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HOLDINGS OF EQUITY BY HOUSEHOLDS IN AUSTRIA DERIVED FROM REGISTER DATA

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This document has been prepared by Michael Andreasch (Oesterreichische National Bank) and will be presented under item 5 of the draft agenda

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Austrian Households' Equity Capital – Evidence from Microdata

To date, research on household wealth has seldom focused on households' business equity holdings. Such equity stakes represent above all ownership in domestic limited liability companies. This study for the first time provides an empirical analysis of the distribution of Austrian households' equity stakes in limited liability companies. For our analysis, we draw on data from three sources: the Company Register, a commercial database and the OeNB's 2004 Survey on Financial Household Wealth. In 2005, some 3% of Austrian households possessed equity capital worth around EUR 22.3 billion, which equaled about 6% of total financial wealth. These equity investor households are characterized by above-average incomes and wealth. Compared with the other households, they are also much more frequently invested in risky assets, tend to own their principal residence and have considerably higher education levels. Such equity holdings are highly concentrated even within this group of investor households.

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Holdings of (non-publicly traded) equity have rarely been researched even though they are an important component of households' financial wealth. In view of tightened refinancing conditions, a comprehensive grasp on equity financing proves particularly relevant, however. Equity consists above all in ownership in domestic limited liability companies. Some 64% of registered businesses in Austria are limited liability companies², which account for about 90% of the equity capital of all Austrian nonfinancial corporations. In Austria, both macro- and microdata are available on household wealth. Macrodata on households stem from the financial accounts for Austria. Annual data on the aggregate household sector (including nonprofit institutions serving households and private foundations) have been available since the reporting year 1980, specifically on households (as a separate item) since 2006. Microdata on Austrian household wealth were for the first time compiled in

2004 by means of a survey. Given the positive skew of the wealth distribution, the probability of randomly sampling a sufficient number of high-income households is rather low. This is problematic since certain financial assets – especially business equity capital – are disproportionately frequently held by very wealthy households. We used microdata on equity stakes in limited liability companies owned by households and private foundations as gleaned from the Company Register to complement this fragmentary picture. This allows us, in particular, to construct more precise estimators for equity stakes in companies.

In this study, we take stock of and analyze Austrian households' business equity holdings. Based on several assumptions, we arrive at additional findings about the overall distribution of financial wealth in Austria. In section 1, we highlight the important role business equity plays in households' and private foundations' overall financial

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² *Based on Company Register records; our analysis does not consider self-employed persons or sole proprietorships that are not registered.*

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wealth. Section 2 contains a description of the data sources for equity stakes in limited liability companies held by households and private foundations. The structure of households' stakes in limited liability companies is spelled out in detail in section 3, and section 4 sheds light on the structure of such stakes owned by private foundations. Section 5 compares the business equity data with the results of the OeNB's 2004 Survey on Financial Household Wealth (SFHW) and presents a socio-economic characterization of the investor households; section 6 concludes. The annex provides information on the regional distribution of stakes in limited liability companies and the risk-bearing capacity of such companies in terms of equity ratios.

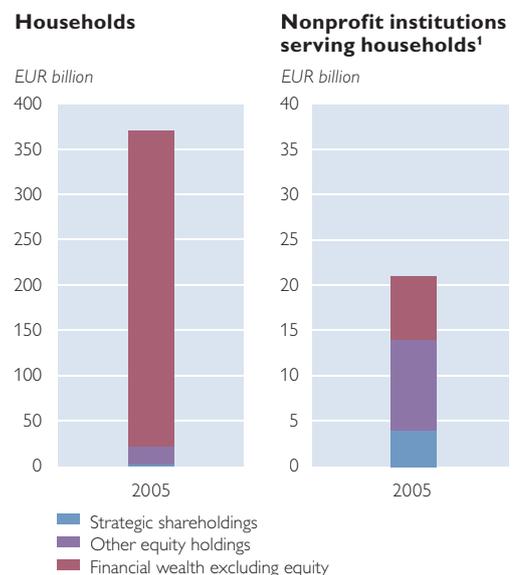
1 Relevance of Business Equity in Households' and Private Foundations' Overall Financial Wealth

Equity capital represents stakes in a company's equity (nominal capital including reserves), which in the case of listed stock are valued on a market-to-market basis. All other stakes are valued at the book value of the respective company. The financial accounts for Austria comprise data on the financial wealth of both households and nonprofit institutions serving households (NPISHs). Financial wealth includes cash, deposits, debt securities, mutual fund shares, loans, ownership of shares and other equity³, net equity in life insurance and pension fund reserves as well as other financial assets. Its computation and definitions are based on the European System of Ac-

counts (ESA) 1995. In the financial accounts, households comprise both producer households (including sole proprietorships and self-employed persons) and consumer households whose place of residence is Austria. NPISHs refer primarily to nonmarket producers that serve households and are resident in Austria, i.e. above all churches, trade unions, associations and especially foundations, including private foundations under the Austrian Private Foundation Act⁴. In 2005, NPISHs held around 5% of the household sector's total financial assets. Private foundations account for the largest portion (in value terms) of NPISH holdings of equity capital, and they are considered in this analysis given that they are generally owned by households.

Chart 1

Equity Holdings as Part of Financial Wealth



Source: OeNB.

¹ Including private foundations under the Austrian Private Foundation Act (Privatstiftungsgesetz).

³ In the financial accounts, residents' ownership of foreign land is treated as an investment in a foreign quasi-corporation. In our analysis, we do not consider such investments.

⁴ Excluding private foundations with close economic links to financial institutions such as banks (e.g. ERSTE Foundation).

Our analysis focuses on equity stakes in domestic limited liability companies.

The volume of households' strategic equity holdings (other equity and strategic shareholdings)⁵ totaled EUR 22.3 billion at end-2005, of which EUR 20.2 billion were non-publicly traded investments in domestic nonfinancial enterprises. This volume rose to EUR 24.3 billion by 2008⁶ and equaled some 6% of households' total financial wealth. NPISHs possessed stakes worth EUR 13.6 billion, EUR 9.3 billion of which were non-share investments. At a share of 65%, equity holdings play a much more important role in NPISHs' total financial wealth than they do in households' total financial wealth. According to the Association of Austrian Private Foundations, in 2005, equity accounted for some 55% of the financial wealth of private foundations, other financial assets for around 24% and real estate holdings for about 21%. As reported by the private foundations themselves, the share of equity in total financial assets thus equals approximately 70%.

Strategic equity holdings (unlisted stocks and other equity of the Austrian household sector) made up around 9.6% of total financial wealth in 2005, which – by European standards – is in the same league as Belgium and Germany.

In contrast to other financial wealth components, data on strategic equity holdings are compiled at the individual level. It is therefore possible to identify individual investors according to socio-

economic characteristics, such as age and place of residence, and to compare the data with the 2004 SFHW results. The latter allow for an analysis of a larger number of socioeconomic properties as well as by other financial asset categories and by household income.

As mentioned before, some 64% of all registered businesses in Austria are limited liability companies⁷, which account for about 90% of the equity capital of all nonfinancial corporations in Austria.

The following stock taking includes individuals' equity stakes in limited liability companies, even if such investments take a negative value. This does not imply, however, that negative values may be interpreted as individuals' liabilities. The same goes for the financial account aggregates.

2 Data Sources for Equity Stakes in Domestic Companies as Compiled for the Financial Accounts

Data on equity capital held by households and NPISHs in the form of stocks:

1. Our calculations are based on banks' reports on securities holdings and, depending on the amount involved, shareholders' direct reports, provided the securities are not parked in domestic banks' custody accounts (and thus covered by the banks' reports).
2. In addition, data on unlisted stocks were drawn from the joint stock companies statistics compiled by Statistics Austria.

⁵ Other equity comprises ownership in limited liability companies, partnerships and quasi-corporations (real estate abroad). Strategic shareholding refers to a shareholder owning 5% or more in a company.

⁶ The increase is based on an extrapolation of the 2005 holdings and the sum of changes in the nominal capital values as taken from the Company Register, which were converted into equity capital values.

⁷ A *Gesellschaft mit beschränkter Haftung* (GmbH) is a corporation with separate legal personality. It is the most common form of business organization in Austria. The owners of this type of limited liability company are liable merely to the amount of their initial contribution of at least EUR 36,000, while sole proprietors are liable with all their assets.

Data on domestic households' and NPISHs' equity holdings in Austrian limited liability companies were sourced from:

1. Company Register information on all enterprises organized as a limited liability company (GmbH). For such companies, figures on the nominal capital are available. The Company Register sheds light on a) the domicile and industry of the company and b) the ownership structure based on the nominal capital, including the number (and age and domicile) of its owners. On December 31, 2005, the Company Register listed some 70,000 limited liability companies⁸ with around 130,000 equity capital relations.
2. A commercial database: The OeNB uses the SABINA database, a special subset of the AMADEUS database, which is maintained by Creditreform. This database contains data on individual equity capital components, nominal capital and various types of reserves. The data are derived from the balance sheets recorded – not necessarily in electronic format – in the Company Register. Usually, it takes about 14 months until the data for a specific balance sheet reporting date are available in a format that may be analyzed electronically; the database is updated on a monthly basis. At present, the database contains 91,000⁹ companies domiciled in Austria.

We link these two data sources via the Company Register number and determine the overall number of companies and the distribution of equity capital across its owners, using the composi-

tion of the nominal capital shares recorded in the Company Register. We calculate for each company the relation of nominal to equity capital from data of the SABINA database. Given the lack of detailed information that could be analyzed electronically, this relation is unweighted, i.e. we assume that the (positive or negative) reserves of a company are equally distributed among all parties. In the case of negative reserves (especially from loss carryovers) that impact on the equity capital, we calculate the respective negative shares for individual households. For equity stakes that are recorded in the Company Register, but not in the SABINA database, we consider all investors' shares in the nominal capital only. The threshold value of EUR 36,000 comes into play relatively frequently. Equity that is recorded only in the SABINA database is not considered in our analysis, as we cannot identify the owners.

3 Stakes in Limited Liability Companies Held by Individuals

We use the above-mentioned data from the Company Register and the SABINA database to describe households' equity capital in limited liability companies at the micro level.

In all, the data set comprises 128,353 equity stakes traceable to individuals. As some individuals own several equity stakes, the number of persons in the data set equals 105,471. Furthermore, it is safe to assume that not all stakes in limited liability companies are captured in the data set, which is why any of the following figures should be regarded as estimates of such stakes held by individuals in Austria.

⁸ *I.e. about 70% of all limited liability companies in Austria.*

⁹ *This number comprises all limited liability companies in the database and not just the 69,632 owned by households. (The remainder is made up of limited liability companies owned e.g. by other companies, the government, banks and nonresidents.)*

Coverage nevertheless probably amounts to over 95% so that statistical uncertainty is very low. As we cannot determine a finite population correction factor given the lack of the overall number, we do not state confidence intervals.

On the assumption that all of these individual investors live in different households, around 3% of Austrian households own equity stakes in limited liability companies. In line with this assumption, this figure represents the upper limit. In the 2004 SFHW, about 2.6% (95% confidence interval: 1.74% to 3.42%) of households reported business equity holdings.

Table 1 shows the structure of equity holdings. Some 86% of these investors hold stakes in one limited liability company, and less than 1% hold stakes in five or more. The highest number of equity stakes per person is 22. The total worth of the equity stakes in limited liability companies comes to EUR 18.6 billion¹⁰. These stakes are therefore by far the most important component of other equity (and strategic shareholdings, 2005: EUR 22.3 billion) shown in the financial accounts.

Table 1

Households' Equity Stakes in Limited Liability Companies

Number of	Share in %	
	equity stakes	investors
1	90,193	90,193
2	22,222	11,111
3	7,584	2,528
4	3,564	891
5 and more	4,790	748
Total	128,353	105,471

Source: OeNB.

Table 2

Breakdown of Limited Liability Companies by Number of Equity Investors

Number of	%	
	investors	companies
1	36.435	52.32
2	20.722	29.76
3	6.901	9.91
4	3.646	5.24
5 or more	1.928	2.77
Total	69.632	100.00

Source: OeNB.

Moreover, several individuals can hold stakes of the same limited liability company. Table 2 presents a breakdown of limited liability companies by the number of individual equity investors.

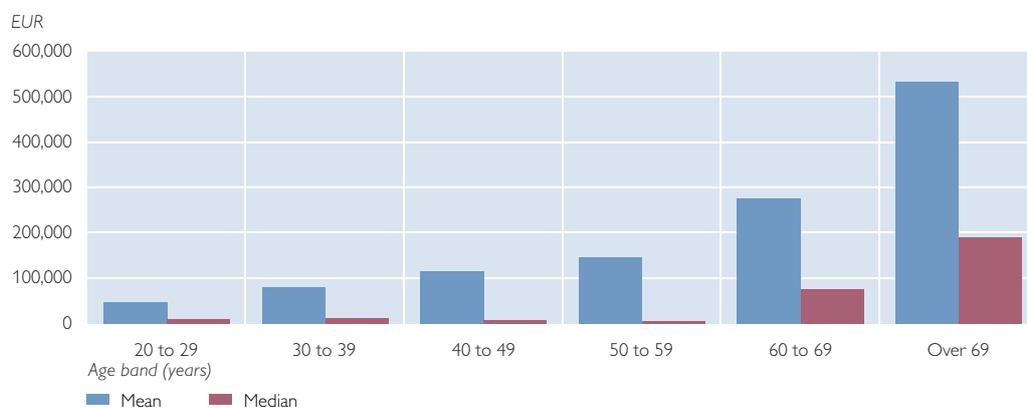
To illustrate the distribution of stakes in limited liability companies among the owners, the values of the individual holdings are added up for each investor. Averaged out, an individual's equity stakes are worth some EUR 176,000, while the median equals around EUR 19,000.

Chart 2 shows the total value of equity holdings broken down by investor age bands. It is evident that the value rises continuously with age, and the increase is particularly strong for older investors. Especially in the higher age bands, we see that the mean value nearly doubles between the 50 to 59 and the 60 to 69 bands as well as between the 60 to 69 and the over 69 bands. This result is not driven by outliers. If we consider the median values, the increases are even more pronounced, especially again in the higher age bands. One reason for this could be that successful limited liability compa-

¹⁰ The total value of stakes in domestic companies (excluding strategic holdings in stock corporations) ran to EUR 20.5 billion at year-end 2005 according to the financial accounts data. The difference is essentially traceable to a differing valuation assessment of individual holdings with negative equity capital and other forms of business organization which do not fall into the limited liability category.

Chart 2

Breakdown of Stakes in Limited Liability Companies by Investor Age Bands



Source: OeNB.

nies stay in the market longer and grow accordingly, while less successful ones come and go. Older owners of limited liability companies thus may look back on very positive track records of the companies they are invested in, while younger owners are more frequently involved in startups and new investments. Businesses may also be converted into limited liability companies once they have reached a certain size. At any rate, disinvestment from limited

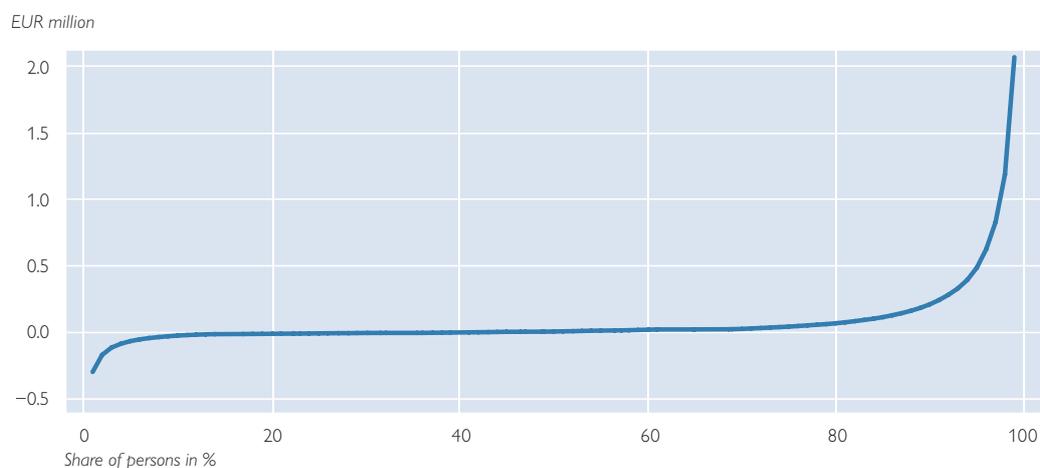
liability companies is obviously rare among the higher age bands.

Strong Concentration of Equity Stakes in Limited Liability Companies

Chart 3 shows the distribution of the total value of all equity stakes held per person by means of a Pen's parade. We find that for around 14% of investors, the total value of equity stakes is negative, and around 40% of investors have

Chart 3

Pen's Parade Illustrating the Distribution of the Total Value of Equity Stakes per Person



Source: OeNB.

Note: For reasons of display, the chart was cut off at the upper and lower tail of the distribution.

equity stakes worth less than EUR 10,000. Less than 20% own stakes of more than EUR 100,000, and about 5% hold equity stakes worth over EUR 500,000. In the chart, both the lower and upper tails of the distribution were cut off for reasons of display. However, individuals' equity stakes range from less than –EUR 20 million¹¹ to over EUR 1.4 billion.

Another way of illustrating the concentration of holdings of limited liability capital is presented in table 3. Of the total value of said stakes, the top 10% of owners hold around 92% (EUR 17.1 billion), the top one-thousandth own about 39% and the top ten-thousandth hold about one-quarter. The Gini index of the distribution equals 0.88. A Gini index of around 0.88 is reached e.g. when nine out of ten persons own EUR 1 and the tenth person owns EUR 500. One has to bear in mind, however, that all values refer to the distribution of stakes in limited liability companies among those 3% of households only that own such stakes, and not to the entire population. Furthermore, the analysis may consider only the first level of equity capital, but not stakes that lim-

ited liability companies hold themselves and potential other multi-tier participating stakes.

4 Stakes in Limited Liability Companies Held by Private Foundations

To capture at the micro level the equity stakes private foundations hold in limited liability companies, we likewise rely on data from the Company Register and the SABINA database. In these databases, it is possible to distinguish private foundations from individuals. The former are normally classified under NPISHs. Within the household sector, private foundations are the group holding the on average highest-value company stakes.

All in all, the data set covers 2,347 stakes in limited liability companies that are held by private foundations or, vice versa, 1,421 private foundations that hold one or more equity stakes (i.e. about 50% of all private foundations that existed in 2005). In addition to their limited liability stakes, private foundations own further financial and housing wealth (section 1). Some 64% of private foundations that own such stakes hold stakes in just one limited

Table 3

Shares of Top Groups in Households' Total Equity Holdings

	Value of all equity stakes per person	Share in total value of equity stakes
	EUR billion	%
Top 10%	17.1	91.94
Top 5%	15.3	82.26
Top 1%	11.3	60.75
Top one-thousandth	7.2	38.66
Top ten-thousandth	4.7	25.11
Total	18.6	100.00

Source: OeNB.

Table 4

Private Foundations' Equity Stakes in Limited Liability Companies

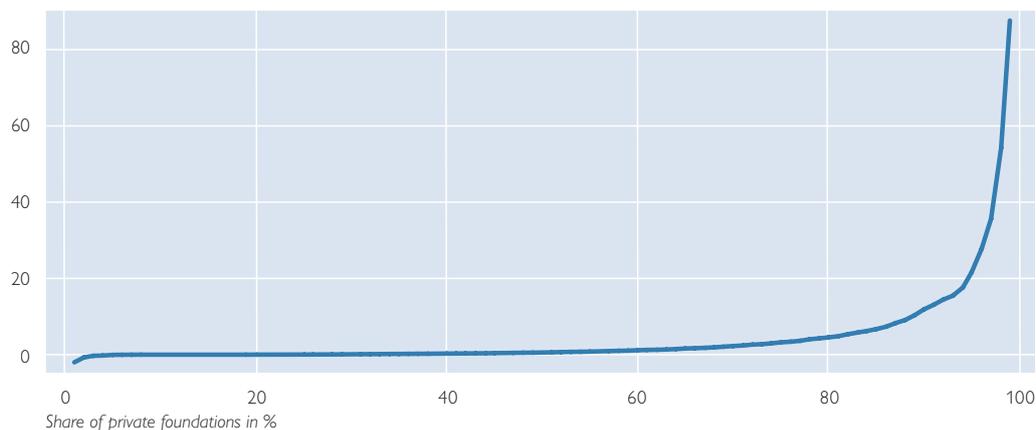
	Number of			Share in %
	equity stakes	equity relations	foundations	
1	914	914	64.32	
2	632	316	22.24	
3	291	97	6.83	
4	148	37	2.60	
5 and more	362	57	4.01	
Total	2,347	1,421	100,00	

Source: OeNB.

¹¹ Negative values should by no means be interpreted as owners' liabilities (section 1).

Pen's Parade Illustrating the Distribution of the Total Value of Equity Stakes Owned per Private Foundation

EUR million



Source: OeNB.

Note: For reasons of display, the chart was cut off at the upper and lower tail of the distribution.

liability company, while about 4% are invested in five or more companies. The maximum number of limited liability stakes held by a single private foundation equals 16.

Averaged out, the limited liability stakes of a private foundation are worth some EUR 6.4 million, while the median equals around EUR 570,000. At a Gini index of 0.84, the equity stakes of private foundations are somewhat more equally distributed than those of individuals. The value of the stakes held by private foundations is, however, signifi-

cantly higher: Summed over the 1,421 private foundations, the total comes to EUR 9.2 billion. This figure is approximately half the total value of the stakes in limited liability companies held by 105,471 households (EUR 18.6 billion). Chart 4 shows the Pen's parade of all equity stakes held by private foundations in value terms. About 20% of private foundations record a negative total value. Around 70% have stakes worth more than EUR 100,000, over 40% hold equity of more than EUR 1 million, and around 20% hold stakes worth more than EUR 5 million.

Table 5 provides a breakdown of private foundations' equity stakes by the shares of the top percentage groups. The top 10% hold around 80%, the top 1% still some 41% of the total value.

5 Comparison with the Microdata of the OeNB's 2004 Survey on Financial Household Wealth

In the following, we use the data compiled during the OeNB's 2004 SFHW to achieve two things. First, we analyze their plausibility in terms of equity cap-

Table 5

Shares of Top Groups in Private Foundations' Total Equity Stakes

	Total equity stakes per private foundation EUR billion	Share in total equity stakes %
Top 10%	7.4	80.35
Top 5%	6.3	68.34
Top 1%	3.8	41.05
Total	9.2	100.00

Source: OeNB.

ital, and second, we describe the socio-economic characteristics of the investor households and examine the impact of a potential underreporting and underrepresentation of equity capital on the distribution of financial wealth.

Multistage stratified clustered address random sampling was used for the OeNB's 2004 survey and produced a total of 2,556 analyzable observations. Within Austria, households were stratified at the province level, and in Vienna, households were stratified by the 23 political districts. Within the districts, the prospective respondents were selected at random. To make the sample more representative, the households were weighted within the sample. The age, occupation and education of the household head and the size of the household, the presence of children up to 14 years of age and the district were factored into the weighting.

On balance, the sample was constructed such that it should capture Austria's household population rather well. However, above all the tails of the distribution are problematic, as such surveys generally have what is called a middle class bias, i.e. both very wealthy and very poor households tend to be underrepresented. This could pose a problem in the capture of business equity holdings, as the latter are usually traceable to especially wealthy households. For a comprehensive discussion of the survey, see Beer et al. (2006).

5.1 Plausibility Analysis

According to the OeNB's 2004 SFHW, around 2.6% of Austrian households own equity stakes.¹² The 2.6% are backed up by 59 observations. Since only few households possess such eq-

¹² In the survey, equity stakes in unlisted companies are distinguished from stakes in listed companies and in self-employed businesses. It is, however, not possible to draw a clear line between stakes in limited liability companies versus stakes in other forms of non-publicly traded businesses. The majority of business equity stakes may be unequivocally identified as stakes in limited liability companies.

Table 6

Popularity and Distribution of Various Types of Financial Assets

	Share of households owning such financial assets %	Gini index
Deposits (savings and current accounts)	99.2	0.608
Savings (building loan contracts and other saving instruments ¹)	96.7	0.631
Building loan contracts	70.6	0.622
Life insurance contracts	53.1	0.752
Stocks	15.7	0.947
Mutual fund shares	11.4	0.958
Bonds	10.6	0.959
Business equity interests	2.6	0.995

Source: OeNB, Survey on Financial Household Wealth 2004.

¹ Passbook savings accounts, savings accounts, savings plans with bonus interest, capital savings accounts.

uity and, by extension, only few such households are captured in the sample, plus equity stakes are especially unequally distributed compared with other financial assets (table 6), estimates for this group have low precision. This is particularly problematic given that households holding such equity tend to be very wealthy. We see a similar problem with other less common assets, such as stocks, bonds and mutual fund shares (Fessler and Schürz, 2008).

The households that own business equity account for a disproportionately high share of around 16% of the entire gross financial wealth in Austria. Moreover, household surveys insufficiently cover the upper tail of the wealth distribution, as wealthier households tend not to participate, or if they do so, tend to provide incomplete information on, or understate, their wealth. It is therefore safe to assume that owing to data

coverage and compilation, the distribution based on individual level data and its moments are closer to the actual values.

To compare the 2004 SFHW data on equity stakes held by households ($n = 59$) with the individual level data ($n = 105,471$), we sort individuals' equity stakes (as derived from the Company Register and SABINA databases) in ascending order and produce 59 percentiles and the respective mean values. We take this approach because ideally, the (albeit only few) observations of equity stakes in the SFHW were sampled at random. This implies that their mean value should equal the mean value of actual equity stakes. On the other hand, this may also accidentally be the case, while the other moments of the distribution are not well captured. To pinpoint as precisely as possible to what extent the entire distribution may be captured, we include in the comparison any variation in equity stakes resulting from the 2004 SFHW, i.e. all of the 59 individual observations. If the 59 equity stake values of the 2004 SFHW match

the actual distribution, they should be rather close to the expected (mean) values of the 59 percentiles construed from the individual level data. The SFHW considered only equity stakes with a positive value. After all, equity stakes carrying a positive sign are part of households' financial assets and households therefore consider them relevant for their budget. By contrast, stakes with a negative sign do not represent liabilities for the owners but indicate that the equity capital of the limited liability company is in negative territory. For this reason, in our comparison, we exclude the negative values (some 14%) of the individual level data in a first step of our plausibility analysis. Furthermore, bear in mind that the comparison rests on the assumption that only one person per household holds such equity. As is evident from chart 5, the OeNB's 2004 SFHW effectively captures the distribution of stakes in limited liability companies despite the low number of observations. As was to be expected, the upper tails of the distribution cannot be

Chart 5

Comparison of Equity Stakes: 2004 SFHW versus 2005 Individual Level Data

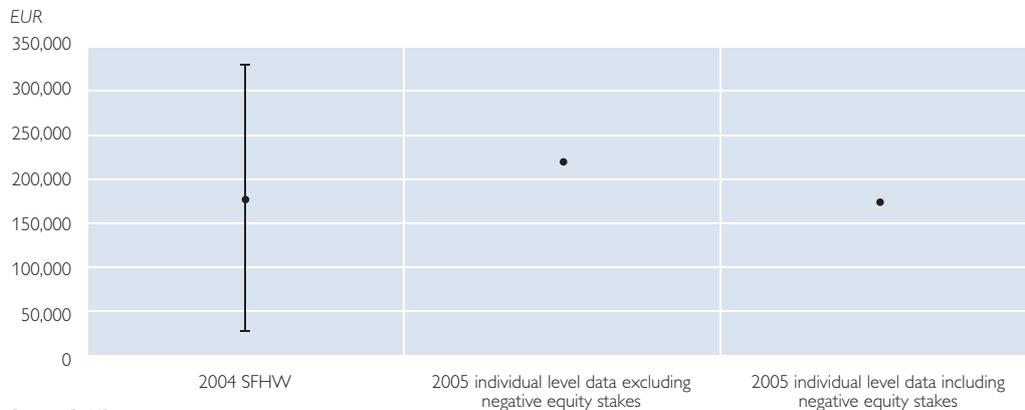
EUR (log)



Source: OeNB.

Chart 6

Comparison of the Estimates for the Value of Equity Stakes



Source: OeNB.

Note: Mean values (including the 95% confidence interval for the 2004 SFHW).

represented, and the lower tails are presented only in an insufficient manner.

Chart 6 juxtaposes the mean value estimates as derived from the OeNB's 2004 SFHW and those based on the individual level data excluding and including stakes with negative signs. Naturally, the estimates derived from the individual level data ($n = 105,471$, coverage of over 95%) are much more precise than those derived from the OeNB's 2004 SFHW ($n = 59$). The mean values do not deviate much from each other, which proves the validity of the OeNB survey data. The mean value based on the individual level data excluding stakes with a negative sign (as mentioned above) is the relevant benchmark here. It lies, quite expectedly (given the middle class bias of such surveys), above the mean value derived from the 2004 SFHW data.

The comparison also confirms the correlation with age. When we break down households holding equity stakes into three age bands (based on the household head's age),¹³ we arrive at an

average equity stake of around EUR 100,000 for the 20- to 39-year-olds, of about EUR 190,000 for the 40- to 59-year-olds and some EUR 420,000 for those aged 60 and more. While these estimates are imprecise given the small number of observations, they confirm that the SFHW data also capture the actual positive correlation between age and the increasing value of equity stakes (chart 3).

5.2 Socioeconomic Characteristics of Equity Investor Households

Owners of equity stakes are high-income, wealthy households. Their financial wealth (excluding business equity) is on average twice as high as that posted by households without business equity holdings. The median value of their financial wealth is almost three times as high as that of the rest of households. About 2.6% of households are equity investors who own some 16% of the overall gross financial wealth. In addition, compared with other households, they are much more frequently invested in risky assets (stocks, bonds

¹³ This comparison is based on the assumption that the household head is the owner of the equity stake. Given the extremely small sample size, we aggregated the age bands used in chart 3 once more.

Table 7

Socioeconomic Characteristics of Equity Investor Households

	Households	
	without business equity stakes	with business equity stakes
Number of observations	2,497	59
Share in %	97.4	2.6
Average age of household head	50.8	48.1
	EUR	
Mean gross financial wealth (excluding value of business equity)	47,000	120,000
Median gross financial wealth (excluding value of business equity)	22,715	64,200
	%	
Share of households with net income of EUR 3,000 and more	19.4	44.6
Share of households owning stocks and/or mutual fund shares	21.1	42.9
Share of households with university degree	12.1	22.9
Share of households owning principal residence	55.5	63.9

Source: OeNB.

and mutual fund shares), tend to own their primary residence and have considerably higher education levels.

5.3 Distribution of Gross Financial Wealth

Owing to the sample size, the individual level data on business equity holdings may be considered to be closer to the actual values, which is why we replace the 59 SFHW observations of equity stakes in accordance with their rank in terms of the value of the equity stake (chart 5) by the mean values of the 59 percentiles derived from the individual level data. In a first variant, we only use equity stakes with a positive sign. In a second variant, basically as a robustness check, we also include equity stakes carrying a negative sign. Table 8 compares the gross financial

wealth distribution of all variants. As expected, it becomes evident that the OeNB's 2004 SFHW data understate the inequality of the distribution of wealth as the problems with covering wealthy households obviously also apply to equity stakes. The Gini index rises both in the scenario covering only positive imputations and the scenario which also includes negative ones.¹⁴ Apart from the widely used Gini index, we employ additional distributional measures to draw comparisons in our robustness analysis: the Mehran index¹⁵ and the Kakwani index¹⁶, both of which, like the Gini index, are based on the Lorenz curve. The Kakwani index in particular is more sensitive to changes in the tails of the distribution than the Gini index. Another common index is the Theil index¹⁷ used in infor-

¹⁴ The share of both the top 10% and the top 5% in total gross financial wealth each increases by some 1 to 2 percentage points.

$$^{15} I_{\text{Mehran}} = \frac{3}{n^3 \bar{y}} \sum_{i=1}^n i(2n+1-i)(y_i - \bar{y})$$

$$^{16} I_{\text{Kakwani}} = \frac{1}{2 - \sqrt{2}} \left[\left(\frac{1}{n\bar{y}} \sum_{i=1}^n \sqrt{y_i^2 + \bar{y}^2} \right) - \sqrt{2} \right]$$

$$^{17} I_{\text{Theil}} = \frac{1}{n} \sum_{i=1}^n \left(\frac{y_i}{\bar{y}} \ln \frac{y_i}{\bar{y}} \right)$$

Table 8

Comparison of Gross Financial Wealth Distributions

Distributional measures	Gross financial wealth		
	OeNB 2004 SFHW ¹	Imputation from individual household equity stakes I ²	Imputation from individual household equity stakes II ³
Gini index	0.658	0.670	0.670
Mehran index	0.789	0.797	0.802
Kakwani index	0.347	0.359	0.362
Theil index	0.980	1.126	1.081
Atkinson index (inequality aversion = 0.5)	0.373	0.394	0.386

Source: OeNB.

¹ OeNB 2004 SFHW (business equity stakes surveyed).

² OeNB 2004 SFHW (imputation from business equity based on individual level data; only positive equity stakes).

³ OeNB 2004 SFHW (imputation from business equity based on individual level data; positive and negative equity stakes).

mation theory. Yet another index, the Atkinson index¹⁸, is based on a welfare function. All approaches show that the data using imputations from the individual level data entail greater inequality in the wealth distribution.

Including the stakes in limited liability companies held by private foundations would considerably amplify this result given the average value of these equity stakes. It is, however, not possible to map these stakes to individual households for the lack of information on the structure of private foundations. Moreover, we would have to formulate additional assumptions about the concurrent (pro rata) holding of a private foundation and business equity holdings at the individual level. Another reason to interpret the calculated indices as a lower limit for the actual inequality of the distribution of gross financial wealth is the positive correlation between the values of equity stakes and other financial assets, which we could not consider in our comparisons based on imputations.

6 Summary and Conclusions

Equity capital comprises above all ownership in domestic limited liability companies. In fact, stakes in limited liability companies accounted for EUR 18.6 billion of the total of EUR 22.3 billion recorded under “other equity” and “strategic shareholdings” in the 2005 financial accounts. Only about 3% of households possess stakes in limited liability companies. What is more, even within the group of equity investor households, holdings are highly concentrated. The Gini index for equity stakes held at the individual level equals 0.88. More than 90% of all equity stakes are traceable to the top 10%, and one-quarter of all stakes to the top ten-thousandth households. These figures refer merely to those about 3% of households that are invested in limited liability companies, which further underlines the high concentration. Furthermore, private foundations, which are generally owned by households, also hold another EUR 9.2 billion in limited liability equity. In

¹⁸
$$I_{Atkinson}(\varepsilon) = 1 - \left[\frac{1}{n} \sum_{i=1}^n \left(\frac{y_i}{\bar{y}} \right)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$
 with parameter ε determining the level of inequality aversion. The higher ε is, the more sensitive this index becomes to changes in the lower end of the distribution.

2005, only about half of the private foundations were invested in limited liability companies. The data from the OeNB's 2004 Survey on Financial Household Wealth attest to the fact that households owning business equity stakes earn disproportionately high incomes and have above-average wealth (even excluding equity stakes). In addition, compared with the other households, such households are much more frequently invested in risky assets, tend to own their principal residence and have considerably higher education levels. The individual level data (gleaned from the Company Register and SABINA databases) lend themselves to

a plausibility analysis of the results on equity stakes as derived from household surveys, which will be highly relevant for the Austrian component of the Eurosystem's future Household Finance and Consumption Survey (HFCS). Comparisons show that the distributional measures calculated from the OeNB's 2004 survey may be interpreted as a lower limit for the actual inequality in the distribution of wealth.

The results of the individual level (Company Register) data confirm those of the OeNB's 2004 survey and for the first time allow for a precise characterization of the distribution of stakes in limited liability companies in Austria.

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Annex

In this annex, we examine the regional distribution of equity stakes and the risk-bearing capacity of limited liability companies based on their equity ratios. These ratios are significant measures of companies' risk-bearing capacity; they may differ quite markedly across industries. As a case in point, the tourism industry is traditionally characterized by low equity ratios. By contrast, companies operating in particularly innovative industries frequently seem to require higher equity ratios to allow for riskier investments.

Regional Distribution

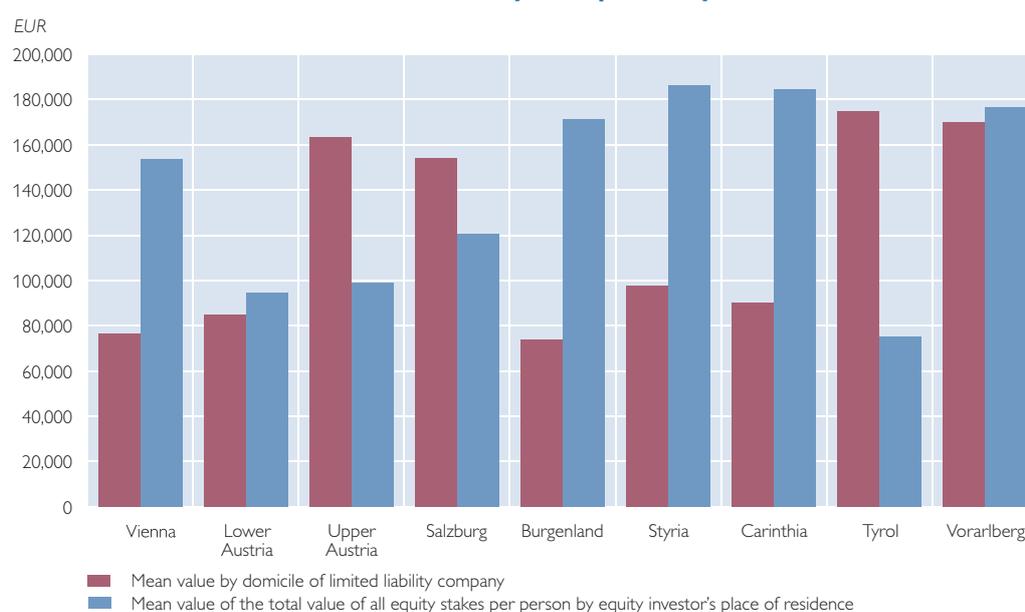
Chart 7 illustrates the regional distribution (in value terms) of limited liability stakes as measured by two variants. Since equity stakes worth more than EUR 100 million ($n < 10$) would have had a strong distortive effect on the regional distribution, they were excluded. Variant 1 shows the mean value

of an equity stake by the domicile of the limited liability company. Variant 2 shows the mean total value of all equity stakes held by an individual by the latter's place of residence. In the breakdown by company domicile, the Austrian provinces of Tyrol, Vorarlberg, Upper Austria and Salzburg record relatively high values for the average limited liability stake. A different picture emerges in the breakdown by the average total value of all equity stakes held by an individual. Here, above all Styria, Carinthia, Vorarlberg, Burgenland, but also Vienna score the highest values, with investors domiciled in Styria, Carinthia and Burgenland owning equity stakes in particular in Upper Austria. Vorarlberg residents, by contrast, hold equity above all in Lower Austria and Vienna. The equity stakes of Vienna residents are rather equally distributed across all Austrian provinces.

Chart 8 depicts the regional distribution of equity stakes (in value terms)

Chart 7

Breakdown of Stakes in Limited Liability Companies by Austrian Provinces¹



Source: OeNB.

¹ Excluding equity stakes worth more than EUR 100 million ($n < 10$).

Breakdown of Stakes in Limited Liability Companies by Total Value¹

Source: OeNB.

¹ Excluding equity stakes worth more than EUR 100 million ($n < 10$).

by the owner's place of residence and the company domicile. The number of limited liability companies in each province and the share of each province in Austria's total population are presented as reference values. We find a disproportionately high share of equity owners in Vienna and Burgenland. This applies both to the comparison with the breakdown of values by company domicile and the number of limited liability companies as well as in relation to the population shares. In terms of company domicile, especially Vorarlberg, Tyrol, Salzburg and Upper Austria weigh in disproportionately heavily with respect to the number of limited liability companies and the population shares. In our analysis, we again excluded equity stakes worth over EUR 100 million ($n < 10$).

Equity Ratios

The equity ratio serves as an important indicator of a company's risk-bearing

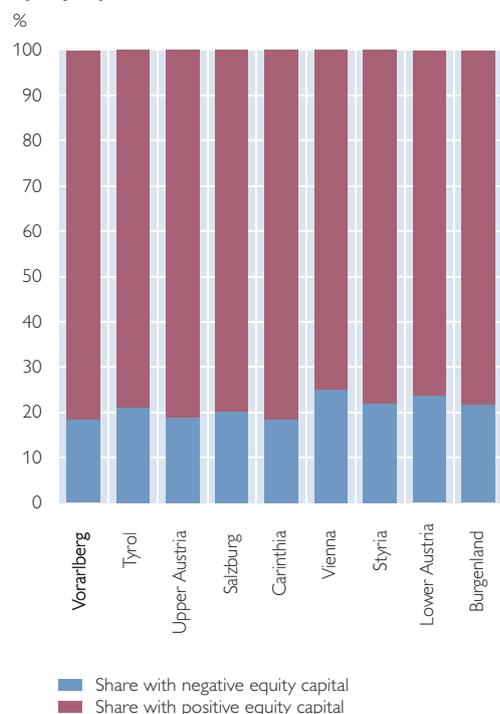
capacity. This ratio is calculated based on information about the company's equity capital and total assets. For the data set used in this study, we were able to compute the equity ratios of about 43,000 limited liability companies; we had to exclude all companies for which information was available only on the nominal capital, but not on reserves. We nevertheless captured clearly over 55% of all Austrian limited liability companies. Furthermore, as the lack of reserve information does not seem to be systematic, the calculated estimates should have high precision.

Chart 9 shows the equity ratios by company domicile, and the provinces are sorted in descending order by the median equity ratio. Some 20% of limited liability companies, with only slight variations as to the individual provinces, post a negative equity ratio. This may be traceable to loss carryovers. It is, however, very difficult to interpret the size of negative equity ratios.

Chart 9

Breakdown of Equity Ratios by Company Domicile

Limited liability companies sorted by equity ratios



Equity ratios of limited liability companies



Source: OeNB.

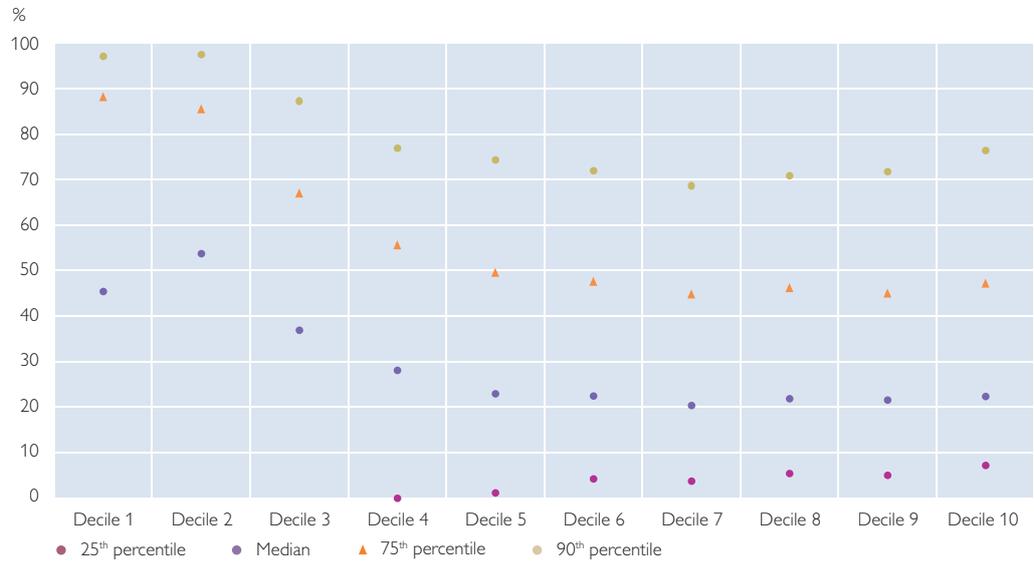
The right panel of chart 9 shows the percentiles of equity ratios for the individual provinces. Vorarlberg records a median equity ratio of more than 35%. Tyrol, Upper Austria and Salzburg follow with values around 30%, and Carinthia, Vienna, Styria and Lower Austria (in a descending order) register values between 26% and 22%. Only Burgenland has a median equity ratio of less than 20%. Across all provinces, the median equity ratio comes to around 26%.

When we examine the equity ratio by deciles of total assets (chart 10), we see that in all deciles, the 10th percentile records a negative equity ratio. In the lowest three deciles, this holds true also for the 25th percentile. Even in the

highest decile of total assets, more than 10% of limited liability companies have negative equity ratios and more than 25% post an equity ratio of less than 10%. The rather high share of limited liability companies with an especially low risk-bearing capacity is thus not confined to companies whose total assets are low. Chart 10 only presents positive values, as the highly negative values of the lower deciles are difficult to interpret. As to the median, the lower deciles of total assets record disproportionately high and the upper deciles disproportionately low equity ratios. The dispersion of equity ratios tends to decline the higher the total assets figure is.

Chart 10

Limited Liability Companies' Equity Ratios by Total Asset Deciles



Source: OeNB.

Note: The 10th percentile is negative in all deciles, the 25th percentile is negative in the lowest three deciles.