrepreneurial assets (e.g., assets associated with actively-managed businesses) are a larger portion of aggregate household portfolios than taxable holdings of corporate equities. Moreover, the mean unrealized capital gain on active business assets among households with such assets is over \$731,000 compared to a mean unrealized capital gain on directly-held publicly-traded equity of roughly \$58,000. Several factors contribute to the importance of these capital gains in households' portfolios. First, successful active businesses can create large capital gains; in part, the large gains associated with success reflect the returns to taking risk since many small businesses are not successful. Second, active business assets are not typically held in tax-advantaged accounts so that the capital gains tax is relevant if an entrepreneur wants to sell his or her business; in contrast, many non-entrepreneurial households hold a substantial amount of their wealth in forms for which the capital gains tax is either irrelevant (e.g., tax-advantaged retirement accounts) or only relevant for a relatively few households (e.g., owner-occupied housing). Third, the incubation period for creating a new business may be quite long and the magnitude of the unrealized capital gain increases with how long someone holds an asset. The relatively large stock of unrealized capital gains on active business assets in household portfolios suggests that the capital gains tax may play an important role in determining when small businesses are sold.

I also present evidence on the relationship between capital gains tax rates and venture capital disbursements using a state-level aggregate data for 1969-2007. The regression results suggest that higher capital gains tax rates are associated with less venture capital funding flowing

into a state. Following Gompers and Lerner (1998), I interpret these results as being consistent with capital gains taxes reducing the volume of entrepreneurs who start businesses that seek external funding.

This paper is organized as follows. Section II provides evidence on the potential importance of entrepreneurial capital gains in the portfolios of U.S. households. This section also places such capital gains in the context of overall taxable capital gains in the United States. Section III provides a simple illustration of the mechanics of taxing entrepreneurial capital gains. While some analysts argue that preferential capital gains tax rates (by which they mean capital gains tax rates below the tax rate on wage income) provide special treatment to the labor income of entrepreneurs, such arguments are overly simplistic. Section IV describes the different channels through which the capital gains tax can affect the decisions of entrepreneurs. The section pays special attention to the differences between capital gains in the context of entrepreneurial ventures and investing in established firms. This section also discusses the analysis of state-level venture capital disbursements. I offer brief concluding remarks in section V.

II. Entrepreneurial Capital Gains and Households' Investments

A natural question to ask is the empirical importance of entrepreneurial investments, and the associated capital gains, in the investment decisions of households. The Federal Reserve's *Survey of Consumer Finances* (SCF) is a particularly useful source of data on household wealth in the United States.⁵ The SCF is a triennial household survey with an oversample of relatively wealthy households since these households account for a disproportionate share of household wealth. The data include weights that allow for inference about the general population and all

⁵ For more information on the SCF, see Bucks, Kennickell, and Moore (2006).

statistics reported below reflect these weights so that they are representative of the overall population. I report tabulations from the 4,422 families surveyed in the 2007 SCF.

A common problem for studying entrepreneurship is measuring entrepreneurial activity. In part, this problem arises because “entrepreneurship” is a vague term, encompassing both ideas of business organizational form (e.g., small businesses allow someone to be the boss even if the enterprise is quite small) and innovativeness (e.g., entrepreneurs as the engine of growth for new products and job creation). As discussed by Baumol, et al., some small businesses are more innovative than others. Given the structure of the SCF data, I will focus primarily on active business assets even though some entrepreneurial investment may lead to other forms of wealth and the fact that not all closely-held businesses are equally innovative.

The SCF asks detailed questions about various categories of wealth, including both financial and non-financial assets. The most important category for entrepreneurial assets is the market value of active businesses in which the household owns and participates. The SCF asks detailed questions on up to three businesses in which the responding household actively participates as well as a summary question on the value of any other businesses in which the family plays an active management role. By focusing on active management – a relatively easy concept to measure – this definition of entrepreneurship does not categorize businesses based on the extent to which the business is innovative. While these questions capture much of what one might think of as entrepreneurial assets, entrepreneurship may also lead to other types of assets, such as commercial real estate, agricultural businesses, passive investments in privately-held businesses, and, in some cases, holdings of publicly-traded equity. For example, passive investors in a new firm will report wealth as passively-held business investments; also, if a firm sells shares to the public, the founding entrepreneur should include his or her shares in the

category of publicly-traded shares. Hence, using active business assets as a measure of entrepreneurial assets may understate total entrepreneurship in the economy.

II.A. Active Business Assets in Household Portfolios

As a starting point for exploring the importance of entrepreneurial investment to household wealth, Table 1 provides some basic summary statistics about household portfolios from the 2007 SCF. The table summarizes both financial assets and non-financial assets. The financial asset categories are liquid assets, assets yielding fixed returns, publicly-traded stock, retirement accounts, and other financial assets.⁶ The non-financial assets categories are equity in a primary residence, equity in other residential real estate, equity in commercial real estate, the value of active business assets (net of business debts and adjusted for loans between the household and the business), agricultural businesses (farms), passive business investments, and other non-financial assets.⁷ Before turning to the data, several clarifications are necessary. First, while the data include retirement accounts controlled by the household (e.g., 401(k) plan balances), the account balances in such plans do not adjust for the tax liability that would be incurred upon withdrawing the assets; moreover, the data exclude the value of traditional defined benefit pension plans. Second, I have excluded vehicles from non-financial assets. Third, when specific assets (e.g., a house) have debt associated with the asset, I have netted the outstanding debt

⁶ More specifically, “liquid assets” includes checking accounts, savings accounts (including education saving accounts), and money market accounts; “fixed income” includes certificates of deposit, bond holdings, and mutual funds that invest in bonds; “stocks” are broken into a directly-held category and a mutual fund category of funds invested in either stocks or a combination of stocks and bonds; “retirement accounts” include the account balances for both individual-based and employer-based tax-advantaged retirement accounts; and “other financial assets” include cash value life insurance policies, annuity contracts, trusts, and other miscellaneous financial assets.

⁷ “Other residential real estate” includes both vacation properties and small-scale rental property. “Commercial real estate” includes both non-residential property and large-scale residential properties (i.e., properties with more than four housing units). “Passive business investments” are businesses in which the household does not play an active management role and can be partnerships, subchapter S corporations, or other forms of corporations. Farms are measured separately in the survey in part since they often include housing as well as business investment; the survey attempts to allocate the residential portion of a farm as part of equity in a primary residence. “Other non-financial assets” include a wide variety of collectables and precious metals.

against the value of the asset so that asset holdings reflect equity in the asset. By netting out such debt, the values of non-business assets are more comparable to the SCF question about active businesses which specifically asks about the net worth of the business rather than the value of the business gross of business loans.

For each asset category, Table 1 provides the percent of households who hold the asset, the median value of these holdings conditional on owning the asset, the overall mean value of the asset, and the asset's share in the aggregate household portfolio of assets. The median asset holding conditional on owning the asset is more informative than the unconditional median since less than fifty percent of households hold most asset categories. Furthermore, since the distribution of asset values is highly-skewed even among households that hold an asset, the median provides better information on the typical asset holdings than the mean asset holdings. The aggregate portfolio share is the total value of the asset held by all households divided by total household assets.⁸

Actively managing a business is often a career choice as well as a portfolio choice. Since at a point in time relatively few people manage their own business, it is not surprising that only a modest fraction of households invest in active business assets: according to the first column of Table 1, roughly 11 percent of all households invest in active business assets. Other types of assets that might be related to entrepreneurial ventures are also held by a modest number of households. Only 1.4 percent of households have passive business investments and 8.2 percent of households hold commercial real estate. By comparison, 68.1 percent of households have housing equity, 53.6 percent of households have retirement accounts, and 23.7 percent of households own stock (either directly or through mutual funds). Thus, active business

⁸ Unlike the average of household portfolio shares, the aggregate portfolio share has the property that the sum of all shares is one. It is the equivalent of the weighted average of household portfolio shares where the weights are overall household wealth.

investments (and other entrepreneurial assets) are concentrated within a segment of the population.

Although active business assets are concentrated among roughly 11 percent of households, they play an important role in aggregate household portfolios. Figure 1 provides a pie chart of the composition of aggregate household portfolios from the SCF data (the data are also in the last column of Table 1). Active business assets constitute 19.0 percent of overall household portfolios for a mean asset value of \$102,972. This portfolio share is larger than the portfolio share of stocks held outside of retirement accounts (which have a 11.7 percent portfolio share after combining direct and mutual fund holdings) and retirement accounts controlled by households (which have a 14.7 percent portfolio share). Housing equity, with a portfolio share of 24.8 percent and average value of \$134,684, is the only asset category that is more important than active business assets in overall household portfolios.

To explain why active business assets represent a substantial share of aggregate household assets despite only 11 percent of households holding such assets, it is useful to consider the portfolios of entrepreneurial households, defined as households that report holding active business assets. Table 2 provides the same information as Table 1 but separates households that own active business assets (Panel A) from households that do not own active business assets (Panel B). One striking fact that emerges from comparing households with and without active business assets is the substantial difference in average wealth across the two groups. Households with active business assets have an average wealth of \$2.10 million compared to an average net worth of just over \$350,000 for households without such assets. Thus, the 11 percent of households that are entrepreneurial tend to have relatively high wealth.

Figure 2 compares the average value of different types of assets for all households, households with active business assets (my definition of entrepreneurs), and households without active business assets. By definition, the entrepreneurs are the households with active business assets. The average holdings of active businesses, however, are large compared to the averages of other categories of assets. For entrepreneurs, the average active business asset position is worth about \$942,000 (the median is \$100,000). Thus, while a modest number of households own businesses, these businesses are often quite large. A less expected pattern is that the entrepreneurs also hold relatively large average amounts of other types of assets. Entrepreneurial households, on average, tend to be wealthier than other households, but this wealth is not solely tied up in the active business assets.

The concentration of active business assets in a minority of households highlights an important fact about entrepreneurs: entrepreneurs tend to hold less diversified portfolios than other households.⁹ Figures 3A and 3B compare the portfolio composition of entrepreneurs and non-entrepreneurs. From Panel A of Table 2, among the households that have active business assets, active businesses account for 45.0 percent of their aggregate assets. Furthermore, these assets are typically in only one or two businesses so that entrepreneurs face the idiosyncratic risk that other households can diversify across investments. As will be discussed below, this lack of diversification of entrepreneurs accentuates the effects of the capital gains tax since the tax has asymmetric effects on successful and unsuccessful investments.

The capital gains tax is more relevant for some types of assets than others. Among the assets for which the capital gains tax is either irrelevant or not very relevant are: (1) liquid assets and fixed income investments since most of the income from fixed income investments are taxed

⁹ Gentry and Hubbard (2004) document the concentration of entrepreneurial assets in household portfolios and discuss the importance of both the concentration of these assets and the associated lack of diversification on household saving decisions.

as ordinary income rather than capital gains;¹⁰ (2) assets in retirement accounts since withdrawals are taxed at ordinary income tax rates rather than capital gains tax rates; (3) primary residences since current law allows a substantial exemption from capital gains on the sale of a household's primary residence; and (4) many of the assets in the other financial assets category (e.g., annuity contracts and the cash value life insurance policies) since they generate income that is subject to ordinary tax rates instead of capital gains tax rates. From Table 1, these asset categories account for over 53 percent of households' aggregate assets for 2007.

The extent to which the remaining assets – stocks, real estate (both other residential and commercial), active businesses, farms, passive businesses, and miscellaneous non-financial assets – generate capital gains varies by asset type. Each asset generates some combination of dividends, rents, ordinary income, and capital gains. Of these remaining asset categories, capital gains taxes are more likely to apply to ownership of stocks, active business assets, commercial real estate, farms and passive businesses.¹¹ Within this set of assets that are potentially sensitive to the capital gains tax, active and passive business assets account for over half of the total aggregate value of households' assets.¹²

¹⁰ Fixed income holdings can create capital gains if bonds are sold with a gain or loss before maturity. Liquid assets tend to generate relatively low taxable income since households accept lower rates of return in exchange for liquidity services (a form of income that escapes income taxation).

¹¹ This list omits other residential real estate (with an aggregate portfolio share of 7.05 percent) since much of the income comes in the form of rents or imputed rents from consumption use and the possibility that second homeowners can avoid capital gains taxation by converting the second home into their primary residence before selling the house. The list also omits other non-financial assets (with an aggregate portfolio share of 1.79 percent) due to the heterogeneous nature of these assets.

¹² That is, the combined aggregate portfolio share of active and passive businesses (i.e., 21.54 percent) is greater than than the combined aggregate portfolio share of households' holdings of stock, commercial real estate, and farm assets (i.e., 16.44 percent).

II.B. Magnitude of Capital Gains from Active Business Investments

The comparison of portfolio shares suggests that active business assets are an important part of household portfolios but this comparison does not necessarily provide information on the relative capital gains across types of assets. For some asset categories, the SCF asks questions about the household's tax basis in the asset.¹³ This information allows for a direct comparison of the unrealized capital gains across asset categories. At the outset, it is important to note that the SCF allows a comparison of *unrealized* capital gains rather than a comparison of *realized* capital gains. By comparing unrealized capital gains instead of realized capital gains, this analysis addresses the gains that could be potentially affected by the capital gains tax. In contrast, studying realized capital gains excludes from the analysis capital gains that are not realized, possibly in response to the tax system.

Table 3 compares reported unrealized capital gains on directly-held equities, active business assets, and passive business assets. In each column, the statistics refer to the sample of households that hold a particular type of asset. Both in terms of the prevalence of having gains instead of losses and the size of these gains, active and passive business assets appear to have a much larger stock of unrealized capital gains. In terms of the percentage of households with gains on their assets, 79.1 percent of active business owners report an unrealized capital gain compared to only 68.1 percent of direct owners of corporate stock. Almost one-fifth (19.3 percent) of households that hold equities directly have an unrealized capital losses compared to only 13.4 and 9.9 percent of owners of active and passive business assets, respectively. The substantial proportion of households with unrealized capital losses on corporate stock runs

¹³ For active and passive businesses, the SCF specifically asks about the "cost basis for tax purposes." For stocks, the survey asks about the gain or loss on the portfolio. While the survey also asks for the gain or loss on mutual funds, it is unlikely that many households answer this question correctly since the tax rules for reinvestment of dividends and capital gains distributions are quite complicated. Thus, I focus on stocks held directly by households.

counter to the standard tax-planning advice that investors can minimize their capital gains tax liability by selling their losers and holding their winners.¹⁴

In terms of the magnitudes of typical capital gains across asset categories, the unrealized gains on business assets are considerably larger than on equities. The median unrealized capital gain on active business assets is \$45,000 compared to only \$950 for equities. The median unrealized capital gain on directly-held equities is surprisingly small. The difference in the mean values is even more dramatic: the average unrealized capital gain on an active business is \$731,528 compared to only \$57,980 for equities.¹⁵ The passive business assets are similar to the active business assets with a median gain of \$40,000 and an average gain of \$655,248.

To put these gains in the context of the size of the investor's stake in the investment, consider the gains as a percentage of the investor's tax basis. For stocks, the median gain is only 10.4 percent and the average portfolio gain is 61.9 percent. In contrast, for active businesses, the median gain is 233 percent and the average percentage gain is 12,358 percent. The magnitude of the average gain reflects that many entrepreneurs have a quite modest tax basis in their venture. For example, if one conditions on the tax basis in the active business asset being larger than \$5,000 (which is true for roughly 71 percent of households with active businesses), the average percentage gain falls to 658 percent, which is still considerably larger than the average gains on stock portfolios.

The data in Table 3 compare the median and average unrealized gains across asset types conditional on households owning each type of asset. Recall, however, from Table 1, that households vary in their propensities to hold different types of assets. While 23.7 percent of

¹⁴ Auerbach, Burman and Siegal (2000) present data on the frequency that households manage their portfolios to offset capital gains with capital losses. They conclude that while some households behave in ways that are consistent with tax-minimizing strategies, many households could reduce their tax liabilities through such strategies.

¹⁵ It is important to note that these means, unlike the means reported in Table 1, are conditional on the household holding a particular type of asset.

households directly invest in shares of stock, only 11 percent of households have active business assets. Even adjusting for the greater number of households with direct holdings of stock, these averages imply that the total unrealized gains on active and passive business assets are larger than the unrealized gains on directly-held stock. Total unrealized capital gains on active business assets are almost six times larger than the total unrealized capital gains on directly-held stock; total unrealized gains on passive business assets are about two-thirds the size of the total unrealized capital gains on directly-held stock.¹⁶

The message from these data is quite clear: the stock of unrealized capital gains on privately-held businesses could be many times larger than the stock of unrealized capital gains on corporate equities. This difference is important since the distortion of realization-based taxation depends on whether individuals change their decisions about realizations. A large stock of unrealized gains on active businesses suggests that there is considerable scope for tax factors to influence decisions about selling firms. In contrast, if households with active business investments tended to have small capital gains (or mainly capital losses), then selling their businesses would trigger only modest capital gains taxes.

The SCF data suggest that capital gains on privately-held (both actively-managed and passive investments) are important for considering the economic impact of capital gains taxation. This conclusion is at odds with the common perception that entrepreneurial assets are a small part of the capital gains tax base (see, e.g., Auerbach, 2007). The common perception is that capital gains taxation is primarily about taxing corporate stock. Support for this claim comes

¹⁶ These ratios are calculated from the data in Table 3. The ratios are the average unrealized capital gains for an asset category weighted by the percentage of households with the asset relative to the average unrealized capital gains for another asset category weighted by the percentage of households that hold the asset. For example, the average unrealized gain on active business assets is \$731,528 and 11.1 percent of households hold such assets and the average unrealized gain on directly-held stock is \$57,980 and 23.7 percent of households directly-invest in stock; thus, $[(731,528) * (.111)] / [(57,980) * (.237)]$ is a ratio of 5.90, implying that the unrealized capital gains on active business assets are almost twenty times larger than the unrealized capital gains on directly-held stock.

from examining *realized* capital gains using tax return data rather than the potential capital gains that are captured by the SCF measure of *unrealized* capital gains. The most recent detailed data on individuals' realized capital gains by type of assets is for the 2007 tax year (Wilson and Liddell, 2010). Wilson and Liddell report that total capital gains were mainly comprised of sales of corporate stock (24.9 percent of total capital gains), pass-through gains from assets sold by partnerships and other pass-through entities (40.1 percent; these often reflect investment companies selling stocks), and distributions from mutual funds (9.4 percent). In contrast, assets that naturally seem to represent smaller businesses are a modest portion of total capital gains: sales of partnership, S-corporation and estate or trust interests account for 5.4 percent of gains and sales of depreciable business real and personal property accounted for 2.9 percent of total capital gains. This comparison may understate the importance of entrepreneurial businesses for several reasons. First, sales of corporate stock do not distinguish publicly-held companies from privately-held businesses; entrepreneurs may eventually realize capital gains either by selling privately-held shares or by taking their company public. Second, the gains generated by pass-through entities include gains generated by venture capital partnerships and other entities that invest in entrepreneurial businesses.

While the SCF and IRS data are not perfectly comparable, the substantial difference in the importance of entrepreneurial businesses in capital gains suggests that the composition of unrealized capital gains may differ substantially from the composition of realized capital gains. A natural explanation for this difference between unrealized and realized capital gains across types of assets is that business investments tend to be held longer than investments in traded equity. Using detailed tax return data for 1993 (similar to that used by Wilson and Liddell), Burman and Ricoy (1997) examine the holding periods associated with realized capital gains

from different assets. They report that the average holding period (weighted by the size of the transaction) for corporate stock is 2.9 years. By comparison, the average holding period for business property is 6.4 years and the average holding period for partnerships, S-corporations, and fiduciaries is 6.9 years. Thus, even among the gains that are realized, the investment behavior of entrepreneurs differs from investors in public firms. These longer holding periods magnify the importance of capital gains taxation since the distortion from the tax increases with the size of the gain, which should increase with the holding period of the asset.

III. What is Taxed by Taxing Entrepreneurial Capital Gains?

III.A. Wage Income vs. Business Income

A common assertion is that by taxing capital gains at lower tax rates than ordinary income, entrepreneurs can lower their tax burden by trading wage taxation in exchange for capital gains taxation if the business is successful (see, e.g., Burman, 1999, p. 76). The claim is that entrepreneurs pay capital gains tax rates on what is arguably labor income. The argument is that entrepreneurs take low salaries during the incubation phase of their business relative to what they could earn elsewhere which reduces their tax liabilities when the firm is young.¹⁷ The foregone wages are reinvested in the business. If the entrepreneur sells the business, part of the capital gain represents the return on accepting lower wages, but this gain faces only the capital gains tax rate. This argument suggests two tax advantages to entrepreneurship. First, if the capital gains tax rate is lower than the tax rate on ordinary income, the entrepreneur benefits from this tax rate

¹⁷ While the choice of compensation through salary or future (uncertain) appreciation in business value has tax consequences, the mix of compensation is not necessarily tax motivated. As discussed by Hall and Woodward (2008), entrepreneurs may take equity as compensation for incentive reasons, especially when outside funding becomes important.

difference. Second, since capital gains taxes are only taxed upon realization, the entrepreneur defers paying taxes.

This analysis is incomplete because it fails to account for tax treatment of the firm. The analysis above suggests that an entrepreneur chooses between having income taxed as wages or as capital gains; a more accurate depiction of the entrepreneur's choice is of having income taxed as either wages or business income. A stylized two-period example of an entrepreneur with a business illustrates the basic tax issues. To abstract from uncertainty, start with a business that is certain to succeed. For simplicity, assume that the entrepreneur incorporates the business when it is created; I will consider alternative organizational form choices after outlining the basic example.¹⁸ I analyze how an incremental change in wage payments affects a business owner's tax liability through the taxation of wage income, business income, and capital gains upon the sale of the business.

In the benchmark scenario, the entrepreneur draws a wage of W in the first period, reports business income of Y in the first period, has a tax basis of B in the business, and sells the firm of a price of P in the second period. Wage and business income in the second period are not instrumental for the example. In the alternative scenario, the entrepreneur receives an additional \$100 in wage income; however, to maintain the same level of investment in the business as in the benchmark case, the entrepreneur must also invest additional capital in the business. With a tax rate on wage income of t_w , the entrepreneur pays $\$100 * t_w$ in additional taxes on ordinary income. However, the business gets to deduct the additional wages from business income. The decrease in the business tax liability is $\$100 * t_b$ where t_b is the tax rate on the business. The first period tax consequences of paying additional wage income are clear: the entrepreneur's wage income

¹⁸ Incorporation at an early stage is quite common at least among start-ups that seek external financing (see Bankman, 1994) despite that such incorporation may not minimize taxes.

increases so that his or her taxes increase, but the business benefits from the deductibility of wages paid so that business taxes decrease.

The additional wage payment has cash flow consequences for the firm that could affect the level of the firm's investment. The increase in wages reduces available cash. However, the effect on cash available for investment is mitigated by the reduction in business taxes caused by the deductibility of wage payments. By paying the additional wages, the firm has $\$100*(1 - t_b)$ less in cash available to fund investment (relative to the benchmark scenario). The entrepreneur must contribute an additional $\$100*(1 - t_b)$ in order to maintain the same level of business investment. This additional investment increases the entrepreneur's tax basis in the firm by $\$100*(1 - t_b)$.

In the second period, the entrepreneur sells the business and pays tax on the capital gain. Under the benchmark scenario, the size of the capital gain is $P - B$ and the tax on the capital gain is $(P - B)*t_{cg}$, where t_{cg} is the tax rate on capital gains. Assuming that the buyer pays the same price for the firm in either scenario, the entrepreneur pays capital gains taxes of $[P - B - \$100*(1 - t_b)]*t_{cg}$ under the alternative scenario. The additional capital explicitly paid into the firm by the entrepreneur under the alternative scenario reduces the capital gains tax liability by $\$100*(1 - t_b)*t_{cg}$ relative to the benchmark scenario. The overall tax consequence of paying wages (instead of the benchmark of the entrepreneur working for 'sweat equity') is that first period taxes would change by $\$100*(t_w - t_b)$ and second period taxes would decrease by $\$100*(1 - t_b)*t_{cg}$.

To illustrate the potential tax consequences for an entrepreneur between earning wages at the early stage of a project and being compensated by capital gains when the project is sold, it is useful to consider several alternative configurations of tax rates. Table 4 summarizes the numerical calculations for various illustrative tax rates. As a starting point (see the calculations

in the first row), it is useful to consider the case that implicitly underlies the common claim that entrepreneurs transform labor income into capital gains income by not paying wage income in the first period. This argument ignores the business tax consequence for the decision, which can be represented by assuming that the t_b is zero. Assume further that t_w is 35 percent and t_{cg} is 15 percent. If the firm increased wages by \$100 in the first period, the net effect would be an increase in tax payments of \$35 since wage income would increase but there would be no value from reducing business taxable income. The entrepreneur would need to invest \$100 in the firm to maintain the same level of investment that would be achieved without the wage payment. This investment would increase the entrepreneur's basis in the firm by \$100 and would reduce future capital gains taxes by \$15. Thus, the tax benefit of accepting sweat equity is avoiding taxes on wages in the first period, deferring tax until the business is sold, and paying tax at preferential capital gains tax rates.

In contrast, the second row of Table 4 considers the case in which the entrepreneur's tax rate on wage income is equal to the tax rate on business income. The business saves taxes in the first period that exactly offset the entrepreneur's tax on the additional wage income. To keep investment constant, the entrepreneur must invest \$65 in the firm. The firm can invest \$100 since it saves \$35 on taxes and receives an equity infusion of \$65. This equity infusion increases the entrepreneur's basis and reduces the subsequent capital gain by \$9.75. In this scenario, paying wages to the entrepreneur, instead of sweat equity, reduces the overall tax burden. This example illustrates that compensating entrepreneurs via sweat equity does not necessarily minimize the tax burden on the entrepreneur.

Another alternative to consider is when tax rates on wage income and capital gains are equal. The third row of Table 4 considers the case of the business tax rate being zero, and the

fourth row of the table illustrates the case of the business tax rate being higher than this common tax rate. When the business tax rate is equal to zero, sweat equity has a tax advantage based solely on the time value of money. Sweat equity can save the entrepreneur \$15 in taxes in the first period, at the expense of increasing taxes by \$15 in the second period. When the business tax rate is 35 percent but the wage and capital gains tax rates are 15 percent, the entrepreneur can benefit by receiving wages since these wages are deductible at the higher business tax rate. This configuration of tax rates illustrates the tax strategy of paying wages instead of dividends in a closely-held business that faces double taxation on the business income (at rates that combine to exceed the wage tax rate).

The calculations in Table 4 do not account for the time value of money in that taxes are paid at different times. The overall tax consequence of the alternative scenario (i.e., paying wages instead of sweat equity) is to change the tax liability by $\$100*(t_w - PV(t_{cg}) - t_b)$, where “PV” represents the discounted present value of the future tax consequences. The practice of entrepreneurs “saving” on taxes by paying themselves low wages only reduces taxes if $t_w > PV(t_{cg}) + t_b$, the tax rate on wage income exceeds the sum of the present value of capital gains tax rate and the business income tax rate. Under current law, the top marginal income tax rates on wage income are similar to the top marginal tax rates on corporate income so it is unlikely that entrepreneurs are reaping large tax benefits from not paying themselves wages if their business is successful.

I have assumed that the business is successful. Many start-up businesses do not have positive taxable income, even if they eventually become successful. The tax code does not allow for tax refunds when a firm earns negative income; instead, firms with losses can carry these

losses forward against future income.¹⁹ In tax jargon, the tax code allows only imperfect loss offsets. Since the firm does not benefit from the tax deduction until the future, these rules reduce the present value of deducting wage payments to the entrepreneur. In the extreme situation, the carryforwards may expire unused so that the firm never gets a tax benefit from deducting the wages. For example, if a firm fails, it may not benefit from the deduction.

The imperfect loss offset rules may reduce the value of the business tax savings created by paying wages to the entrepreneur. However, relying on these imperfections to argue that the tax code favors entrepreneurs because they can avoid wage taxation by increasing their business income (by not paying themselves wages) is misguided. As discussed in more detail below, imperfections in loss offset rules create disincentives for investment because they create asymmetries in the treatment of investment: the government taxes successful projects but does not refund losses of unsuccessful projects.

The assumption that the business incorporates at the outset imposes that the firm faces a separate entity-level tax. This assumption is not critical for the analysis. If the firm is taxed as a pass-through entity, then the business income would be taxed on the entrepreneur's tax return.²⁰ Thus, the entrepreneur has more wage income but less business income. Unless the marginal tax rate on these two sources of income differs for an individual, the entrepreneur does not save taxes by accepting a lower wage. As a pass-through entity, the entrepreneur's tax basis in the investment changes each year with his or her allocated share of the income of the business.

¹⁹ One possibility is that the entrepreneur sells the business while it has net operating loss carryforwards. These tax characteristics may affect the price the buyer pays for the firm. (See Henning, Shaw and Stock (2000) for evidence on how tax characteristics can affect acquisition prices of firms.) By increasing the size of the net operating loss carryforward, the additional wage paid to the entrepreneur may increase the price paid in an acquisition since the firm will pay less in taxes in the future. Thus, the price at which the firm is sold may depend on whether the entrepreneur receives wage payments, which would violate my assumption that the price does not depend on the two scenarios considered above. This price difference would typically increase the capital gains tax liability under the alternative scenario which reduces the apparent tax advantage of deferring compensation.

²⁰ The exact rules for passing losses through to owners vary by organizational form. If losses cannot be passed through to the owner, then the analysis would be the same as if the firm is incorporated as a C-corporation.

These basis adjustments affect the size of future capital gains such that the gain is the same as if the owner received the income and reinvested in the firm. Thus, under the assumption that the entrepreneur would also reinvest the marginal increase in wages in the firm, the size of the entrepreneur's capital gain should be the same under the two scenarios.

III.B. Capital Gains Tax as a 'Success' Tax

This analysis rejects the idea that the capital gains tax on entrepreneurs is a tax on their labor services. Instead, the decision to pay wages creates a choice between whether income will be taxed as wage income or business income. Taxing capital gains creates a tax in addition to the taxes on wage or business income. This additional tax can be particularly burdensome because it tends to fall asymmetrically on successful projects.

Before illustrating the mechanics of asymmetric taxation, it is useful to consider the effects of a symmetric tax on risky investment. A tax on returns reduces the after-tax rate of return on investment but it also reduces the variance of returns. The reduction in the variability of returns provides the entrepreneur with a form of insurance. This form of insurance could be particularly valuable to entrepreneurs since they hold undiversified positions in their firms and cannot typically use financial markets to share this risk. If the tax system is symmetric with respect to risk taking (i.e., the tax rate is flat and the government provides tax refunds on losses), then a tax on risky investment may actually increase investors' willingness to hold risk. The reason for this counterintuitive prediction is that the tax system reduces the variance of returns in addition to reducing the mean return. Unlike a symmetric tax on returns, an asymmetric tax does not necessarily provide insurance. In the extreme, the government takes part of the upside of the venture but does not share in its losses.

To understand why the capital gains tax disproportionately falls on successful ventures, consider an entrepreneur who starts a business by contributing financial capital and time to the enterprise. By their nature, start-ups have a lumpy distribution of outcomes (see, *e.g.*, Hall and Woodward, 2008). For simplicity, assume that the project has two possible outcomes. It will either be worthless or be very successful. As with the previous example, begin by assuming that the entrepreneur incorporates the business at its inception. In understanding the effects of taxation, it is useful to consider the taxation of different outcomes.

If a start-up business does well, the entrepreneur often exits by offering shares to the public through an initial public offering (IPO). For a successful start-up, the IPO may trigger a substantial capital gain for the entrepreneur. In addition to the capital gains tax, the income of the firm is subject to corporate income taxation and shareholders are subject to taxation on dividends received. However, since these taxes would be due irrespective to whether the entrepreneur sells the firm, the capital gains tax operates as an additional layer of taxation on the firm's success.

The size of the entrepreneur's gain depends on the value of the business and the entrepreneur's tax basis in the business. The value of the business will depend on the present value of the future after-tax income that the business can generate. Thus, the future taxes that the business will pay can affect what the entrepreneur receives for the business. The entrepreneur's tax basis typically depends on his or her financial contribution to the firm.

In contrast, if the firm fails, then the tax treatment of the losses depends on the specifics of how the firm is organized. If the firm is incorporated so that it is subject to the corporate income tax, the losses may be trapped inside the firm, but the entrepreneur will have a capital loss on the shares that he or she owns in the firm. The entrepreneur may be allowed to use his or her capital

losses to offset other income (possibly with some limitations). One implicit limitation is that the capital loss is limited to the entrepreneur's financial stake in the company. As discussed above, many entrepreneurs invest time in their business while earning below market wages. While they do not pay income taxes on the wages that they do not earn (as described above), this type of investment may not create a capital loss if investments of foregone wages do not establish basis in the firm for these investments. If the firm is not incorporated, the business losses may pass through to the entrepreneur's personal tax return; however, since the entrepreneur does not sell the firm, the additional layer of tax created by the capital gains tax is not relevant.

For firms that fail, the key point is that the losses may be deductible from one tax base (either the corporate tax base or the individual tax base) but typically do not create two deductions. In contrast, for successful firms, the capital gains tax applies in addition to taxes on business income.

In addition to these extreme outcomes, some start-up businesses yield intermediate outcomes. One possibility is that the firm does not fail but is not so successful that the entrepreneur sells the firm to a larger firm. Instead, the entrepreneur operates the firm and pays taxes on any income generated by the firm. Since capital gains taxes are triggered when a firm is sold, the capital gains tax does not apply to such outcomes. If the entrepreneur bequeaths the business to his or her heirs, then current U.S. tax law allows the heirs to step-up the basis of the business which reduces capital gains tax liabilities.

Overall, the capital gains tax creates an asymmetric tax on successful entrepreneurial ventures. In contrast, for portfolio investment, the realization nature of capital gains taxation provides the possibility that the asymmetric nature of capital gains taxation goes in the opposite direction: by strategically timing the sale of losses, investors can share more of their losses than

their gains with the government. Auerbach, Burman, and Siegel (2000) find that relatively few households are successful at sheltering capital gains from income, consistent with losses facing a higher marginal tax rate than gains. Overall, they conclude that most gains and losses face tax rates that are close to the statutory tax rate, suggesting that capital gains and losses from portfolio investment faces roughly symmetric taxation.

IV. Capital Gains Taxation and Entrepreneurs' Decisions

The capital gains tax can affect a number of decisions made by entrepreneurs. First, it can affect whether entrepreneurs start new businesses. Second, capital gains taxation can affect how and when entrepreneurs exit their business. Third, capital gains taxes can affect entrepreneurs' ability to raise funds from outside investors. This section examines each of these decisions in turn and the magnitude of the potential distortion.

IV.A. Entrepreneurial Entry and Asymmetric Taxation

Relatively little empirical research has been done on the behavioral effects of asymmetric capital gains taxation on entrepreneurial entry. Focusing on asymmetric taxation created by progressivity in ordinary income tax rates, Gentry and Hubbard (2003) examine how asymmetries in taxation affect the propensity of individuals to enter self employment or acquire active business assets. Using data from the Panel Study on Income Dynamics, they find substantial effects of this success tax on individuals' decisions along both these margins. While these results suggest that asymmetric taxation of business entry decreases the rate of business formation, their methodology does not specifically include capital gains taxes.²¹

²¹ Unfortunately, their methodology cannot be easily modified to include capital gains taxes.

Cullen and Gordon (2007) formulate a broader model of tax incentives for entrepreneurial risk-taking, including the incentive effects of capital gains taxation. Their model incorporates both personal and corporate tax incentives for starting a business. They predict modest increases in entrepreneurial risk-taking from cutting the capital gains tax rate in half. From their baseline of the 1993 tax code, they estimate that cutting the capital gains tax rate would increase entrepreneurial entry by roughly 10 percent.

IV.B. Entrepreneurial Investments and the Lock-in Effect from Capital Gains Taxes

The difference between unrealized capital gains, as measured in the SCF, and realized capital gains, reported on tax returns, suggests that realization behavior may differ dramatically between different types of assets. Entrepreneurs may be less likely to sell their businesses than investors in public stock are to sell stock. The nature of the investments may play an important role in this difference. Issues in corporate governance and asymmetric information make it difficult for an entrepreneur to sell a small portion of his or her business to outsiders. Being privately-held concentrates ownership and control in a small number of investors. Information and incentive problems make it difficult for an entrepreneur to avoid taking a substantial stake in his or her business. For example, providers of outside finance may condition financing on the entrepreneur being actively involved in running the business.

While these incentive and information concerns are almost certainly important for entrepreneurs' decisions about selling their businesses and their lack of diversification,²² taxes can also play a role. A common complaint about capital gains taxation is that the realization-based tax regime creates a "lock-in" effect which inhibits asset sales. The lock-in effect is one

²² Bitler, Moskowitz and Vissing-Jorgensen (2005) provide evidence of how agency costs contribute to entrepreneurs' lack of diversification.

commonly-cited explanation of why capital gains realizations respond quickly to changes in the capital gains tax rate (see, e.g., Eichner and Sinai, 2000). In the context of portfolio investment, this lock-in effect leads investors to holding onto stocks with gains instead of rebalancing their portfolios; this lock-in effect creates an economic distortion because investors do not hold their preferred portfolio of stocks. Investors may also forego what they expect are profitable opportunities to switch from one set of stocks to another. As discussed by Burman (1999), the magnitude of this distortion might be quite small for the portfolio investments of a typical investor. First, a diversified portfolio is likely to have some stocks with losses and other stocks with gains. Investors can realize some of their losses to offset realized gains so that the lock-in effect does not distort their portfolio decisions. Second, to the extent that stock markets are efficient and stocks are close substitutes for each other, investors can make other adjustments in the portfolios that offset the distortions created by the lock-in effect.

For entrepreneurs, however, the lock-in effect may create a quite costly distortion. Entrepreneurs often have undiversified portfolios so that offsetting portfolio adjustments are less likely to mitigate the tax consequences of selling their appreciated assets. Moreover, unlike portfolio investment in which who owns the stock has little effect on the operations of the firm, the operating decisions of a privately-held business may depend on who owns the stock since the owners control the firm. Likewise, if the lock-in effect induces firms to stay privately held, part of the economic distortion is that these firms miss out on growth opportunities that could be financed by being publicly traded.

Empirical analysis on the magnitude of this distortion is complicated by the need for measures of the difference in value that a business will have across owners. However, two recent papers (Cavalcanti and Erosa, 2007; and Chari, Golosov, and Tsyvinski, 2005) have

applied quantitative general equilibrium models to measure the lock-in effect of capital gains taxes on entrepreneurs. Cavalcanti and Erosa develop a model in which closely-held firms derive value from two sources: a common value that can be transferred to other owners; and an idiosyncratic (non-market) component that depends on the owner. In this model, trade in businesses benefits society by allowing new owners with potentially higher idiosyncratic value to acquire the firm. The capital gains tax deters these transactions by creating a cost to business turnover. The parameters in their benchmark calibration lead to a low steady-state business turnover rate with less than two percent of all entrepreneurs selling their businesses in a given year; this matches actual data on business turnover and is consistent with the large stock of unrealized capital gains held by entrepreneurs documented in the SCF data. Given this starting point, taxing capital gains of entrepreneurs raises very little revenue.

Cavalcanti and Erosa consider two possible policy experiments: (1) a fifty percent reduction in the capital gains tax rate (from 28 to 14 percent); and (2) indexing basis for inflation (the major source of capital gains in their framework). Both of these policy changes substantially increase the rate of business turnover – to 11 percent per year with the lower tax rate and 7 percent per year with indexing of basis. Given the substantial increase in turnover, it is not surprising that Cavalcanti and Erosa estimate that these policy changes for the taxation of closely-held businesses would be self-financing.²³ In terms of welfare effects, they estimate that eliminating the capital gains tax on entrepreneurs and replacing the revenues with a lump sum tax would increase total output by 0.48%; for comparison, the revenue from taxing these capital gains in their model is only 0.03%. These calculations suggest a substantial welfare loss from taxing the capital gains of entrepreneurs.

²³ Since Cavalcanti and Erosa compare steady state outcomes, these results do not reflect activity related to transitory changes in business turnover in response to a tax change. Instead, these results compare business turnover across steady state situations with different tax policies.

Chari, Golosov, and Tsyvinski (CGT) emphasize that some individuals have a comparative advantage in creating new businesses; however, creating a new business requires focused attention so these entrepreneurs are best suited to attend to one business at a time. CGT refer to these individuals as “serial entrepreneurs.” Once the business has been established, economic efficiency is enhanced by the entrepreneur selling the firm to professional managers and potentially starting another new business. By creating a transaction cost for selling the firm, the capital gains tax creates a lock-in effect by which entrepreneurs hold their businesses inefficiently long.

CGT build a general equilibrium model to quantify the magnitude of this inefficiency; they choose parameters for the model that match the percentage of households who are entrepreneurs and the fraction of total income earned by entrepreneurs. In their model, eliminating a capital gains tax rate of 20 percent would increase the percentage of entrepreneurs who sell a business in a period from 10 percent to 29 percent – roughly a tripling of the rate at which entrepreneurs sell successful businesses instead of manage the business themselves. Given that business sales are quite sensitive to the capital gains tax rate, it is not surprising that CGT conclude that the revenue maximizing capital gains tax rate on entrepreneurs is roughly 15 percent.²⁴

IV.C. Capital Gains Taxes and the Supply of Entrepreneurial Financing

In addition to affecting the taxes paid by entrepreneurs, the capital gains tax also affects the incentives for outsiders to fund entrepreneurs. While one can think of the effects on the entrepreneurs as being effects on the demand for entrepreneurial finance, the effects on outside investors are supply-side effects. These outsiders can take several forms. At early stages of

²⁴ CGT focus on the revenue-maximizing tax rate. However, the revenue-maximizing tax rate might create a substantial marginal deadweight loss since a reduction in the tax rate will not reduce revenue by much, but it might provide substantial benefits in terms of the reallocation of businesses.

investment, entrepreneurs often rely on friends and family members for financing. Moving beyond this rather closed network, entrepreneurs may seek financing from angel financing and eventually from venture capital funds. Angel financing often comes from wealthy individuals (many of whom are successful entrepreneurs). These investors often invest in a limited number of firms, though angel financing is evolving toward some pooling of resources across investors. As individuals, they face capital gains taxation. Venture capital funds and hedge funds provide capital to entrepreneurs. These funds are typically organized as partnerships. The investors (usually limited partners in the funds) face capital gains taxes on their returns from investing through these vehicles.

To the extent that the capital gains tax rate affects savings and portfolio decisions of potential investors in these firms, it can affect the supply of capital for entrepreneurs. The importance of capital gains taxation depends on the mix of different types of investors (e.g., taxable vs. tax-exempt investors) in providing funds to entrepreneurs through different channels. Poterba (1989) documented that individual investors provided a relatively modest portion of venture capital money. Gompers and Lerner (2004) report that individuals provided 12 percent of the funds invested in venture capital funds during 2002. The bulk of venture capital funding comes from pension funds (45 percent of the 2002 total) and endowments (11 percent of the 2002 total) that should not be sensitive to the capital gains tax rate.²⁵ Given that individuals play only a modest role in investing in venture capital funds, it is unlikely that the individual capital gains tax rate plays an important role in the supply of venture capital backing to entrepreneurs.²⁶

²⁵ Other sources of investment for venture capital funds in 2002 included corporations (10 percent) and insurance companies and banks (16 percent). These investors may have been subject to capital gains taxes as corporations.

²⁶ Gompers and Lerner (1998) use state-level variation in capital gains tax rates to explore whether venture-capital-backed investment varies with capital gains tax rates. Their results suggest that higher capital gains tax rates are associated with less investment financed by venture capital in the state. However, this relationship is strongest for investment by venture capital funds that rely heavily on pension funds as a source of capital. Gompers and Lerner hypothesize that this relationship indicates that the relationship between venture capital finance and capital gains tax

Recent data on both informal investors and angel investors indicate that these investors are critical for small businesses. Reynolds (2005) reports that informal investors contributed an average of \$162 billion per year over the period 2000-2004; by comparison, he reports an average of \$45 billion per year of venture capital funding of start-ups for 2000-2003. According to the Center for Venture Research (2008), angel investors provided \$26 billion in financing for start-ups in 2007. Van Osnabrugge and Robinson (2000) estimate that angels provide three to five times as much financing as venture capitalists and fund roughly thirty times more firms than venture capitalists. These data suggest that the average stake provided by an angel investor is much smaller than that provided by a venture capitalist. Van Osnabrugge and Robinson's data indicate that the typical angel investment is roughly \$75,000 so these investors are crucial for the earliest stage of external financing.

In contrast to the lack of individuals holding interests in venture capital partnerships, the friends, family, and angel investors who finance entrepreneurial ventures typically face the individual income tax. Thus, the capital gains tax rate is relevant for their after-tax rates of return. The extent to which the capital gains tax rate affects these investors' decisions depends, in part, on the tax treatment of alternative investments. A natural alternative to investing in a start-up business is investing in more established businesses. Such investments typically face the capital gains tax, which suggests that the capital gains tax does not necessarily disadvantage investments in start-ups. However, as discussed in the context of the entrepreneurs who invest in their own businesses, these investors may take relatively large and undiversified positions in the start-up firm. Morrisette (2007) reports that angel investors tend to have a small number of investments at a time. Thus, these investors may also be disproportionately affected by possible

rate is driven by a demand-side relationship (rather than a supply-side effect). States with low capital gains tax rates have more entrepreneurs who seek funding from venture capitalists. These needs are met by a mix of sources, most of which do not face the capital gains tax rate.

asymmetries in capital gains tax rules. That is, they may face a higher effective tax rate on gains than they face on losses.

While one function of venture capital and angel financing is to match entrepreneurs who need funds with investors who are willing to fund such investments, the private equity process also affects the operations and viability of entrepreneurial enterprises. Venture capitalists and angels provide more than just financial capital: they also provide advice to entrepreneurs. Structuring the contracts between venture capitalists and the firms they finance so as to align the incentives between the various parties is an important part of the process. As emphasized by Keuschnigg and Nielsen (2004), capital gains taxation can affect this contracting environment. Their model implies that capital gains taxation reduces effort by both the entrepreneur and the outside investor (i.e., the venture capitalist). They posit that the capital gains tax has an especially deleterious effect on effort because firms only face the tax if they are successful.

VI.D. Capital Gains Taxes and Venture Capital Disbursements

The effects of capital gain taxes on venture capital funding can reflect both supply side considerations (i.e., the taxation of the investors in the venture capital fund) and demand side considerations (i.e., the taxation of the entrepreneurs who seek funding). As mentioned above, since many of the investors in venture capital funds are not tax sensitive, Gompers and Lerner (2004) argue that venture capital disbursements may respond more to demand side considerations than supply side considerations. Gompers and Lerner (1998) use state-level variation in capital gains tax rates to explore whether venture-capital-backed investment varies with capital gains tax rates. Their results suggest that higher capital gains tax rates are associated with less investment financed by venture capital in the state. However, this relationship is

strongest for investment by venture capital funds that rely heavily on pension funds as a source of capital. States with low capital gains tax rates have more entrepreneurs who seek funding from venture capitalists.

More specifically, Gompers and Lerner use state-level data from 1976 – 1994 on venture capital disbursements to entrepreneurs in each state to estimate the effects of capital gains taxes on entrepreneurial activity. Their dependent variables are the logarithm of real venture capital investment (i.e., disbursements) in the state per million residents and the number of companies receiving venture capital in the state per thousand residents. The marginal tax rate on capital gains (combining Federal and state tax codes) captures the effect of capital gains taxes. They include a number of state-specific time-varying and state-invariant (but time-varying) control variables. The variables that vary by state and year include: (1) the logarithm of the previous year's real gross state product per capita; (2) the previous year's real gross state product growth in the state; (3) the logarithm of previous year's real expenditure on academic research and development per capita in the state; and (4) the logarithm of previous year's real expenditure on industrial research and development per capita in the state.²⁷ The year-specific (but state-invariant) variables include: (1) the logarithm of the value of all venture capital-backed initial public offerings in the previous year; (2) the previous year's T-bill return; (3) the previous year's return on a value-weighted stock index; and (4) a dummy variable for whether ERISA's prudent investor rule had been clarified.

²⁷ Their dependent variable comes from tabulations by Venture Economics. Gross state product is from the U.S. Department of Commerce's Bureau of Economic Analysis. The industrial R&D data are from the National Science Foundation's Survey of Research and Development in Industry. Before 1978, these data were collected biannually so they imputed data for missing years. For some states, the R&D data are missing in some year so regional data are allocated to various states based on gross state product. The academic R&D data are from the NSF's Survey of Research and Development Expenditures at Universities and Colleges. They use the National Bureau of Economic Research's TAXSIM model for calculating tax rates.

Following Gompers and Lerner, I estimate a similar regression for a considerably larger panel of state data. In addition to adding more recent years through 2007, I add data back to 1969.²⁸ By moving to a longer time dimension, I am not able to separate R&D spending into industry and academic components. My regression differs from Gompers and Lerner's model along several other dimensions. First, since the data include some zeroes, I estimate the model in levels rather than logs. Second, rather than use state-invariant but time-varying information, I focus on models that include year fixed effects; the year fixed effects model should provide a more flexible specification for absorbing any time-specific effects. Third, when the R&D variable is imputed (either due to missing years or states that are imputing using regional data), I include an interaction term between the R&D variable and a dummy variable that is equal to one when the variable is imputed and zero when the variable is from reported data; the logic behind the interaction term is that the imputed values suffer from classical measurement error so they might cause attenuation bias.

Table 5 presents estimates of the effect of capital gains tax rates on venture capital disbursements to entrepreneurs within a state. The first column of results is for a regression that includes state fixed effects but not year fixed effects. The second column of results includes both state and year fixed effects. The capital gains tax rate in the recipient state has a negative, and statistically significant, effect on venture capital disbursements. A one percentage point increase in the marginal tax rate implies a decrease in venture capital disbursements of \$1.28 per capita (in the first specification) and \$3.48 per capita (in the second specification). The mean tax rate in the sample is 24%, and the mean venture capital disbursement is \$23.8 per capita. Thus, evaluated at the mean venture capital disbursement, a one percentage point increase in the capital

²⁸ Gompers and Lerner were limited by the NBER's TAXSIM model only having state tax information back to 1976. Jon Bakija graciously provided me with tax rate data that extends from 1969 through 2007.

gains tax rate decreases venture capital investment into the state on the order of 5.4 to 14.6 percent. Since the money raised by venture capital funds comes from many states and often comes from tax insensitive investors, Gompers and Lerner suggest interpreting the results of this type of regression as capturing the demand side of venture capital. States with higher tax rates on capital gains appear to have fewer entrepreneurs starting businesses that seek venture capital backing.²⁹

V. Concluding Remarks

Entrepreneurial assets are an important part of the aggregate net worth of U.S. households. These investments play a vital role in the creation of jobs and new products. Data from the Federal Reserve Board's *Survey of Consumer Finances* indicates that investment in entrepreneurial ventures has generated a large stock of unrealized capital gains, considerably larger than the stock of unrealized capital gains on corporate equities. In contrast, tax return data suggests that the realized capital gains on entrepreneurial assets may be smaller than the realized capital gains on corporate equities. The magnitude of these unrealized capital gains suggests a shift in focus in considering the effects of capital gains taxation. While typical analyses of capital gains consider households' portfolio investments in stock, the distortions created by the capital gains tax for entrepreneurial assets may prove to be considerably more important than those created by taxing capital gains associated with investing in public companies.

The magnitude of unrealized capital gains on entrepreneurial investments suggests that the capital gains tax could distort a number of important decisions of entrepreneurs. These decisions

²⁹ Similar results hold in models with personal income instead of gross state product as a measure of income. Using lagged tax rates instead of the contemporaneous tax rate also yields similar results.

include starting a new business, expanding the business, and obtaining outside financing; the capital gains tax can also affect whether and when an entrepreneur sells his or her business. The possibility that the capital gains tax is asymmetric with respect to gains and losses, with gains being taxed more heavily than losses, magnifies the importance of these distortions.

The tax policy response to these potential distortions could take several different forms. One approach is to reduce the capital gains tax rate that applies to most types of assets. A benefit of such an approach is that it does not discriminate against types of investments. An alternative approach is targeted tax relief for capital gains on entrepreneurial assets. One example of targeted capital gains tax relief is the exclusion of 50% of the gains for qualified small business stock that is obtained when a qualified firm has an initial public offering (Section 1202 of the Internal Revenue Code). Guenther and Willenborg (1999) conclude that this tax treatment has increased the prices at which entrepreneurs have sold their firms, consistent with the objectives of the policy. While targeted approaches focus attention on a class of assets for which the distortions of the capital gains tax may be the largest, targeted approaches often carry administrative challenges. Defining which assets qualify for special treatment is an exercise in line drawing that inevitably creates some distortions between types of investment that are quite similar but fall on different sides of where the qualifying line is drawn.

Table 1: Household Portfolios and the Importance of Entrepreneurial Investments				
	Percent of households with asset	Conditional median value of asset	Mean value of asset	Aggregate Portfolio Share
Financial Assets:			216,948.2	40.0
Liquid assets	91.0	4,130	24,397	4.51
Fixed income	29.7	9,700	27,017.9	4.98
Stocks	23.7	25,000	63,567.9	11.71
Held directly	17.9	17,000	39,531.2	7.29
Mutual funds	10.6	50,000	24,036.7	4.42
Retirement accounts	53.6	45,000	79,625.3	14.67
Other financial assets	27.0	10,000	22,340.2	4.13
Non-financial Assets:			325,214.8	60.0
Equity in primary home	68.1	107,000	134,683.5	24.83
Other residential real estate	13.5	100,000	38,282.6	7.05
Commercial real estate	8.2	72,500	23,123.2	4.25
Active businesses	10.9	100,000	102,971.6	18.98
Farms	0.59	127,772.4	2,582.3	0.48
Passive business investment	1.4	118,000	13,856.3	2.56
Other non-financial assets	14.4	10,000	9,715.4	1.79
TOTAL			542,163.1	

Source: Author's calculations from the Federal Reserve Board's *Survey of Consumer Finances 2007*.

Table 2: Household Portfolios and the Importance of Entrepreneurial Investments, By Entrepreneurial Status

Panel A: Households with Active Business Assets				
	Percent of households with asset	Conditional median value of asset	Mean value of asset	Aggregate Portfolio Share
Financial Assets:			564,311.2	26.92
Liquid assets	99.0	12,000	66,877.9	3.19
Fixed income	39.3	7,500	68,807.9	3.29
Stocks	40.8	63,000	205,299.7	9.78
Held directly	30.5	30,000	126,054.6	6.01
Mutual funds	22.2	72,100	79,245.1	3.77
Retirement accounts	64.0	91,000	168,180	8.05
Other financial assets	37.4	26,000	55,145.8	2.63
Non-financial Assets:			1,532,767	73.08
Equity in primary home	87.4	141,000	269,291.4	12.86
Other residential real estate	29.1	155,000	125,238.8	5.97
Commercial real estate	20.7	140,000	87,722.4	4.18
Active businesses	100.0	100,000	942,543.9	44.96
Farms	5.2	123,557.1	21,578.5	1.03
Passive business investment	3.6	232,000	49,965.6	2.38
Other non-financial assets	22.1	25,000	36,426.5	1.74
TOTAL			2,097,078	

Table 2: Household Portfolios and the Importance of Entrepreneurial Investments, By Entrepreneurial Status				
Panel B: Households without Active Business Assets				
	Percent of households with asset	Conditional median value of asset	Mean value of asset	Aggregate Portfolio Share
Financial Assets:			174,345	49.56
Liquid assets	90.1	3,600	19,186.8	5.45
Fixed income	28.5	10,000	21,892.4	6.21
Stocks	21.6	24,000	46,184.8	13.14
Held directly	16.4	15,000	28,919.3	8.24
Mutual funds	9.2	50,000	17,265.6	4.90
Retirement accounts	52.3	41,000	68,764.3	19.56
Other financial assets	25.7	10,000	18,316.6	5.20
Non-financial Assets:			177,111.3	50.33
Equity in primary home	65.7	102,000	118,174.2	33.57
Other residential real estate	11.6	79,000	27,617.6	7.86
Commercial real estate	6.7	58,000	15,200.2	4.32
Active businesses	N/A	N/A	N/A	N/A
Farms	0.03	873,042	252.4	0.072
Passive business investment	1.1	100,000	9,427.6	2.68
Other non-financial assets	13.5	8,000	6,439.3	1.83
TOTAL			351,456.3	

Source: Author's calculations from the Federal Reserve Board's *Survey of Consumer Finances 2007*.

Table 3: Unrealized Capital Gains and Losses on Different Types of Assets			
	Directly-Held Equities	Active Business Assets	Passive Business Assets
Percent of Households	17.9	10.9	1.4
Percent of Households with the asset who have:			
A loss	19.3	13.9	9.9
Neither a loss or gain	12.6	7.0	15.3
A gain	68.1	79.1	74.8
Mean unrealized capital gain of households with the asset	\$57,980.0	\$ 731,528.3	\$655,247.9
Median unrealized capital gain of households with the asset	\$950.0	\$45,000	\$40,000.0
Mean unrealized gain or loss as a percentage of basis for households with the asset	61.9	12,358.3	9,583.7
Median unrealized gain or loss as a percentage of basis for households with the asset	10.4	233.3	100.0

Source: Author's calculations from the Federal Reserve Board's *Survey of Consumer Finances 2007*.

Table 4: Illustration of Taxation of Entrepreneurial Wages				
Tax Rates			Change in taxes created by paying an additional \$100 in wages to the entrepreneur, but holding investment constant	
Wages	Capital Gains	Business Income	Period 1	Period 2
35	15	0	35	-15
35	15	35	0	-65*.15 = -9.75
15	15	0	15	-15
15	15	35	-20	-65*.15 = -9.75

Notes: The tax calculations assume that the business pays an additional \$100 in wages to the entrepreneur in the first period, but the entrepreneur invests sufficient money to keep the investment constant (which is equal to $\$100 \cdot (1 - t_b)$). This additional paid-in capital increases the entrepreneur's basis in the firm, which subsequently reduces the future capital gains tax liability. The calculations assume that the eventual sales price of the business does not depend on the wage payment.

Table 5: State-level Venture-Capital Backed Investment, 1969-2007		
Dependent variable: Real Venture Capital Disbursements per Capita		
Independent variable:	(1)	(2)
State + Federal Capital Gains Tax Rate	-128.33* (31.33)	-347.87* (115.49)
State personal income per capita	0.000813* (0.000187)	0.000186* (0.0000158)
R&D Funding per capita	0.0865* (0.00785)	0.0719* (0.00614)
R&D Funding * imputed value dummy	-0.0709* (0.0126)	-0.0377* (0.0126)
State fixed effects?	Yes	Yes
Year fixed effects?	No	Yes
Number of observations	1938	1938

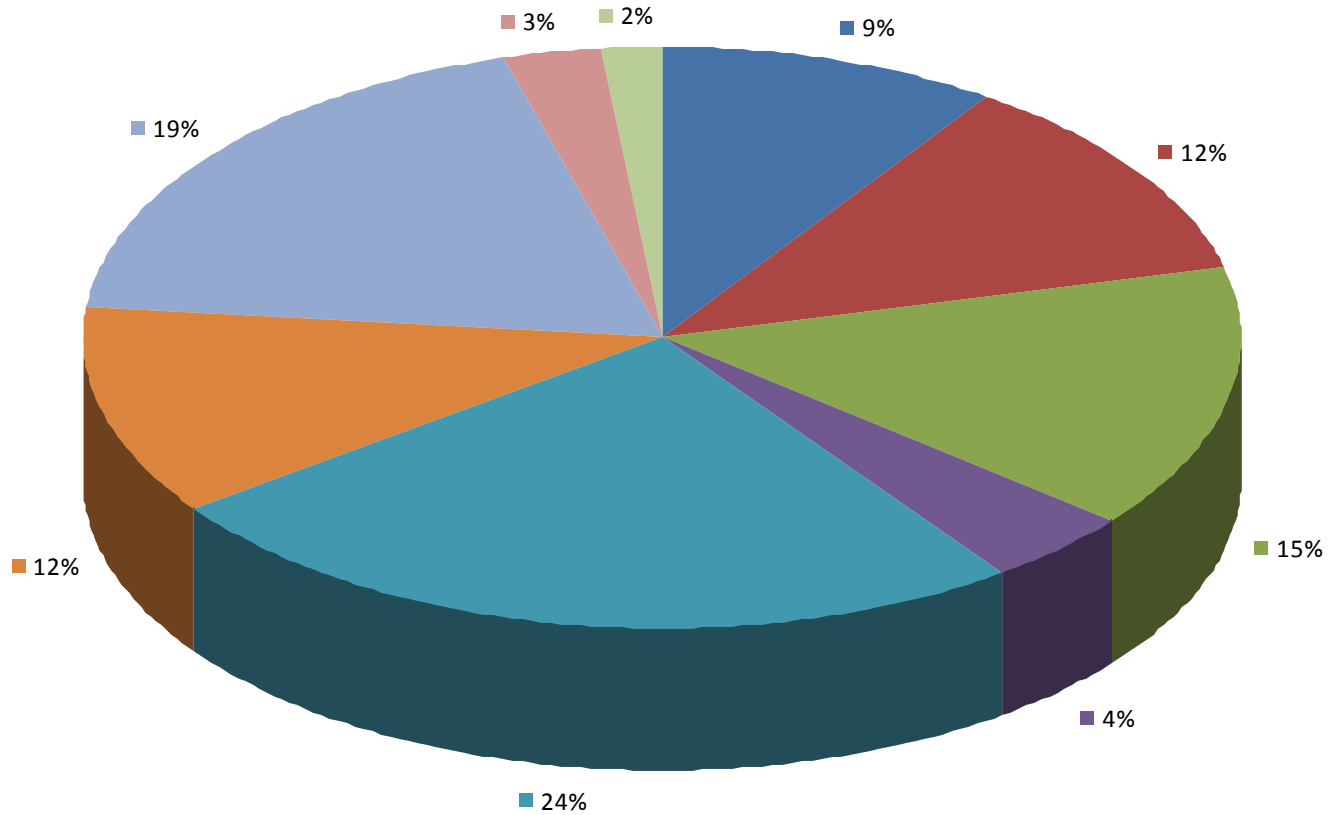
Notes: State-level panel data from 1969-2006. * denotes estimated coefficients that are statistically significant at the 99% confidence level. Tax rates are expressed as fractions; the mean total tax rate in the sample is 0.24. The mean venture-capital disbursement per capita is \$23.8.

References

- Auerbach, Alan J. 2007. "How to Tax Capital Gains," *Wall Street Journal*, August 16, 2007.
- Auerbach, Alan J., Leonard E. Burman, and Jonathan M. Siegel. 2000. "Capital Gains Taxation and Tax Avoidance: New Evidence from Panel Data," in *Does Atlas Shrug? The Economic Consequences of Taxing the Rich*, edited by Joel Slemrod, Cambridge, MA: Harvard University Press, pp. 355-388.
- Bankman, Joseph. 2004. "The Structure of Silicon Valley Start-Ups," *UCLA Law Review*, vol. 41, iss. 7, pp. 1737-1768.
- Baumol, William J., Robert E. Litan, and Carl J. Schramm. 2007. *Good Capitalism, Bad Capitalism, and the Economics of Growth and Prosperity*. New Haven, CT: Yale University Press.
- Bitler, Marianne, Tobias J. Moskowitz, and Annette Vissing-Jorgensen. 2005. "Testing Agency Theory with Entrepreneur Effort and Wealth," *Journal of Finance*, vol. 60, no. 2, pp. 539-576.
- Bucks, Brian K., Arthur B. Kennickell, and Kevin B. Moore. 2006. "Recent Changes in U.S. Family Finances: Evidence from the 2001 and 2004 Survey of Consumer Finances." *Federal Reserve Bulletin*.
- Burman, Leonard E. 1999. *The Labyrinth of Capital Gains Tax Policy: A Guide for the Perplexed*. Washington, D.C.: Brookings Institution Press.
- Burman, Leonard E. and Peter D. Ricoy. 1997. "Capital Gains and the People Who Realize Them," *National Tax Journal*, vol. 50, no. 3, pp. 427-451.
- Cavalcanti, Ricardo de O. and Andres Erosa. 2007. "A Theory of Capital Gains Taxation and Business Turnover." *Economic Theory*, vol. 32, pp. 477-496.
- Center for Venture Research. 2008. "The Angel Investor Market in 2007: Mixed Signs of Growth." www.unh.edu/cvr.
- Chari, V.V., Mikhail Golosov, and Aleh Tsyvinski. 2005. "Business Start-ups, the Lock-in Effect, and Capital Gains Taxation." Unpublished manuscript, Harvard University.
- Cullen, Julie Berry and Roger H. Gordon. 2007. "Taxes and entrepreneurial risk-taking: Theory and evidence for the U.S.," *Journal of Public Economics, Volume 91, Issues 7-8, August 2007, Pages 1479-1505*.

- Desai, Mihir A. and William M. Gentry. 2004. "The Character and Determinants of Corporate Capital Gains," in James M. Poterba, ed., *Tax Policy and the Economy*, volume 18, MIT Press, pp. 1-36.
- Eichner, Matthew and Todd Sinai. 2000. "Capital Gains Realizations and Tax Rates: New Evidence from Time Series," *National Tax Journal*, vol. 53, no. 3, pt. 2, pp. 663-682.
- Gentry, William M. and R. Glenn Hubbard. 2003. "Tax Policy and Entry into Entrepreneurship." Unpublished manuscript, Williams College and Columbia University.
- Gentry, William M. and R. Glenn Hubbard. 2004. "Entrepreneurship and Household Saving." *Advances in Economic Analysis and Policy*, vol. 4, issue 1, article 8. Available at: <http://www.bepress.com/bejeap/advances/vol4/iss1/art8>
- Gompers, Paul A. and Josh Lerner. 1998. "What Drives Venture Capital Fundraising?," *Brookings Papers on Economic Activity: Microeconomics*, pp. 149-204.
- Guenter, David and Michael Willenborg. 1999. "Capital gains tax rates and the cost of capital for small business: Evidence from the IPO market," *Journal of Financial Economics*, September, pp. 385-408.
- Henning, Steven L., Shaw, Wayne H. and Stock, Toby. 2000. "The Effect of Taxes on Acquisition Price and Transaction Structure," *Journal of American Taxation Association*, Vol. 22, Supplement.
- Keuschnigg, Christian and Soren Bo Nielsen. 2004. "Taxation and Venture Capital Backed Entrepreneurship," *International Tax and Public Finance*, vol. 11, pp. 369-390.
- Morrisette, Stephen G. 2007. "A Profile of Angel Investors," *Journal of Private Equity*, vol. 10, iss. 3, pp. 52-66.
- Poterba, James M. 1989. "Venture Capital and Capital Gains Taxation." in Lawrence Summers, ed., *Tax Policy and the Economy*, volume 3, MIT Press, pp. 47-67.
- Reynolds, Paul D. 2005. *Entrepreneurship in the U.S.: 2004 Assessment*. Eugenio Pino Family Global Entrepreneurship Center, Florida International University.
- Van Osnabrugge, Mark and Robert J. Robinson. 2000. *Angel Investing: Matching Start-Up Funds with Start-Up Companies*. San Francisco: Jossey-Bass.
- Wilson, Janette and Pearson Liddell. 2010. "Sales of Capital Assets Reported on Individual Income Tax Returns, 2007." *Statistics of Income Bulletin*, Internal Revenue Service, U.S. Government, Winter.

Figure 1: Aggregate Portfolio Shares



■ Liquid assets + Fixed Income ■ Stocks ■ Retirement accounts ■ Other financial assets ■ Housing Equity
■ Other real estate ■ Active businesses ■ Passive business investment ■ Other non-financial assets

Figure 2: Mean Value of Asset

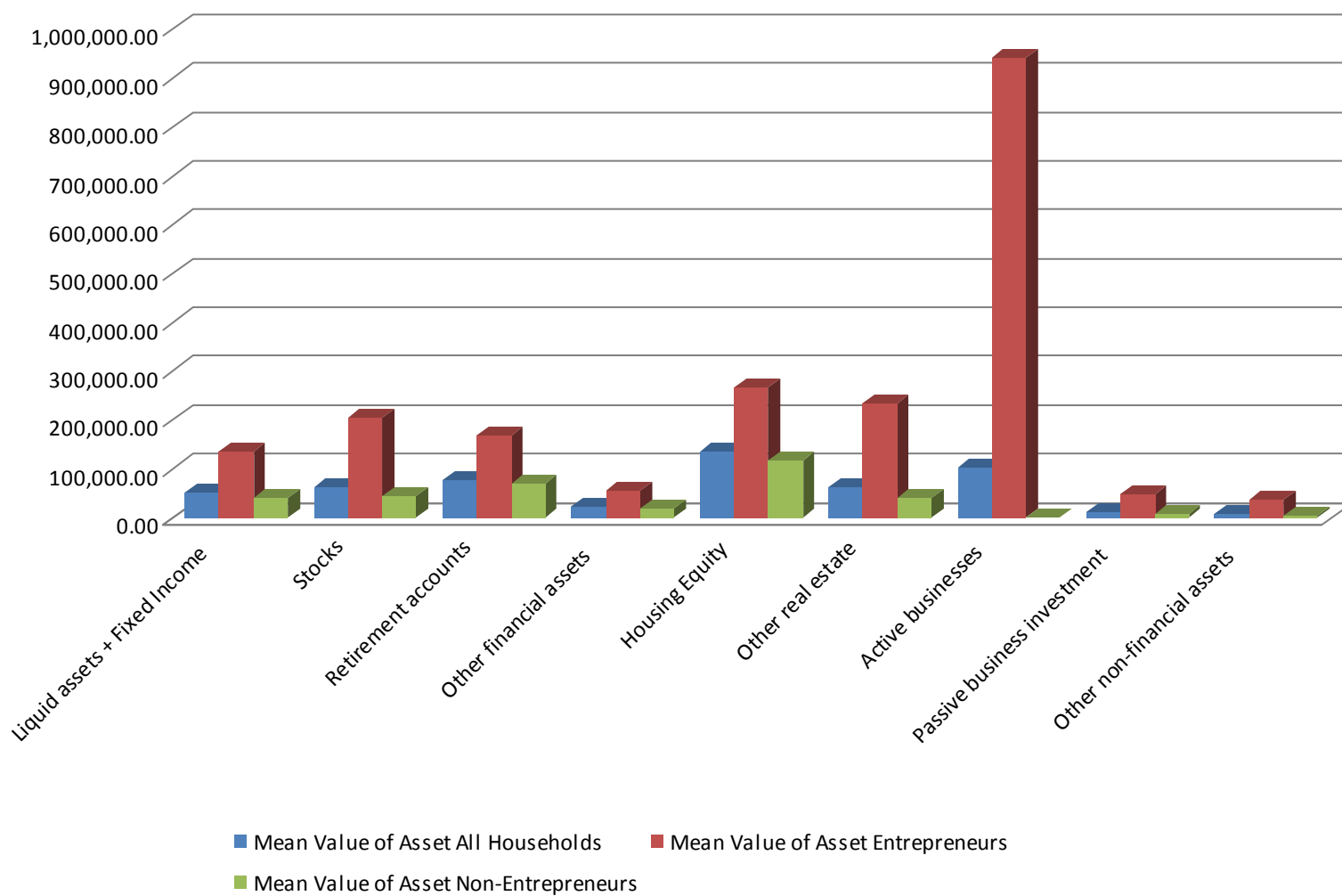
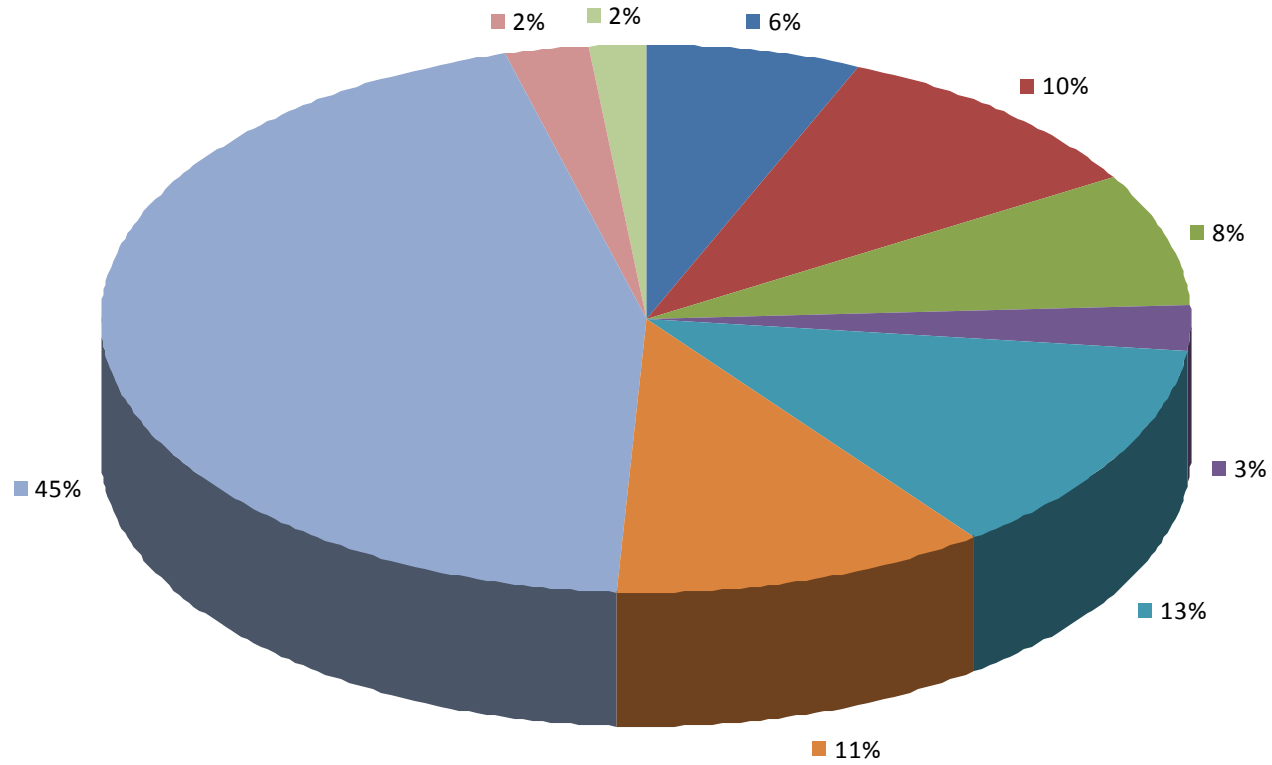
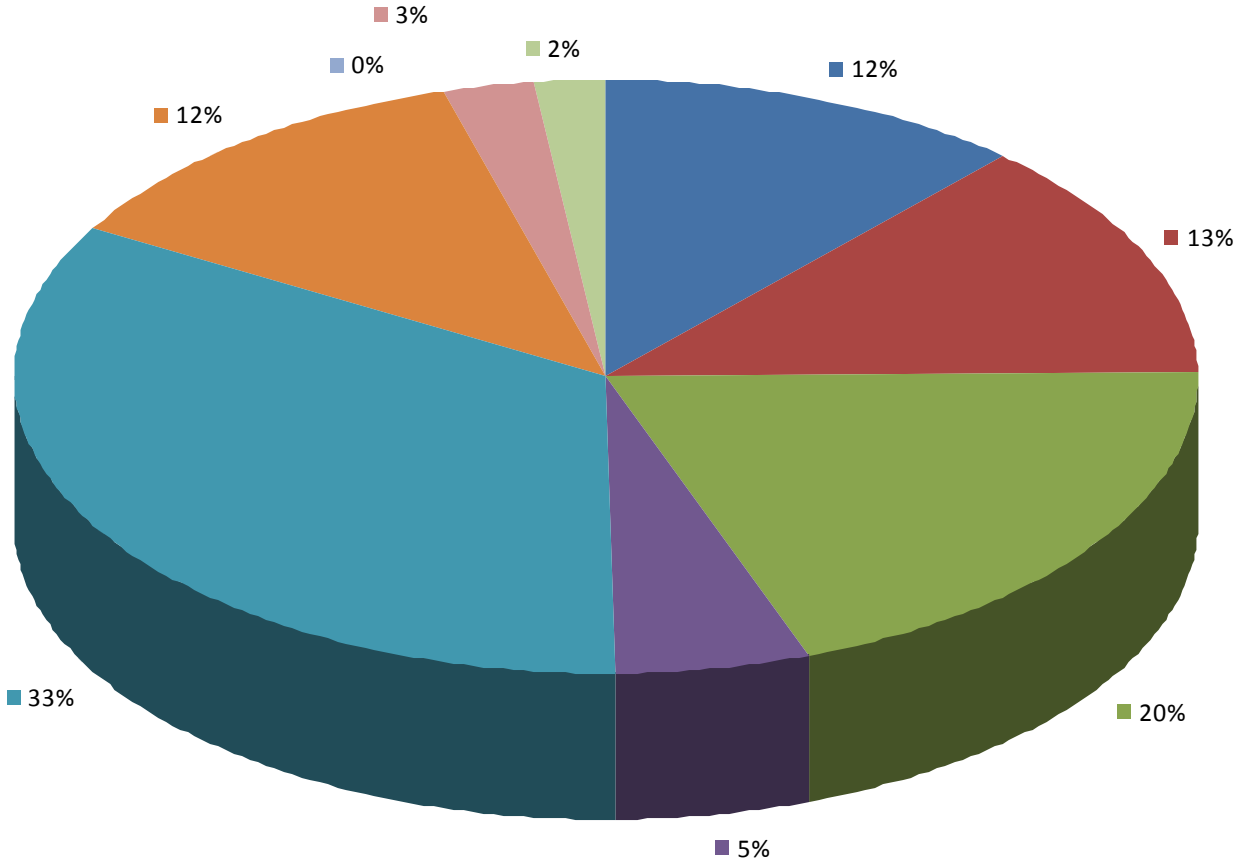


Figure 3A: Aggregate Portfolio Share for Entrepreneurs



■ Liquid assets + Fixed Income ■ Stocks ■ Retirement accounts ■ Other financial assets ■ Housing Equity
■ Other real estate ■ Active businesses ■ Passive business investment ■ Other non-financial assets

Figure 3B: Aggregate Portfolio Share for Non-entrepreneurs



■ Liquid assets + Fixed Income ■ Stocks ■ Retirement accounts ■ Other financial assets ■ Housing Equity
■ Other real estate ■ Active businesses ■ Passive business investment ■ Other non-financial assets