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- FORTHCOMING: REVIEW OF FINANCE -

Abstract

Owners of private companies often invest a substantial share of their net worth in one company, which exposes them to idiosyncratic risk. For US companies we investigate whether owners require compensation for lack of diversification in the form of higher returns to equity. Exposure to idiosyncratic risk is measured as the share of the owner's net worth invested in the company. Equity returns are measured as the earnings rate and as capital gains. For both returns measures we find a positive and significant influence of exposure to idiosyncratic risk. This paper improves our understanding of returns to private equity.

JEL classification: G32, G11, L26

Keywords: returns to private equity, exposure to idiosyncratic risk, private companies

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1 Introduction

Owners of private companies typically have a high share of their personal net worth invested in a single private company. The large investments give them high ownership shares, which reduces agency costs, but also exposes them to the idiosyncratic risk of the company. Rational owners will require a compensation for this risk exposure in the form of higher returns to their investment.

In this article, we investigate whether the owners of private companies require a compensation for their risk exposure. Moskowitz and Vissing-Jørgensen (2002) find that, on average, returns to private equity are not higher than returns to public equity. This is puzzling, since private equity has an unfavourable risk-return trade-off: there does not seem to be a compensation for idiosyncratic risk. The paper is based on the theoretical work by Heaton and Lucas (2002), who use a consumption-based model to argue that poorly diversified entrepreneurs should require a large return premium over public equity. A simulation by Kerins et al. (2004) also suggests that exposure to idiosyncratic risk is very costly. These theoretical papers are based on the assumptions that entrepreneurs understand idiosyncratic risk and that their risk aversion is sufficiently high that it makes them require a high return premium to accept idiosyncratic risk. Our paper is, to our knowledge, the first to directly test whether private equity owners who take on more idiosyncratic risk (relative to their net worth) are compensated by higher average returns, and if yes, by how much. We test whether equity returns vary systematically with risk exposure but we do not address the question of why returns are, on average, low.

Information on private companies from the Survey of Consumer Finances (SCF) and the Survey of Small Business Finances (SSBF) is used. We measure exposure to idiosyncratic

risk as the share of net worth that the owner has invested in the company. We use an instrumental variables approach for all regressions because owners may be willing to invest a larger amount in companies that are more profitable.

We find evidence that returns to equity is higher if owners have a higher exposure to idiosyncratic risk. This holds for both the earnings rate (profits divided by equity value) and capital gains. The results are statistically and economically significant and robust to the use of different specifications in both data sets. Furthermore, we find that owners with and without an active management role are concerned about idiosyncratic risk. For owners with an active management interest we are able to control for their ownership share. Owners with a higher ownership share have a higher incentive to work hard, since they can keep a higher share of the resulting profits for themselves. For owners with an active management interest the SCF data allow us to explicitly control for effort, measured as the average weekly hours worked. With controls for incentives and effort included, it is likely that investment considerations give rise to the results. The results of the SCF indicate that private equity owners who have invested an additional 10 percent of their net worth in private equity require an average return increase of about 15.7 percentage points to take on the resulting additional risk. We therefore find an economically important influence of idiosyncratic risk.

The analysis improves our understanding of the behaviour of owners of private companies. Owners demand higher expected returns from business opportunities, if they have a higher share of net worth invested in the company. Owners can influence expected returns by deciding in which companies to invest, which activities the company engages in, and when to close the company or sell their stake.

How does this analysis relate to the unfavourable risk-return trade-off of private equity found by Moskowitz and Vissing-Jørgensen (2002)? We find that owners of private compa-

nies demand compensation for their exposure to idiosyncratic risk. We therefore exclude one possible explanation for low returns, namely that owners do not understand or do not care about idiosyncratic risk. However, we cannot explain why individuals invest in private equity given the low average level of returns. Hamilton (2000) finds that both initial earnings and earnings growth are lower for entrepreneurs than for individuals in paid employment. The author gives nonpecuniary benefits, such as utility from being one's own boss, or overoptimism as likely explanations. Our results therefore provide novel support for the argument by Moskowitz and Vissing-Jørgensen (2002) that it is puzzling that the average entrepreneur willingly enters entrepreneurship given that the observed average private equity returns are similar to the observed average public equity returns.

The literature already does provide some evidence that private equity investors do worry about idiosyncratic risk. Bitler et al. (2005) show that owner-managers in riskier firms take on a lower ownership share, as do the owner-managers with lower wealth. Furthermore, firm size seems to be scaled down in riskier firms. The risk measure used by Bitler et al. (2005) is the absolute value of the residual from a regression of the earnings rate on a set of controls. The present paper improves on and supplements this work by analysing measures of the returns earned as the outcome variable and by using the variation in idiosyncratic risk held, generated from cross-owner differences in the share of net worth invested in the firm.

There is also evidence from venture capital and buyout funds that idiosyncratic risk matters for required returns. Jones and Rhodes-Kropf (2004) develop a theoretical model to analyze the role of idiosyncratic risk for the pricing of investments. The model predicts a positive relationship between the net of fees investment returns of funds and the ex post idiosyncratic risk of the funds' returns. The venture capitalist is compensated for the expected idiosyncratic risk by the contract with the fund investors. If the venture capitalist finances

a company with higher than expected idiosyncratic risk, a higher discount rate is applied. The entrepreneur therefore needs to compensate the venture capitalist for higher than expected risk, even though the entrepreneur holds the market power in the model. The model explains why venture capital discount rates can be very high. The authors test the model with data on venture capital and buyout funds. They find a strong correlation between realized risk and fund returns. Realized risk is the standard deviation of the residual in a regression of fund returns on the contemporaneous value and on lags of the excess market return. The authors have cash flow information for each fund but do not know in how many portfolio companies the fund has invested in or whether funds have an industry focus. Data on a fund's diversification are therefore limited. Our analysis differs from that of Jones and Rhodes-Kropf (2004) in that we use a more direct measure of exposure to idiosyncratic risk, namely share of net worth invested, and, in addition, investigate a different asset class.[1]

There are also studies investigating the consequences of idiosyncratic risk on sector size, productivity growth and investment. Castro et al. (2009) use a simulation model to investigate the influence of idiosyncratic risk on the relative size of the capital and consumption goods producing sectors. Better legal institutions allow for better risk sharing and therefore encourage investment in the capital goods producing sector that has higher idiosyncratic risk than the consumption goods producing sector. Michelacci and Schivardi (2008) establish for OECD countries that higher sector-level idiosyncratic risk depresses sectoral labour productivity growth in countries with lower levels of diversification opportunities. Panousi and Papanikolaou (2009) find a negative influence of idiosyncratic stock-return volatility on the investment of publicly traded firms in the US. The authors provide evidence that this

[1]There are other studies investigating the returns of venture capital funds, see, for example, Cochrane (2005), Kaplan and Schoar (2005) and Ljungqvist and Richardson (2003).

effect can be explained with managerial risk aversion.

The paper also adds to the literature on the influence the concentrated ownership structure of private companies has for their performance. Ang et al. (2000) find that a higher ownership share by the manager reduces agency costs. Bitler et al. (2005) document a positive influence of ownership share on effort and a positive influence of effort on firm performance. Himmelberg et al. (2002) argue that a higher share of insider ownership should increase the cost of capital, since insiders are exposed to idiosyncratic risk. They find confirming evidence for public companies. In their study, the variable insider ownership captures both the effect due to lack of diversification and the effect due to better incentives.

The rest of the paper is organised as follows: Section 2 develops the hypothesis; Section 3 describes the measure of exposure to idiosyncratic risk; Section 4 introduces the data sets and gives summary statistics; Section 5 investigates the return measures in detail, Section 6 presents the empirical results, and Section 7 concludes.

2 Development of Hypothesis

In a US study, Moskowitz and Vissing-Jørgensen (2002) have documented the prevalence of owners' lack of diversification. Households with an investment in private equity have, on average, 41% of their net worth invested in private equity, of which 82% is invested in just one company in which the household has an active management interest. Owners are therefore exposed to the idiosyncratic risk of the company.

The cost due to lack of diversification has been described in the literature for different situations. Tobin (1958) finds in his early contribution that risk-averse investors divide their investment in monetary assets between interest-earning but risky assets and non-interest

earning but safe cash, in such a way as to achieve their preferred risk-return trade-off. Brennan and Torous (1999) investigate investments in the stock market and find that significant welfare gains can be attained by increasing the number of securities in the portfolio. Managers of public companies are often deliberately exposed to the idiosyncratic risk of their companies through stock or stock options in order to provide them with incentives to exert effort. Managers value stock or stock options in their compensation contracts less, when a greater part of their wealth is correlated with the value of the company (Lambert et al., 1991; Meulbroek, 2001; Hall and Murphy, 2002; and Kahl et al., 2003).[2]

Kerins et al. (2004) use the capital asset pricing model and data on newly public companies to derive the opportunity cost of capital for an entrepreneur with concentrated ownership. Their simulations show that exposure to idiosyncratic risk increases the cost of equity capital substantially. The authors calculate the returns achievable in the stock market with a portfolio that has the same total risk as an investment divided between a private company and the stock market. The stock market returns determine the opportunity cost of capital for the entrepreneur. The authors calculate for companies with 0-25 employees that an increase of the entrepreneur's share of personal wealth invested in the company from 15% to 25% increases the cost of equity capital by 14.2 percentage points.

Since the literature shows that exposure to idiosyncratic risk is costly, we expect that owners of private companies will demand compensation for their risk exposure, if they behave rationally. Owners can influence equity returns by deciding which projects the company should realize. If they have a high share of their net worth invested in the company, they

[2] Heaney and Holmen (2008) use data on the exposure to idiosyncratic risk for Swedish shareholders of listed companies to approximate the value they attach to control using the model developed by Lambert et al. (1991).

will only agree to projects if the expected returns of the projects are sufficient to compensate them for their lack of diversification. Accordingly, we test the following hypothesis in this paper: Owners with a higher exposure to idiosyncratic risk demand higher returns on their equity investment as compensation.

3 Measuring Exposure to Idiosyncratic Risk

To measure the lack of diversification we use information on the owner's equity investment in the company and on the owner's net worth. The share of net worth invested in the company is then used as proxy for exposure to idiosyncratic risk. Net worth is defined as the sum of all assets minus the sum of all liabilities of the owner.

Two measures for the share of net worth invested (SNWI) are calculated. The first method considers only the value of the equity investment. Depending on the data source, the value is measured either as market value or as book value. This variable is denoted as SNWI A.

$$\textbf{SNWI A} \;=\; \frac{(ownership\ share * market\ [book]\ value\ of\ equity)}{net\ worth} \tag{1}$$

The second calculation takes into account that the equity investment is not the only way in which the owner's assets are tied to the company. Owners can also give personal guarantees for company loans, use private assets as collateral and extend loans to the company or receive loans from the company. The second measure for exposure to idiosyncratic risk, SNWI B, considers these possibilities. It is calculated according to the following formula:

$$\textbf{SNWI B} = \frac{(ownership\ share * market\ [book]\ value\ of\ equity) + guarantees + collateral + net\ loans}{net\ worth} \tag{2}$$

We now turn to the discussion of whether SNWI is a good measure for risk exposure. Owners are confronted with variability in the earnings of the company and with variability in the value of their equity investment. These risks normally increase with SNWI. However, return risk can also influence how much owners invest. Owners may only be willing to invest substantial amounts if they consider the risk manageable. We therefore include a control for return risk in all regressions.[3] We divide companies into bins according to the value of SNWI. For each bin, we calculate the interdecile range of the earnings rate and divide it by the median of the earnings rate. For owners active in management of the SCF and the SSBF, we use 100 bins. For owners not active in management of the SCF we use 20 bins, since we have fewer observations and would otherwise be confronted with extreme values.

To describe owners' risk exposure completely, it would be desirable to have information on the correlation structure of the returns of the assets in the owners' portfolios. The total risk of the portfolios of owners who have an investment in the stock market is lower if the returns to private equity are negatively correlated with the stock market compared to a situation with a positive correlation. However, the surveys do not contain information from which the correlation structure could be derived.

The data used for the analysis also include companies whose owners have unlimited liability, i.e. they are liable for company obligations with all their private assets. The question

[3]We would like to thank an anonymous referee for suggesting this risk measure.

arises as to whether our measure of exposure to idiosyncratic risk is meaningful in this situation. The bankruptcy law in the USA stipulates that private assets below exemption limits can be kept by owners in the case of a bankruptcy proceeding. In practice, owners often have no assets exceeding these limits and therefore only lose their equity investment in a bankruptcy (Berkowitz and White, 2004, p. 71, and Fan and White, 2003, p. 544). It follows that SNWI is a valid proxy for risk exposure for owners with unlimited liability as well.[4]

4 Data

4.1 DATA SOURCES

The first data source used is the Survey of Consumer Finances (SCF), which is conducted by the Board of Governors of the Federal Reserve System, Washington, DC. The survey provides detailed information about the financial situation of households. We select two subsamples from the five SCF waves between 1989 and 2001. The first subsample includes all households with an active management interest in a private company. The survey asks for information about the largest three companies. We designate the household member who

[4]If a private company goes bankrupt in the USA with obligations still outstanding, an owner with unlimited liability can declare personal bankruptcy to dispose of the company debt. It is possible to give up all assets that are not exempt but to keep future earnings (Chapter 7), or to keep all assets and agree to a repayment plan to repay part of the debts (Chapter 13). The exemption rules differ between states. The median value for home equity is USD 15,000 and the median value for other personal assets is USD 7,000 (Berkowitz and White, 2004). Furthermore, if owners agree to keep up payments on loans that are secured on their home or private car, they do not lose these assets. If retirement savings are not excluded from the bankruptcy proceeding in the first place, they can be kept if the amount is reasonably necessary to support oneself upon retirement (Jackson, 2001).

makes the largest contribution to the running of the company as the main owner. Overall, the subsample contains complete information on 4029 households.[5] The survey asks for an estimate of the market value of the equity share in the company. Observations for companies with an equity value below USD 1,000 are deleted, because very small values of equity can lead to implausibly high earnings rate figures. As a further measure to ensure plausible earnings rate figures, the smallest and largest 1% of the observations of this variable are excluded. For the variable capital gains, the largest 1% of observations is deleted.[6] In addition, households are required to have positive net worth and positive private wealth, i.e. positive net worth not considering equity investments in private companies. In the end, 3900 households are included in the analysis. Of the included households, 70% have a management interest in only one company, 20% in two and 10% in three. Overall, 5436 companies are

[5]The SCF includes information on assets, such as private businesses or the value of the primary residence, only at the household level. Some information, for example education and job characteristics, is given for individual household members. To control for individual characteristics, we determine which household member is the main owner according to job characteristics. The survey states separately for each private business which household members work for it. If only one person works for the business, this person is the main owner. If both work for the business, then the single person who is self-employed in the main job is the main owner. If both are self-employed in their main jobs, then the main owner is the one who works the higher number of weekly hours in the main job. The same criteria apply for the second job, if both work for the business, but neither is self-employed in the main job. We use individual owner characteristics as instruments and as controls in the regression analysis. In the following, we use the term "owner" of the private company and not "household" owning the private company, although different owners may share the same household characteristics. The clustering of the error terms in regressions is at the household level.

[6]We chose only censoring at the top for the variable capital gains, because the absolute amount of the smallest values is quite limited and these observations do not overly influence the regression results. The smallest values of capital gains represent with close to -100% a total loss. We obtain identical results when deleting the smallest and largest 1% of observations of this variable.

included. The unit of observation is a company, not a household.[7]

For the second subsample of the SCF, all households with ownership in a private business in which they do not have an active management role are selected. The survey provides information on up to six companies with different legal forms. Should a household have more than one company of the same legal form, then information is only available for the sum of those. Overall, full information on 1486 households with ownership in 2090 (partly combined) companies is available. The same selection rules as for the first subsample apply, with the sole difference that the minimum size of USD 1,000 applies to the household's equity share and not to the total equity of the company. As before, equity value is given as market value. Finally, information on 1424 households and 1924 companies is used. 76% of these households have ownership in only one company, 16% in two companies, and 8% in between three and six companies.[8]

The second data source is the Survey of Small Business Finances (SSBF), which is also conducted by the Board of Governors of the Federal Reserve System. This survey provides information on private companies with up to 500 employees from the non-agricultural, non-financial sectors. From the SSBF, only the 1998 wave is used, because this is the only wave with information on the net worth of owners. Full information for 3496 companies is available. In contrast to the SCF, the owner information refers always to the largest owner and the value of equity is given as book value. In the majority of companies, the largest owner is active in the management. For the 10.7% of companies with a hired manager, it is possible but not necessarily the case that the largest owner is active in the management.

[7]See Kennickell et al. (2000) for more information on the 1998 SCF survey.

[8]We select the head of household as the main owner for companies in which the household has no active management role. Since the owners do not work for the company, it is not possible to determine the main owner according to job characteristics.

The SSBF data differentiates between three categories of total net worth of the owner: the book value of the ownership share, the equity value of the primary residence and the remaining net worth. The same inclusion criteria as for the SCF apply. In the SSBF, a high share of companies (21%) has negative equity values. Since SNWI is not well defined if the equity value is negative, only observations with positive equity values can be included in the empirical analysis.[9] Due to more extreme values, trimming of the earnings rate is done to the 5% level. 2345 companies are included in the analysis.[10]

4.2 SUMMARY STATISTICS

Descriptive statistics for all variables can be found in Tables 1, 2 and 3. The SCF data includes five imputations for missing values. We average the variables across imputations and then analyze them. Alternatively, it would also be possible to average results across imputations and to adjust standard errors. We prefer the first method since it is more tractable for the econometric models used in this paper. We use survey weights for the calculation of the descriptive statistics to make them representative for the underlying population. On average, companies have 32 employees in the SCF and 9.5 employees in the SSBF. Owners working for the company are included in the number of employees. The size of the company is measured with the logarithm of the number of employees. The average age of the company in both surveys is around 14 years.

One component of returns to equity is the earnings rate. It is defined as profits divided

[9] 21% of the companies have negative or zero equity values. This is a common finding for small and medium-sized enterprises. For example, KfW Research (2006) finds that almost 20% of German SMEs have negative book values for equity.

[10] More detailed information on the 1998 SSBF survey is available in Bitler et al. (2001).

by equity value. The profit figures in the two subsamples of owners with active management interest are reported before the payment of corporate tax. To make the numbers better comparable across legal forms, we calculate the corporate tax, which has to be paid only by C-corporations, and subtract it from the reported profits. Corporate tax rates differ according to the size of profits and have changed over the years. Table A in the appendix displays the tax rates.[11] As robustness check, we also show regression results without this tax adjustment. For the subsample of owners without management interest, we only know the amount of profits that the owners received after the payment of the corporate tax. Because the ownership share of the owners is unknown, it is not possible to calculate the total profits of the company and therefore it is not possible to calculate the respective tax liability. All calculations for the subsample of owners without management interest are therefore based on profits after the payment of corporate tax.

The second component of returns to equity is capital gains. It is only available for owners with a management role in the SCF. It is calculated according to the following formula:

$$\textbf{Capital gains} = \left(\frac{market\ value\ of\ equity}{value\ of\ original\ investment} \right)^{1/(years\ since\ founded\ or\ acquired)} \tag{3}$$

The value of the original investment is the nominal value of the equity investment. Additional investments over time are included. This value would be the cost basis for tax purposes, if the owner sold his or her share.

We use the two returns measures separately in the empirical analysis. It is not possible to

[11] C- and S-corporations are both characterized by limited liability. C-corporations have to pay corporation tax on profits that are paid out to their shareholders. In contrast, profits of S-corporations are only taxed via the income tax paid by their owners.

add them to obtain the total returns to equity, since this would lead to double counting of the retained earnings. The retained earnings cannot be subtracted from the earnings rate, since it is not known which portion of profits companies retain. The descriptive statistics for earnings rate and capital gains are discussed in detail in the next section.

The measures SNWI A and SNWI B document a considerable lack of diversification. For owners with active management interests, SNWI A is on average 27.4% (SCF) and 23.5% (SSBF). When guarantees, collateral and loans are taken into account as well, the average value of SNWI increases by 4.2 and 4.2 percentage points respectively.[12] Owners without management interests have a lower average value of SNWI A of 14.8%. The average ownership share is 77.6% (SCF) and 85.3% (SSBF).

We control for ownership share in the analysis of the subsamples of owners with an active management interest. For owners with an active management interest in the SCF it is also known how many hours the owner works on average per week in the company. We use the logarithm of this value in the regression as a control for effort. We take the weekly hours of the main owner. The main owner has to be self-employed in the main or in the second job and has to report that he or she is working for the company.

The regressions contain control variables for company size, company age, legal form, and industry, and the owner's level of education, experience and ethnicity. The descriptive statistics for the control variables are also shown in Tables 1, 2 and 3. Experience in the SCF includes all occupations, counting years in full-time employment as such and weighting years in part-time employment with a factor of 0.5. Experience in the SSBF is defined as the number of years owning or managing a company. All subsamples contain sole proprietorships, partnerships and corporations. In the subsample of owners that are not active in

[12]The SSBF does not include information on loans that owners receive from their companies.

the management, the share of sole proprietorships is lower and the share of partnerships is higher than in the subsample of owners that are active in the management. SCF regressions for owners with active management interest contain dummies differentiating between seven industries; the SSBF regressions contain industry controls at the two-digit SIC level.

5 Characteristics of Returns to Equity

Descriptive statistics of the return measures in this section permit a better understanding of the data. It is important to point out that the return measures provided are not informative about the mean or standard deviation of actual returns earned in the population of owners of private companies for several reasons. The samples consist only of surviving firms. This biases returns (earnings rates and capital gains) up via failed firms having dropped out, but biases the returns down via very successful firms having gone public or having been acquired by public firms. These issues can be overcome by looking at the return to private equity as a whole and making various adjustments as in Moskowitz and Vissing-Jørgensen (2002). These adjustments cannot be made at the firm level. This is an inherent problem of doing firm level analysis, which is unfixable absent longitudinal firm data. Furthermore, the profits and thus the returns are overstated since they partly reflect the labour input of the owners, not only the return to the invested capital.

In Table 4, we compare the returns to equity values of the two data sets. All earnings rates are after the payment of corporate tax. Columns (1) and (2) show the returns for the SCF subsample of owners active in management. The mean returns are relatively high with an earnings rate of 49.8% and capital gains of 27.5%. The median values are substantially lower: 15.2% for the earnings rate and 10.7% for capital gains. The median of total returns

to equity with an assumed retention rate of 30% is then 21.3%.[13]

The mean and median values of the SSBF earnings rate (column (3)) are substantially higher than the SCF values (126.8% and 47.8%, respectively). To investigate whether the explanation for the differences lies with the use of the book value of equity in the SSBF data, we calculate the earnings rate for the SCF with book values for the year 1989, the only year in which book values are available. When we compare column (1) and (4) for the year 1989 and columns (1) and (3) for the year 1998, we find that mean and median earnings rates with book values are about twice as high as the earnings rates with market value. Overall, the differences in the two data sources can therefore be explained quite well by the use of book and market values, respectively.

We then plot the distribution of returns in Figure 1 to get a better understanding of the data. All return measures have a unimodal distribution with high skewness, which explains that the means are substantially higher than the medians. The SSBF earnings rate has a higher density for relatively large returns, but otherwise the shape is similar for all return measures.

Column (5) shows lower returns for owners without an active management role compared to owners with an active management role. A further investigation of the data shows variation in the returns over time, with low mean returns in the survey year 1992. Compared to other legal forms, corporations have lower earnings rates but higher capital gains. There

[13]We have to rely on an approximation of the retention rate, since the surveys do not provide information on retained profits. Moskowitz and Vissing-Jørgensen (2002, p. 770) derived an approximate retention rate of 30% from aggregate statistics. National accounts show a retention rate of around 40% for public and private C corporations. For the entity of all private companies, the authors choose the lower value of 30%, since private companies may have fewer growth opportunities.

are industry differences as well: Agriculture has low earnings rates and low capital gains, whereas manufacturing has low earnings rates but high capital gains.[14] Larger and older companies show relatively smaller earnings rates.

6 Exposure to Idiosyncratic Risk and Equity Returns

6.1 DEALING WITH ENDOGENEITY

In order to establish causality from exposure to idiosyncratic risk to equity returns, we need to deal with the problem of endogeneity. Using the instrumental variables approach, we run a first-stage regression to predict instrumented values of the endogenous regressors: SNWI, ownership share and hours worked. In the second-stage, we use the predicted values of the endogenous variables as regressors to obtain consistent parameter estimates.

Our main endogeneity concern is reverse causality. SNWI is affected by reverse causality, since owners who know that a company is of high quality may be willing to invest more. In this case there is a positive effect of the equity return on the share of the net worth invested. The same effect is possible for ownership share. Owners may be willing to buy a larger share of a good company. As a robustness check, we also instrument the hours worked. Owners with management interest may adjust their effort depending on the current performance of the company.

We use owner's age as first instrument. The owner's age should be related to SNWI, as Heaton and Lucas (2000) document that the portfolio composition of individuals is influenced by their age. Individuals above the age of 65 have a smaller share of their wealth invested

[14]Some industries in column (4) have fewer than 100 observations. The values should therefore be interpreted with caution.

in private equity. Furthermore, net worth may increase with age, since individuals have had more time to save. We argue that the owner's age by itself is unrelated to equity returns. When using it as an instrument, it is, however, important to include controls for hours worked, experience and education, since they are related to age and it is possible that hours worked, experience and education have a direct influence on returns.[15] When the owner's age is used as an instrument, it is also important to include the company's age as control. Otherwise the results may be influenced by survivorship bias. Moskowitz and Vissing-Jørgensen (2002) show that only 30 percent of all entrepreneurial firms have survived after 10 years.[16] As robustness check we also present results for the subsample of owners up to the age of 65 years. We want to make sure that the effect of the instrument 'owner age' is not completely determined by retirement on the job.

As second instrument set, we use a dummy for inheritances received in the past as well as the logarithm of the amount of inheritances received.[17] The SCF provides detailed information on up to three inheritances that the households have received in the past. The value of the inheritances is inflated with the consumer price index to the year of the survey.[18] The variable 'dummy inheritance' is equal to one, if at least one inheritance has been received in the past. The variable 'value inheritance' is the sum of the inflated value of the inheritances.

[15]Bitler et al. (2005) use similar instruments for ownership share, namely age, age squared and dummies for type of company acquisition.

[16]Survivorship bias works against finding a positive relationship between SNWI and returns to equity. Over time the good companies remain. They will have high profitability and low values of SNWI, since the owner has had time to accumulate outside wealth.

[17]We would like to thank an anonymous referee for suggesting inheritances as an instrument.

[18]The consumer price index is taken from the U.S. Department of Labor, Bureau of Labor Statistics. We selected the Consumer Price Index for all urban consumers, since only this time series is available for the required length of time. The data can be downloaded from ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.

The logarithm of this variable is used in the first-stage regressions. We include a dummy in addition to the value because the dummy allows for a base effect. The categories trusts as well as transfers/gifts are not included.[19]

Since inheritances are an event that increases the net worth of the household, we expect it to have a negative correlation with SNWI. The occurrence of inheritances is outside of the control of the owner. In many cases, the inheritances will have no direct influence on the company's performance. However, it is important to think carefully about possible influences and to discuss whether and how they can be controlled for. Work by Perez-Gonzalez (2006) has shown that selecting a family CEO as opposed to an unrelated CEO leads to underperformance of the companies. Regression to the mean is responsible for family-related candidates typically not having the best ability for the job as CEO. The same can be argued for owner-managers of private companies that inherited the company. Inherited companies can have owner-managers with on average lower ability and therefore lower returns. As a robustness check, we omit companies that have been inherited. Furthermore, an increase in wealth through an inheritance can reduce the incentives to work hard, since the household has access to an alternative source of income. We control for this indirect influence to the degree that our control for hours worked is able to control for effort. In addition, individuals may care less about inherited wealth in comparison to wealth earned through hard work. As a robustness check, we omit companies that have been inherited.

[19]Inheritances are arguably a bit more exogenous than trusts or transfers/gifts, since they always depend on the exogenous event of death. If we include the two categories trusts as well as transfers/gifts in the definition of the inheritance related instruments, we find identical or stronger results for the influence of SNWI on company performance, but for several specifications with capital gains as the dependent variable, the test of overidentifying restrictions is not passed.

For some subsamples, we also use as third instrument a dummy for home ownership. This dummy has a value of one, if the owner of the company owns his or her primary residence. There should be a negative correlation between this instrument and SNWI. If resources are bound for owning the primary residence, a smaller share of net worth will be available for investment in the company. The decision of whether to buy or to rent a house depends on many factors, e.g. whether cheaper buying or renting opportunities are found and whether the owner wants to stay in the area. We therefore expect the dummy variable to be unrelated to the error term of the second-stage regression. Yet, there is a possible endogeneity issue of more profitable firms enabling owners to buy larger houses. Liu and Yermack (2007) find for listed companies that company performance declines after the CEOs buy very costly houses. The authors interpret buying costly houses as a sign of managerial entrenchment. These issues are less of a concern when using the dummy for home ownership as an instrument rather than the value of the home.

After presenting the instruments, we discuss omitted variable bias as a further endogeneity concern. The instruments are only valid if they pick up only the part of the variation of the SNWI that is not caused by the omitted variables. The first influence to be addressed is tax evasion. Tax evaders may report lower values of SNWI to the extent that they saved the gains from tax evasion. The relationship between owner age and tax evasion is unclear. It is possible, however, that owners with inheritances and with own houses may be more prone to evade taxes insofar as they are richer and the gains from tax evasion may be higher. Tax evaders may report lower earnings rates and also lower values of SNWI to the extent that they saved the gains from tax evasion. Therefore, a positive relationship between the earnings rate and SNWI can be induced. However, since SNWI is a stock variable shaped by many other factors, the influence of tax evasion is likely to be too small to affect the results.

Companies with venture capital investment may have lower values of SNWI and ownership share since they have additional owners. VC financed companies have probably younger owners, which tend to have higher values of SNWI. The effects of VC financing and the instrument owner age point into opposite directions. Since the other instruments, inheritance and home ownership, are probably not related to VC financing, we expect that instrumenting is sufficient. Apart from that, the influence of VC financing should be quantitatively negligible, because less than 1% of all private equity (defined as equity in sole proprietorships, partnerships and corporations) in the USA is held by venture capitalists (Moskowitz and Vissing-Jørgensen, 2002).

The final endogeneity concern is measurement error. The market value of equity in the SCF data may be a noisy estimate, since private companies have no quoted market value. The book value of equity in the SSBF is calculated as the difference of the company's assets and liabilities. It is possible that there are errors in the measurement of assets and liabilities, because many respondents are not required by law to draw up a balance sheet. Since systematic relationships between the measurement error in those company characteristics and our instruments are unlikely, we do not expect a bias due to the measurement error.

Descriptive statistics for all instrumental variables are displayed in Tables 1, 2 and 3. In Table 5, we present the results of the first-stage regressions for SNWI A, ownership share and hours worked. Results for SNWI B are omitted, since they are very similar. The regressions include all control variables from the second stage. For brevity, not all coefficients are shown.[20]

We start by discussing the results for the first stage of SNWI. As expected, owner age has

[20] As Ang et al. (2000) and Bitler et al. (2005) we use unweighted regressions. For the SSBF the variables used for stratification and oversampling are publicly known. They are included as controls in the regressions.

a negative and significant relationship with SNWI in all subsamples. As there is no clear theoretical guidance on the functional form for owner age, we chose the functional form that fitted the data of the subsamples best. We chose the quadratic form for the subsample of owners not active in management, and the linear form for the other subsamples.

Both dummy inheritance and the logarithmic value of the inheritances are negatively related to SNWI. These variables are only available for the SCF. Both instruments are significant for the subsample of active managers. For the subsample of owners not active in management, only the logarithmic value of the inheritances is significant at the 10% level.

The dummy for home ownership is used for owners active in management of the SCF only in the specification with hours worked also instrumented. If hours worked are not instrumented, the informational content of this instrument is not necessary. We use the dummy for home ownership also in the subsample of owners not active in management, because the instruments related to the inheritances are rather weak in this subsample. We also use this instrument for the subsample of the SSBF, since inheritance information is not available. This instrument has a negative relationship with SNWI, as anticipated, and is always significant.

We next turn to the specifications with ownership share as dependent variable. Owner age has either a positive or an insignificant coefficient. The instruments relating to inheritances are not significant. As can be seen from Shea's partial R squared (Shea, 1997), the instruments have a better explanatory power for SNWI than for ownership share. We searched for but could not find convincing additional instruments with a higher explanatory power for ownership share. In this situation, it is reassuring that the main results hold when restricting to companies with only one owner. For these companies, inclusion of ownership share is not relevant.

In the first-stage regression for hours worked, owner age shows a negative relationship with the dependent variable. This relationship cannot purely be determined by retirement because the coefficient and its precision is nearly unchanged, if owners up to the age of 65 years are considered (results not shown). Inheritances are also negatively correlated with hours worked. As discussed above, this highlights the importance of controlling for hours worked, since the financial resources of an owner may influence his or her effort.

Concerning the other control variables, the influence of return risk is of most interest. Through all subsamples, we consistently find a negative influence of return risk on SNWI and on ownership share. Risk has a larger influence on SNWI than on ownership share. For columns (1) and (2) of Table 5 we find that a one standard deviation increase of risk decreases SNWI by 4.7 percentage points whereas ownership share is only decreased by 1.1 percentage points.

We calculated all first-stage regressions with the restriction of a maximum owner age of 65 years. There are only marginal changes with respect to significance levels and only one insignificant instrument changes its sign. It is important to note that the negative relationship between owner age and SNWI remains even if the age restriction is applied.[21]

[21] Since it is possible that some owners reduce their activity as managers or as monitors of the management before reaching the full retirement age of 65 years, we also checked the robustness of the results for an age restriction of 60 years. Qualitatively we obtained the same results but some coefficients are estimated with less precision due to the reduced number of observations.

6.2 INFLUENCE ON THE EARNINGS RATE

6.2.1 *Owners Active in Management*

Table 6 shows results of the investigation of how exposure to idiosyncratic risk influences the earnings rate. In column (1), we show a standard OLS regression that suffers from reverse causality and non-standard measurement error. The non-standard measurement error causes a negative bias as equity is included in the denominator of the dependent variable and in the numerator of the independent variable SNWI A. It is therefore not possible to interpret the negative sign of SNWI A in an economic sense. The coefficient of ownership share is not influenced by the measurement error. We find a positive and significant incentive effect. Owners with a higher ownership share may work harder, because they obtain a higher share of the resulting profits.

In column (2), we show the first instrumental variable (IV) estimate. The coefficient on SNWI A is now positive and significant. A 10 percentage point increase in SNWI A increases the earnings rate by 11.8 percentage points. Compared to the unweighted mean earnings rate of 44.1%, it is clear that this effect is economically important. This result is in line with our hypothesis that owners demand compensation for exposure to idiosyncratic risk. After instrumenting ownership, we no longer find a positive incentive effect. Since there are more instruments than endogenous regressors, it is possible to test the overidentifying restrictions. This test is passed with a p-value of 0.44. Company size and company age have no influence on the earnings rate.[22]

The regression also contains a control for return risk. Companies with higher return risk

[22]We checked whether there is a non-linear relationship between SNWI and returns to equity by including squared terms of SNWI. However, the squared terms were never significant.

earn higher returns on average. The size of the effect is in a sensible range. An increase of return risk by one standard deviation increases returns by 16.5 percentage points. There is therefore additional evidence that idiosyncratic risk is compensated in the cross-section of firms. Not only is the share of net worth that the owner invested important, the overall level of return risk matters as well.

In our investigation, the results for owners with an active management role are possibly influenced by effort. An owner-manager with a higher share of net worth invested in a company is financially more dependent on its success and may therefore work harder. The instrumental variables approach does not control for this possibility. We therefore control for the average weekly hours the owner-manager works in the company. This control has a negative but insignificant influence on the returns.[23] If hours worked is instrumented as well, the results are a bit weaker. This is likely because owner age is the strongest instrument for both SNWI and hours implying that some of the power to identifying the impact of SNWI is lost once hours are instrumented for as well. Due to the difficulty of finding extra instruments to instrument powerfully for hours too, we decided not to instrument for hours in all specifications.

The regressions contain further controls for the owner's level of education, work experience and ethnicity as well as controls for legal form, industry and year. The coefficients are not shown for brevity.

To test the robustness of the results, we calculate several variations shown in columns (3) to (9). All variations confirm the significant positive influence of SNWI found for the

[23] At first glance, the negative sign of hours worked in a returns regression can be surprising. It can be explained by the fact that the owner-managers of poorly performing companies were working very hard to avoid failure.

base case. We calculate the earnings rate before the payment of corporate tax. We want to make sure that the results are robust to the non-linear adjustment for corporate tax that we introduced to make the returns more comparable. We restrict the sample to owners with a maximum age of 65 years in order to exclude the possibility that our results are driven by retirement on the job. We use the broader measure for exposure to idiosyncratic risk, SNWI B. We restrict the analysis to the largest company of each household, which means that we cover the most important investment and there is no need to be concerned about within-household correlation across companies. We also restrict the analysis to companies in which the household has an ownership share of 100%, thereby excluding the possibility that the earnings rate could be influenced by the exposure to idiosyncratic risk of another owner. As further robustness check we treat hours worked as an endogenous variable. The variable hours worked remains insignificant. It has now a positive coefficient, whereas before its coefficient was mostly negative. As a final robustness check, we exclude companies that are inherited. This is to make sure that the results from using inheritances as an instrument are not driven by owners who inherited their firm having lower SNWI and inherited firms having lower earnings rates. The test of overidentification is passed for all specifications.

Results from the SSBF are shown in Table 7. The results of the SCF and the SSBF are quite similar. In the IV estimation of column (2), we find a positive influence of SNWI on the earnings rate. An increase of SNWI A by 10 percentage points is related to an increase of the earnings rate of 28.8 percentage points. Results are robust to the calculation of the earnings rate before the payment of corporate tax; to a restriction to a maximum age of owners of 65 years; to the use of the alternative measure of exposure to idiosyncratic risk, SNWI B; and to a restriction to companies with only one owner.[24] We also confirmed that results are

[24]For each company, the SSBF gives the sum for all owners for loans guaranteed by the owners, the value

robust to the exclusion to inherited firms. The results are not shown because instruments related to inheritances are not available for this data set. As in the case of the SCF, we see a positive influence of return risk on returns to equity, although it is not significant in all specifications. The test of overidentifying restrictions is passed for the specification with one owner. For the other specifications, it is not possible to conduct this test, since they contain as many instruments as endogenous variables.

6.2.2 *Owners Not Active in Management*

Investment objectives differ between owners with and without management interests. For owners with management interests, the equity investment is connected to the employment decision. Not only are the returns on investment important; alternative employment opportunities must also be taken into account. Some owners with management interests also obtain substantial non-pecuniary benefits from being their own boss. We do control for hours worked in the SCF data, but this variable could be an imperfect measure of effort. The results for owners without active management interests are a more direct test of our hypothesis in the sense that they only refer to investment decisions. They cannot be influenced by effort or employment considerations.

The results for owners without a management role are presented in Table 8. The regressions do not contain a control for ownership share, since this information is not available. As in the previous tables, the OLS regression in column (1) shows a negative coefficient for SNWI A due to non-standard measurement error. The instrumented regression in column (2)

of owner assets that are used as collateral and the volume of loans between the owner and the company. For the calculation of SNWI B, this information is multiplied by the ownership share of the largest owner and added to the equity investment to get an approximation of this owner's personal involvement.

confirms our hypothesis for owners without an active management role as well. An increase of 10 percentage points in SNWI A translates into an increase of 12.2 percentage points in the earnings rate.

As a robustness check, we restrict the analysis to owners with a maximum age of 65 years. The results in column (3) show that the influence of idiosyncratic risk remains. A restriction to the owner's largest company (column (4)) also confirms our hypothesis. The overidentification test is passed for all specifications. We cannot calculate SNWI B for this subsample and we cannot restrict to companies with just one owner, since ownership shares are not known. We also cannot exclude inherited companies as a robustness check, since the type of acquisition is not known.

6.3 INFLUENCE ON CAPITAL GAINS

In Table 9, we present results relating to the second component of returns to equity, capital gains. The number of observations in the capital gains regressions is smaller, since companies with an initial investment of zero cannot be included. As in the earnings rate regression, the OLS estimate in column (1) is influenced by non-standard measurement error. Equity is included both in the numerator of the dependent variable and in the numerator of the independent variable SNWI, which causes a positive bias.

The standard IV specification in column (2) shows a positive influence of exposure to idiosyncratic risk on capital gains. An increase of SNWI A by 10 percentage points is associated with an increase in capital gains of 13.5 percentage points. As robustness checks, we restrict to owners with a maximum age of 65 years, use the alternative regressor SNWI B, restrict the analysis to the largest company of the owner and consider only companies with

one owner. All specifications confirm the positive influence of exposure to idiosyncratic risk on capital gains. As a further robustness check, we also instrument the variable hours worked. As in the earnings rate specification of Table 6, the instrumented variable hours worked has a positive but insignificant coefficient. We also calculate a regression excluding inherited firms. With these specifications, we can again confirm the positive influence of idiosyncratic risk on capital gains. The test of overidentifying restrictions is passed for all specifications.

As was the case for the previous subsamples, we find that return risk has a positive influence on capital gains. In the specification of column (2), the coefficient of return risk is only significant at the 12% level though. A one standard deviation increase in return risk leads to an increase in capital gains of 6.2 percentage points. Compared to the influence on the earnings rate of the same companies, the influence is smaller.

6.4 IMPLICATIONS

The empirical findings of this paper have important implications for our understanding of investment decisions at private companies. We show that owners exposed to idiosyncratic risk require higher returns as compensation for their risk exposure. The realisation of a business idea can therefore depend on the net worth of the potential entrepreneur. If the investment volume is large relative to the net worth, then the business idea needs to have a higher expected return in order to be realized. Furthermore, the available volume of additional bank or equity finance can be crucial, since it allows the potential entrepreneur to employ fewer of his or her own resources.

It was found that the probability of becoming an entrepreneur and of staying in business

increases after an inheritance (Holtz-Eakin et al., 1994a and Holtz-Eakin et al., 1994b), which is interpreted as evidence of liquidity constraints. Our results suggest an additional interpretation. Because exposure to idiosyncratic risk decreases through the inheritance, the required rate of return on investment projects decreases and therefore more business ideas will become worthwhile. Hurst and Lusardi (2004) also argue that the effect of inheritances is unlikely to be only evidence for liquidity constraints. The authors use past and future inheritances as an instrument for wealth and find that both instruments help to predict business entry. It is therefore likely that inheritances capture not only liquidity effects.

Does the finding of this study, that owners receive compensation for their exposure to idiosyncratic risk, open up a possibility for some owners to earn excess returns? Ownership shares are often equal in private companies due to control considerations (Bennedsen and Wolfenzon, 2000). If a rich owner invests a share in a company that otherwise has poorer owners, he or she could expect a return that is more than sufficient to compensate for his or her own risk exposure. However, this consideration leaves the open question of low average returns of private equity untouched.

7 Conclusions

Owners of private companies typically have a high share of their personal net worth invested in a single private company, which exposes them to the idiosyncratic risk of the company. This paper seeks to determine whether the owners require compensation for their risk exposure. Using information from the Survey of Consumer Finances (SCF) and the Survey of Small Business Finances (SSBF), we find that the degree of risk exposure has a statistically and economically significant positive influence on returns on equity. We calculate separate

results for the earnings rate and for capital gains, as well as for owners with and without an active management role. We therefore show that owners are aware of the risk and demand compensation. This result improves our understanding of the behaviour of owners of private companies.

In future research, it would be interesting to test whether owners of public companies also receive higher returns, if they are exposed to idiosyncratic risk. Founders or families hold concentrated ownership stakes in several public companies. If these owners demand compensation for their exposure to idiosyncratic risk, then it could be reflected in a higher earnings rate or better stock market performance.

Table 1: Descriptive Statistics SCF - Owners Active in Management

This table provides descriptive statistics of the sample. Descriptive statistics are calculated using survey weights. Statistics are representative of the underlying population.

	Mean	**Median**	**Stdev.**	**Min**	**Max**
Number of employees	31.95	4	216.2	1	5000
Company age (in years)	13.82	11	10.73	1	67
Earnings rate after corporate tax (in %)	49.81	15.25	110.2	-22.5	1062
Earnings rate before corporate tax (in %)	51.82	16.29	117.1	-22.5	1560
Capital gains (in %)	27.47	10.70	58.58	-99.88	747.0
SNWI A (in %)	27.42	20	24.81	0.002	99.71
SNWI B (in %)	31.58	23.14	28.15	-11.72	100
Ownership share (in %)	77.58	100	31.20	0.001	100
Return risk	11.26	7.14	22.45	2.93	261.3
Hours worked	46.74	50	19.02	1	133
Experience (in years)	28.01	27	11.74	0	85
Owner age (in years)	49.51	49	10.84	21	94
Dummy inheritance	0.301	0	0.459	0	1
Value inheritance (in million USD)	0.049	0	0.787	0	194.1
Dummy home ownership	0.923	1	0.26	0	1

Industry	*Legal form*	*Education*	*Ethnicity*
Agriculture 11.6%	Sole prop. 40.6%	No high school 5.7%	White 92.8%
Construction, mining 8.5%	Partnership 22.2%	High school 23.8%	Hispanic 1.8%
Manufacturing 8.0%	S-corp. 19.4%	BA 34.2%	Black 2.1%
Retail, wholesale 17.8%	C-corp. 17.8%	MA 13.4%	Asian 3.3%
Services 54.1%		PhD 22.9%	

Table 2: Descriptive Statistics SCF - Owners Not Active in Management

This table provides descriptive statistics of the sample. Descriptive statistics are calculated using survey weights. Statistics are representative of the underlying population.

	Mean	**Median**	**Stdev.**	**Min**	**Max**
Earnings rate after corporate tax (in %)	19.72	1.73	62.27	-20	516
SNWI A (in %)	14.84	5.35	21.50	0.002	100
Return risk	31.60	17.03	44.60	7.56	217.0
Experience (in years)	32.07	32	12.24	0	87
Owner age (in years)	55.19	54.00	12.46	23	94
Dummy inheritance	0.399	0	0.490	0	1
Value inheritance (in million USD)	0.079	0	1.12	0	194.1
Dummy home ownership	0.95	1	0.21	0	1

Legal form	*Education*	*Ethnicity*
Sole prop. 7.3%	No high school 1.7%	White 94.3%
Partnership 14.6%	High school 8.8%	Hispanic 0.7%
Limited Partnership 47.2%	BA 40.9%	Black 1.4%
S-corp. 13.1%	MA 20.1%	Asian 3.6%
C-corp. 12.8%	PhD 28.5%	
Other 5.0%		

Table 3: Descriptive Statistics SSBF

This table provides descriptive statistics of the sample. Descriptive statistics are calculated using survey weights. Statistics are representative of the underlying population.

	Mean	**Median**	**Stdev.**	**Min**	**Max**
Number of employees	9.51	3	26.09	1	482
Company age (in years)	14.35	12	11.60	1	104
Earnings rate after corporate tax (in %)	126.8	47.79	193.5	-61.95	1002
Earnings rate before corporate tax (in %)	133.5	50.00	207.6	-61.95	1507
SNWI A (in %)	23.50	16.12	22.15	0.004	98.92
SNWI B (in %)	27.71	19.50	26.00	0.041	100
Ownership share (in %)	85.27	100	24.35	1	100
Return risk	12.15	9.13	11.29	3.41	92.73
Experience (in years)	19.13	18	11.62	0	72
Owner age (in years)	50.79	50	11.21	21	95
Dummy home ownership	0.892	1	0.310	0	1

Industry	*Legal form*	*Education*	*Ethnicity*
Construction, mining 11.6%	Sole prop. 50.2%	No high school 3.5%	White 86.3%
Manufacturing 8.5%	Partnership 5.8%	High school 47.8%	Hispanic 5.3%
Retail trade 28.2%	S-corp. 23.8%	College 48.7%	Black 3.9%
Services 51.5%	C-corp. 20.2%		Asian 4.5%
Not classified 0.2%			

Table 4: Comparison of Returns to Equity Values

This table provides descriptive statistics for returns to equity. Descriptive statistics are calculated using survey weights. Statistics are representative of the underlying population. All earnings rates are after the payment of corporate tax.

	(1)		(2)		(3)		(4)		(5)	
Returns measure	Earnings rate		Capital gains		Earnings rate		Earnings rate		Earnings rate	
Equity value	market		market		book		book		market	
Owners active in management	yes		yes		yes		yes		no	
Data source	SCF		SCF		SSBF		SCF		SCF	
	mean	median	mean	median	mean	median	mean	median	mean	median
All	49.8	15.2	27.5	10.7	126.8	47.8	106.0	20.0	19.7	1.7
Survey year										
1989	47.3	10.4	27.2	7.1			106.0	20.0	23.2	0.7
1992	43.1	13.3	25.2	9.3					18.9	2.1
1995	48.5	16.5	28.0	11.2					34.1	2.5
1998	58.8	17.0	29.4	11.5	126.8	47.8			16.9	2.0
2001	50.2	18.3	26.8	11.8					9.2	1.5
Legal form										
Sole proprietorships	64.5	27.0	21.3	6.7	137.8	63.6	110.5	28.5	27.3	6.0
Partnerships	50.3	9.5	30.0	11.2	175.7	101.1	168.2	15.9	21.3	1.8
Corporations	32.7	10.6	32.9	14.8	106.1	32.4	48.2	18.8	16.2	0.3
Industry										
Agriculture	21.2	4.7	14.9	3.8			43.7	6.3		
Construction, mining	91.3	29.8	22.0	10.8	149.7	79.8	172.7	75.2		
Manufacturing	30.1	7.8	39.7	18.7	101.0	30.6	22.1	15.1		
Retail, wholesale	32.6	13.7	22.2	11.0	102.6	38.8	96.1	23.2		
Services	57.8	19.7	31.0	10.9	139.3	54.3	144.5	27.5		
Size										
$\leq$ 5 employees	54.1	15.9	27.2	8.6	130.5	53.7	112.3	20.0		
$>$ 5 employees	43.3	15.0	27.8	13.8	119.3	38.2	94.9	20.0		
Age										
$\leq$ 12 years	51.7	13.5	41.6	19.9	134.1	58.3	133.6	22.0		
$>$ 12 years	47.4	16.6	10.1	6.6	118.5	37.9	73.6	20.0		

Table 5: First-stage Regressions

This table reports first-stage regressions. All regressions contain additional controls for education, experience, ethnicity and legal form. Regressions (1) to (5) also contain controls for industry and year. Regression (6) also contains controls for year. Regressions (7) and (8) also contain controls for industry at the two-digit SIC level, region and urban versus rural area. Standard errors in parentheses are robust to heteroscedasticity and within-household correlation across firms. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	SCF	SCF	SCF	SCF	SCF	SCF	SSBF	SSBF
Dep. variable	SNWI A	Ownership share	SNWI A	Ownership share	ln hours	SNWI A	SNWI A	Ownership share
Owners active in management	yes	yes	yes	yes	yes	no	yes	yes
Owner age	-0.516***	0.143**	-0.537***	0.097	-0.018***	-1.12***	-0.267***	-0.069
	(0.058)	(0.061)	(0.056)	(0.060)	(0.002)	(0.376)	(0.058)	(0.055)
Square owner age						0.010***		
						(0.003)		
Dummy inheritance	-5.23***	-1.04	-5.57***	-1.42	-0.154***	-1.30		
	(1.04)	(1.45)	(1.02)	(1.45)	(0.046)	(1.09)		
ln value inheritance	-1.01***	0.072	-0.994***	0.003	-0.026**	-0.579*		
	(0.277)	(0.363)	(0.277)	(0.365)	(0.012)	(0.320)		
Dummy			-12.72***	0.680	-0.022	-11.37***	-17.13***	-0.480
home owner			(1.56)	(1.16)	(0.038)	(3.01)	(1.79)	(1.34)
Return risk	-0.196***	-0.047***	-0.195***	-0.050***	-0.0008*	-0.087***	-0.288***	-0.202***
	(0.017)	(0.013)	(0.017)	(0.013)	(0.0004)	(0.003)	(0.030)	(0.055)
ln hours	3.86***	2.41***						
	(0.549)	(0.608)						
Company size	3.68***	-4.73***	4.00***	-4.65***	0.041***		5.67***	-4.41***
	(0.214)	(0.236)	(0.212)	(0.235)	(0.005)		(0.413)	(0.420)
Company age	0.265***	0.267***	0.285***	0.276***	0.004***		-0.017	-0.113**
	(0.033)	(0.039)	(0.033)	(0.039)	(0.001)		(0.050)	(0.054)
Number of observations	5436	5436	5436	5436	5436	1924	2345	2345
Number of households	3900	3900	3900	3900	3900	1424	2345	2345
R squared	0.211	0.451	0.218	0.449	0.093	0.168	0.252	0.469
Shea's partial R squared	0.015	0.001	0.016	0.001	0.013	0.030	0.037	0.0004

Table 6: Influence on Earnings Rate - Owners Active in Management (SCF)

This table reports regressions of the earnings rate on company characteristics. Earnings rates are after corporate tax if not declared otherwise. Regressions contain additional controls for industry, year, education, experience, ethnicity and legal form. The regressors SNWI and ownership share are instrumented in columns (2) to (6) and (9); the regressor SNWI is instrumented in column (7). Instruments are owner age, dummy inheritance and log value inheritance. Corresponding first-stage regressions are shown in Table 5, columns (1) and (2). The regressors SNWI, ownership share and ln hours are instrumented in column (8). Instruments are owner age, dummy inheritance, log value inheritance and dummy home owner. Corresponding first-stage regressions are shown in Table 5, columns (3) to (5). Standard errors in parentheses are robust to heteroscedasticity and within-household correlation across firms. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	IV	IV	IV	IV	IV	IV	IV	IV
	all comp.	all comp.	before corp. tax	owner age $\leq$ 65 years	all comp.	largest comp.	one owner	all comp.	inherited comp. excl.
SNWI A	-0.637***	1.18**	1.21**	1.11**		1.63**	0.889*	1.01*	1.01*
	(0.059)	(0.504)	(0.542)	(0.482)		(0.695)	(0.466)	(0.560)	(0.621)
SNWI B					1.02**				
					(0.446)				
Ownership share	0.172***	-0.942	-1.08	0.076	-1.21	-0.097		-0.983	-2.99
	(0.047)	(1.94)	(2.12)	(1.85)	(1.91)	(1.72)		(1.95)	(3.55)
Return risk	0.375**	0.697***	0.706***	0.795***	0.677***	7.08***	1.06***	0.665***	0.572*
	(0.152)	(0.236)	(0.251)	(0.253)	(0.233)	(1.79)	(0.353)	(0.210)	(0.312)
ln hours	4.16	-2.42	-2.03	-5.44	-1.63	1.88	-4.57	2.32	1.95
	(2.97)	(6.84)	(7.26)	(7.03)	(6.73)	(6.74)	(5.29)	(21.77)	(10.66)
Company size	2.05**	-9.79	-10.46	-4.53	-11.02	-5.83	-10.77***	-9.52	-18.80
	(0.985)	(8.25)	(9.00)	(8.60)	(8.15)	(7.86)	(2.63)	(8.77)	(15.54)
Company age	0.144	0.153	0.223	0.030	0.292	0.075	0.021	0.190	1.01
	(0.139)	(0.604)	(0.642)	(0.674)	(0.577)	(0.451)	(0.212)	(0.579)	(1.29)
Number of observations	5436	5436	5436	4717	5436	3900	2995	5436	5144
Number of households	3900	3900	3900	3413	3900	3900	2544	3900	3727
Overidentification test, χ^2		0.606	0.685	1.14	0.634	0.080	0.710	0.684	0.000
(dof, p-value)		(1, 0.436)	(1, 0.408)	(1, 0.285)	(1, 0.426)	(1, 0.778)	(2, 0.701)	(1, 0.408)	(1, 0.984)

Table 7: Influence on Earnings Rate - Owners Active in Management (SSBF)

This table reports regressions of the earnings rate on company characteristics. Earnings rates are after corporate tax if not declared otherwise. Regressions contain additional controls for industry at the two-digit SIC level, education, experience, ethnicity, legal form, region and urban versus rural area. The regressors SNWI and ownership share are instrumented in columns (2) to (5); the regressor SNWI is instrumented in column (6). Instruments are owner age and dummy home owner. Corresponding first-stage regressions are shown in Table 5, columns (7) and (8). Standard errors in parentheses are robust to heteroscedasticity. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	IV	IV	IV	IV
	all comp.	all comp.	before corp. tax	owner age $\leq$ 65 years	all comp.	one owner
SNWI A	-1.77***	2.88**	3.29**	2.82**		3.51***
	(0.163)	(1.19)	(1.43)	(1.32)		(1.15)
SNWI B					3.01**	
					(1.33)	
Ownership share	0.675***	-1.11	-4.31	-1.22	-3.97	
	(0.186)	(10.25)	(12.21)	(12.86)	(11.84)	
Return risk	-0.401	0.732	0.140	0.812	0.246	1.40**
	(0.363)	(1.97)	(2.36)	(2.61)	(2.24)	(0.686)
Company size	9.56***	-23.39	-39.47	-25.23	-42.15	-18.14**
	(3.51)	(49.55)	(59.21)	(63.62)	(59.33)	(8.10)
Company age	-0.185	-0.187	-0.683	-0.057	-0.155	0.700
	(0.367)	(1.26)	(1.51)	(1.42)	(1.34)	(0.760)
Number of obs.	2345	2345	2345	2084	2345	1394
Number of owners	2345	2345	2345	2084	2345	1394
Overident. test, χ^2						0.722
(dof, p-value)						(1, 0.396)

Table 8: Influence on Earnings Rate - Owners Not Active in Management (SCF)

This table reports regressions of the earnings rate on company characteristics. Earnings rates are after corporate tax. Regressions contain additional controls for year, education, experience, ethnicity and legal form. The regressor SNWI is instrumented in columns (2) to (4). Instruments are owner age, square of owner age, dummy inheritance, log value of inheritance and dummy home owner. Corresponding first-stage regressions are shown in Table 5, column (6). Standard errors in parentheses are robust to heteroscedasticity and within-household correlation across firms. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

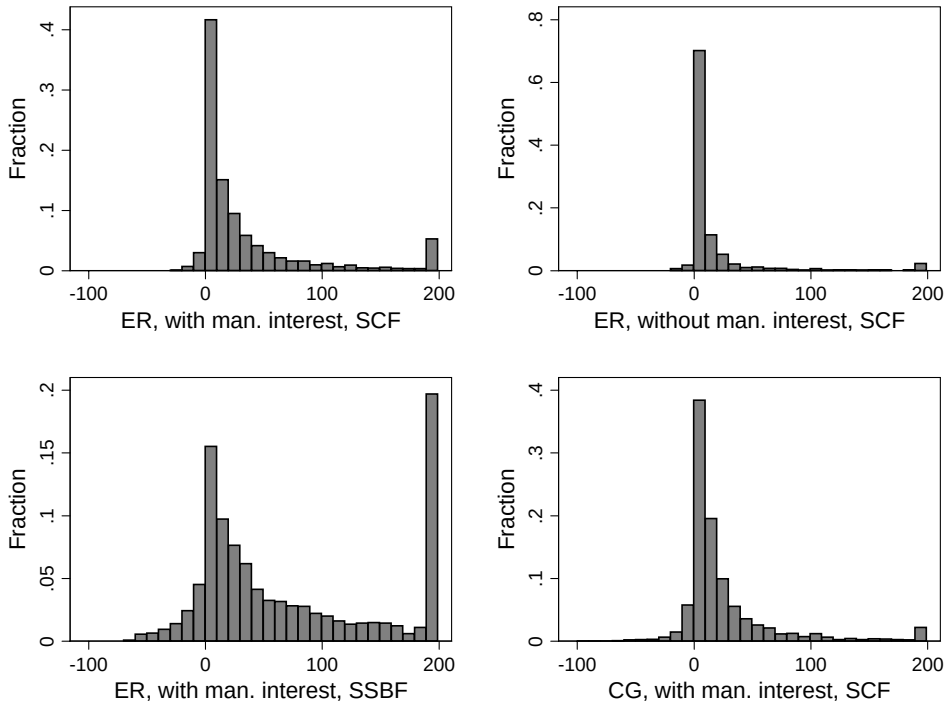
	(1)	(2)	(3)	(4)
	OLS	IV	IV	IV
	all comp.	all comp.	owner age $\leq$ 65 years	largest comp.
SNWI A	-0.121	1.22**	1.81*	1.03*
	(0.077)	(0.602)	(1.03)	(0.621)
Return risk	0.028	0.149**	0.170*	0.039*
	(0.027)	(0.059)	(0.096)	(0.023)
Number of observations	1924	1924	1463	1347
Number of households	1424	1424	1081	1347
Overidentification test, χ^2		3.38	5.92	0.412
(dof, p-value)		(4, 0.497)	(4, 0.205)	(4, 0.982)

Table 9: Influence on Capital Gains - Owners Active in Management (SCF)

This table reports regressions of capital gains on company characteristics. Regressions contain additional controls for industry, year, education, experience, ethnicity and legal form. The regressors SNWI and ownership share are instrumented in columns (2) to (5) and (8); the regressor SNWI is instrumented in column (6). Instruments are owner age, dummy inheritance and log value inheritance. Corresponding first-stage regressions are shown in Table 5, columns (1) and (2). The regressors SNWI, ownership share and ln hours are instrumented in column (7). Instruments are owner age, dummy inheritance, log value inheritance and dummy home owner. Corresponding first-stage regressions are shown in Table 5, columns (3) to (5). Standard errors in parentheses are robust to heteroscedasticity and within-household correlation across firms. *, **, *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	IV	IV	IV	IV	IV	IV
	all comp.	all comp.	owner age $\leq$ 65 years	all comp.	largest comp.	one owner	all comp.	inherited comp. excl.
SNWI A	0.275***	1.35***	1.22***		1.37***	0.951***	0.858**	1.41***
	(0.041)	(0.459)	(0.426)		(0.503)	(0.238)	(0.424)	(0.475)
SNWI B				1.18***				
				(0.376)				
Ownership share	-0.041	2.04	2.07	1.79	0.591		2.07	2.65
	(0.034)	(1.61)	(1.42)	(1.48)	(1.04)		(1.53)	(2.17)
Return risk	-0.065***	0.231	0.218	0.216	2.51*	0.061	0.160	0.269
	(0.024)	(0.150)	(0.151)	(0.135)	(1.30)	(0.059)	(0.118)	(0.175)
ln hours	-0.030	-10.83*	-10.30*	-10.29*	-7.29	-5.61*	6.29	-12.26*
	(1.78)	(6.25)	(5.93)	(5.75)	(5.16)	(2.94)	(17.2)	(7.10)
Company size	0.488	6.29	8.00	5.14	-0.200	-2.97*	7.60	9.06
	(0.554)	(6.73)	(6.47)	(6.29)	(4.44)	(1.54)	(6.86)	(9.38)
Company age	-1.41***	-2.20***	-2.63***	-2.06***	-1.58***	-1.33***	-2.11***	-2.53***
	(0.089)	(0.530)	(0.565)	(0.472)	(0.252)	(0.117)	(0.471)	(0.771)
Number of observations	4858	4858	4204	4858	3556	2722	4858	4654
Number of households	3556	3556	3107	3556	3556	2325	3556	3428
Overidentification test, χ^2		1.19	0.655	1.20	1.20	3.94	0.941	0.321
(dof, p-value)		(1, 0.275)	(1, 0.418)	(1, 0.274)	(1, 0.273)	(2, 0.139)	(1, 0.332)	(1, 0.571)

Figure 1: Distribution of Returns to Equity



Note: ER stands for earnings rate; CG stands for capital gains.

Appendix

Table A: Tax Brackets

This table reports historical tax rates that are taken from www.taxpolicycenter.org. From 1994 onwards, the rates can also be found at the home page of the American Internal Revenue Service, www.irs.gov.

Profit range (in USD)	**Tax rate**	**Survey years**
≤ 0	0%	1989 – 2001
$> 0 - \leq 50{,}000$	15%	1989 – 2001
$> 50{,}000 - \leq 75{,}000$	25%	1989 – 2001
$> 75{,}000 - \leq 100{,}000$	34%	1989 – 2001
$> 100{,}000 - \leq 335{,}000$	39%	1989 – 2001
$> 335{,}000$	34%	1989 – 1992
$> 335{,}000 - \leq 10{,}000{,}000$	34%	1995 – 2001
$> 10{,}000{,}000 - \leq 15{,}000{,}000$	35%	1995 – 2001
$> 15{,}000{,}000 - \leq 18{,}333{,}333$	38%	1995 – 2001
$> 18{,}333{,}333$	35%	1995 – 2001

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