Measuring the market value of shares and other equity in the Portuguese financial accounts

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1. Introduction

From 1997 onwards, international comparisons of debt-to-equity (D/E)[2] and equity-to-Gross Domestic Product (GDP) (E/GDP)[3] ratios tended to show values for Portugal, based on the financial accounts, that seemed to underestimate the equity instrument. The Portuguese D/E ratio was one of the highest in Europe (above 1.1),[4] particularly for the most recent years; E/GDP showed a declining pattern, especially from 1999 onwards, with the figure for Portugal being one of the lowest in Europe (around 1.0).

The historical data on shares and other equity in the Portuguese financial accounts were first estimated on the basis of a constant sample of 10,000 non-financial companies for which data were available in the Central Balance Sheet Database (Central de Balanços, or CB) of the Bank of Portugal (BP), and based on extrapolators calculated by the National Statistics Institute (Instituto Nacional de Estatística, or INE) using fiscal data on own funds for 1997. Among other constraints is the fact that the market value figures available for some companies were not taken into account. In addition, fiscal data were not available on a sufficiently timely basis for the compilation of financial accounts to be reported to international organisations.

To overcome these difficulties, an alternative methodology was then developed for the estimation of liabilities in the shares and other equity category within the financial accounts. Section 2 of this paper presents a summary of the conceptual framework, while section 3 provides the sources of data. Section 4 describes the methodology and estimation algorithm used. The main results obtained are shown in section 5. Section 6 provides a final brief international comparison.

2. Conceptual framework

The European System of Accounts (ESA 95) establishes that the valuation of the shares and other equity category should be based on current prices (§ 7.52). For quoted securities, the value to consider should be the relevant market price in stock exchanges or other organised financial markets (§ 7.53); for unquoted shares (§ 7.54), an estimate should be made with reference to quoted shares, taking into account companies' differences in liquidity, sector of activity, and size; for other types of equity (§ 7.56), the estimate might use own funds or nominal value (of capital).

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2 Measuring the type of financing (own funds or indebtedness) used by companies.

3 Measuring equity as a proportion of domestic economic output.

4 Non-consolidated data from the financial accounts of several countries were used to calculate the ratios, including the following instruments: securities other than shares; loans; trade credits and advances; and shares and other equity.

Given the practical constraints of implementing the capitalisation method, due to differences with regard to the variables mentioned, European compilers[5] recommended using own funds as an alternative. Own funds were considered a good proxy for market value of unquoted shares and other equity, since this allows for international comparisons and is considered easy to implement. Own funds include nominal capital, supplementary capital, reserves and net profits/losses.

The methods used in Portugal for valuation of the "shares and other equity" item, by institutional sector of the issuer, are as follows (see Table 1):

Table 1

Methods for valuation of shares and other equity

	Quoted	Unquoted	Other equity
Non-financial corporations	Market value	Own funds	Own funds
Financial corporations	Market value	Own funds	Own funds
Rest of the world	Market value	Own funds	Own funds

Observed Estimated

Source: Banco de Portugal.

3. Sources of data

The alternative methodology that has been developed to overcome the difficulties mentioned above involves gathering data from several sources: the Directory of Statistical Units (Ficheiro de Unidades Estatísticas, or FUE), the Securities Statistics Integrated System (Sistema Integrado de Estatísticas de Títulos (SIET)) and the Central Balance Sheet Database (CB).

- FUE: This file is based on data compiled by INE for 2003 and is composed of more than 350,000 active non-financial companies resident in Portugal. Data were gathered from this file concerning companies' legal form, sector of economic activity, business turnover, number of employees and nominal capital.
- SIET: This is a security-by-security and investor-by-investor system managed by BP for the purpose of constructing statistics on securities issues and portfolios, which are then used within a set of financial statistics, namely, the financial accounts. The system compiles data relating to published issues of shares in Portugal, including all quoted shares in the Portuguese market (70 companies in 2003) and the nominal capital for unquoted shares (16,725 companies in 2003). The SIET is considered comprehensive for unquoted shares.
- CB: This is a database managed by BP, containing information from non-financial companies that responded to the voluntary annual survey seeking balance sheet and profit and loss accounting data. The database, which includes data from some 18,000 companies (for 2003), has good coverage, particularly for

[5] Eurostat's Working Group on Unquoted Shares and the European Central Bank's Sub-Group on Shares and Other Equity.

large, well performing companies, with a statistical sample for the others. It also includes information from a mandatory quarterly survey conducted in conjunction with INE and drawing on a sample of approximately 3,500 companies each year. Valuation of shares and other equity, for the purpose of the financial accounts, drew on information from this database concerning non-financial companies' sector of economic activity, number of employees, nominal capital and own funds.

4. Methodology and estimation algorithm

4.1 Non-financial corporations

In the financial accounts, the liabilities in shares and other equity of non-financial companies (K_{nfc}) were divided into the following sub-components:

$$K_{nfc} = K_{qs} + K_{nqs} + K_{oe}$$

For quoted shares (K_{qs}), the market value was taken directly from SIET, which includes quotations for all companies listed on the Portuguese stock exchange. For unquoted shares (K_{nqs}) and other equity (K_{oe}),[6] an estimate of companies' own funds was used as a proxy, in the absence of market values.

4.1.1 Yearly estimates

Constructing an estimate for the year 2003[7] was an initial step in developing the methodology. This estimate was then used as an anchor for estimating the set of values for the entire 1997–2005 period.

Base year

In the case of unquoted shares (K_{nqs}), data on nominal capital was compiled from SIET. Own funds were then extracted from the CB for the companies common to the two databases. Given that not all SIET-registered companies with unquoted shares reported their figures to the CB, extrapolators based on ratios of own funds to nominal capital, as observed in the CB, were then applied to SIET non-financial companies not included in the CB.

If the CB sample were representative and homogeneous, one could apply the mean ratio of own funds to nominal capital, as shown in the CB, to the nominal capital shown in SIET, in order to obtain an own funds estimate for SIET-registered companies with unquoted shares not included in the CB. Unfortunately, since the annual survey is voluntary in nature, it was reasonable to assume that responding companies performed better economically and financially than non-responding companies. Thus, it was considered necessary to stratify ratios according to sector of economic activity[8] and company size,[9] rather than using a single

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6 K_{oe} includes (non-financial) real estate assets, such as land and buildings, held by non-residents. This value was extracted directly from the international investment position statistics.

7 The choice of 2003 as a base year was due to the fact that the data in the FUE for that year were considered more complete and broader in their coverage.

8 The thirteen sectors considered were: agriculture, hunting, forestry and fishing; construction; education, health and other community, social and personal services; heavy manufacturing; hotels and catering (restaurants and other); light manufacturing; mining and quarrying; post and telecommunications; production and

ratio. With information from FUE on their economic sectors and numbers of employees, the companies with unquoted shares included in SIET were then distributed according to the various strata defined.

Own funds for unquoted shares were afterwards calculated according to the following expression:

$$K_{nqs} = K_{nqs\_obs} + K_{nqs\_est}$$

K_{nqs_obs} indicates the value of own funds of companies with unquoted shares included in the CB, which accounted for approximately 27 percent of the number of companies with unquoted shares in the SIET universe in 2003.

K_{nqs_est} was calculated according to the following expression:

$$K_{nqs\_est} = \sum_i \sum_j (1 + \alpha_{ij} \cdot \partial_{ij}) \cdot NK_{nqs\_obsSIET\_ij}$$

$NK_{nnqs\_obsSIET\_ij}$ represents the nominal capital of SIET-registered companies not included in the CB, for sector of economic activity i and size category j;

$(1 + \alpha_{ij})$ is the ratio of own funds to nominal capital shown in the CB for sector of economic activity i and size category j, ie

$$1 + \alpha_{ij} = K_{nqs\_obs\_ij} \Big/ NK_{nqs\_obs\_ij}$$

In general, the extrapolators α_{ij} were positive, since nominal capital is one of the components of own funds; however, outliers from companies with ratios above 10 or below zero were excluded.

The coefficients ∂_{ij} were used in order to calibrate the natural bias of the extrapolators α_{ij} arising from the CB sample. They were attributed a variable weight of discrete values – 1, 0.5 and 0 – if the representativeness of the CB sample, in terms of number of companies in each stratum, was over 50 percent, between 50 and 25 percent, or below 25 percent, as compared with the universe of SIET-registered companies with unquoted shares (see Table 2).

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distribution of electricity, gas and water; real estate; rental and supply of services to non-financial corporations; transportation and storage; wholesale and retail trade; repair of motor vehicles.

[9] The five size categories considered, based on the number of employees, were: over 250; 51–250; 9–50; 2–8; 0–1.

Table 2

CB coverage of unquoted shares by sector of economic activity and size category

	Number of employees					
Economic activity sector	**>250**	**51–250**	**9–50**	**2–8**	**0–1**	
Agriculture, hunting, forestry and fishing	100%	67%	28%	8%	3%	17%
Construction	96%	55%	24%	9%	5%	22%
Education, health and other community, social and personal services activities	92%	69%	24%	5%	5%	26%
Hard manufacturing industry	93%	58%	43%	32%	9%	53%
Hotels and catering (restaurants and others)	97%	50%	18%	5%	4%	24%
Light manufacturing industry	95%	68%	32%	14%	5%	47%
Mining and quarrying	100%	65%	37%	17%	8%	37%
Post and telecommunications	93%	83%	50%	22%	43%	52%
Production and distribution of electricity, gas and water	80%	81%	76%	63%	31%	56%
Real estate	67%	61%	34%	14%	7%	10%
Rental and supply of services to non-financial corporations	88%	47%	27%	25%	29%	29%
Transports and storage	95%	58%	38%	15%	12%	38%
Wholesale and retail trade and repair of motor vehicles	88%	62%	32%	12%	6%	29%
	93%	61%	31%	16%	13%	27%

Coverage by number of companies

more than 50% between 50% and 25% less than 25%

Source: Banco de Portugal.

For other equity (K_{oe}), a procedure similar to the above was employed, the difference being that the reference universe was the FUE and not the SIET. For a small proportion of companies (4 percent of FUE companies), own funds figures were directly obtained from the CB, while for the rest an extrapolation was made based on applying the CB ratios to the nominal capital in the FUE. Since the CB sample was less representative for other equity than for unquoted shares, the number of calibrators of nil value was higher (see Table 3).

The final values obtained for both unquoted shares and other equity are presented below. One may conclude that, for both types of capital, the values directly observed in the samples were predominant, as compared with the ones that were estimated (see Table 4).

Table 3

CB coverage of other equity by sector of economic activity and size category

	Number of employees					
Economic activity sector	**>250**	**51–250**	**9–50**	**2–8**	**0–1**	
Agriculture, hunting, forestry and fishing	0%	30%	16%	5%	2%	5%
Construction	75%	25%	7%	2%	1%	3%
Education, health and other community, social and personal services activities	82%	38%	8%	1%	0%	2%
Hard manufacturing industry	77%	36%	14%	5%	2%	10%
Hotels and catering (restaurants and others)	100%	25%	4%	1%	0%	1%
Light manufacturing industry	95%	44%	17%	6%	2%	9%
Mining and quarrying	0%	52%	30%	9%	5%	17%
Post and telecommunications	0%	75%	20%	6%	8%	9%
Production and distribution of electricity, gas and water	100%	28%	39%	17%	24%	27%
Real estate	0%	17%	13%	3%	1%	2%
Rental and supply of services to non-financial corporations	67%	26%	7%	1%	1%	2%
Transports and storage	80%	40%	15%	4%	1%	4%
Wholesale and retail trade and repair of motor vehicles	77%	49%	15%	3%	1%	4%
	78%	37%	12%	3%	1%	4%

Coverage by number of companies

more than 50% between 50% and 25% less than 25%

Source: Banco de Portugal.

Table 4

Estimates of unquoted shares and other equity for 2003

	Unquoted shares		**Other equity**	
Observed values	84 703	84.7 percent	34 215	59.6 percent
Extrapolated values with ∂_{ij} = 1	4 344	4.3 percent	660	1.1 percent
Extrapolated values with ∂_{ij} = 0.5	7 040	7.0 percent	1 336	2.3 percent
Extrapolated values with ∂_{ij} = 0	3 939	3.9 percent	21 193	36.9 percent
Total	100 026		57 404	

Unit: 10^6 euros and percent of total

Source: Banco de Portugal.

In order to validate the ad hoc values chosen for ∂_{ij} , two linear regressions were constructed, one for unquoted shares and another for other equity, according to the following formula:[10]

$$Ln(K - NK) = \alpha \ + \beta_1 Ln(NK) + \beta_2 Ln(NE) + \beta_3 Ln(BT) + \delta_j D_j + \xi$$

The regressions attempted to explain the difference between own funds and nominal capital using the variables available in the FUE, ie nominal capital, number of employees, business turnover and sector of economic activity. After running the regressions for those CB companies for which all data were available, the β coefficients obtained were applied to the remaining companies. The results of the regressions confirmed the overall values of unquoted shares and other equity obtained earlier.

1997–2005 period

For the period before and after 2003, the data compiled directly from the annual surveys were used in the case of companies included in the CB.

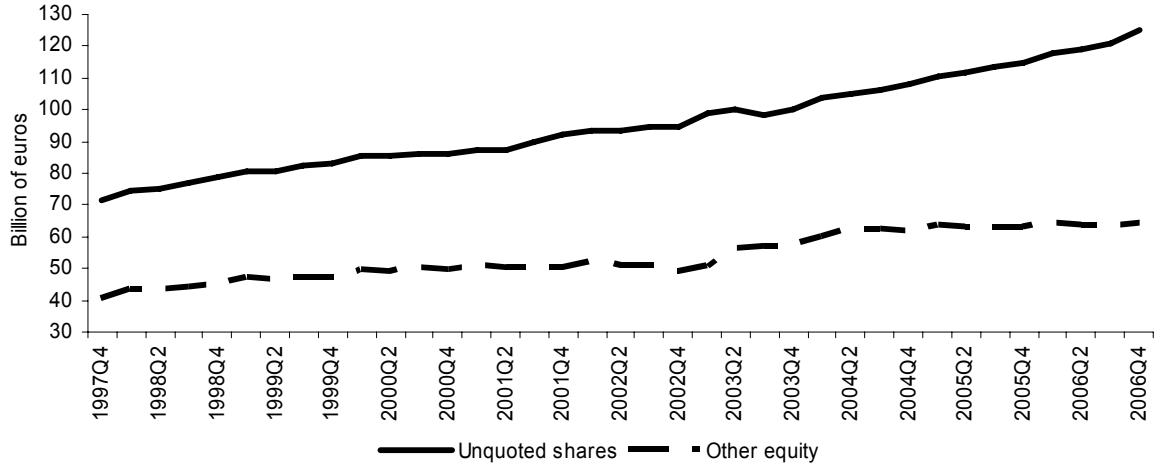
A hypothesis regarding changes in own funds with respect to nominal GDP, as well as with respect to figures computed for the invariant CB sample, was proposed for companies with unquoted shares and companies with other equity not included in the CB sample.

4.1.2 Quarterly estimates

Quarterly figures were obtained from the yearly estimates, using an indicator reflecting the seasonal patterns in companies' own funds. This indicator was constructed using accounting data from the CB quarterly surveys. The indicator's time series were then compiled, following which the quarterly nominal GDP growth rate was applied. The quarterly indicator was subsequently applied to the annual figures for own funds using ECOTRIM, software which employs a quarterly approach. The results show a stable quarterly change in both types of capital – unquoted shares and other equity (see Figure 1).

Figure 1

Quarterly non-financial corporations' liabilities in unquoted shares and other equity



Source: Banco de Portugal.

[10] Where K stands for own funds, NK for nominal capital, NE for number of employees, BT for business turnover and D for a dummy variable representing the sector of economic activity.

4.2 Extension to institutional sectors other than non-financial corporations

After running the exercise of valuing shares and other equity for non-financial corporations, it was extended to liabilities in shares and other equity in other institutional sectors, namely, the financial sector and the rest of the world.

For quoted shares, the prices quoted on the Portuguese stock exchange were used. In the case of the rest of the world, quoted prices of non-resident companies on the respective stock exchanges, gathered through commercial data providers, were also used, although most Portuguese investment abroad is channelled to unlisted companies.

For companies with unquoted shares and other equity, in the case of the financial sector, own funds figures were derived from balance sheets. For the rest of the world, two sources were used. On the one side, the foreign direct investment (FDI) surveys were taken; these surveys are carried out on an annual basis by the compilers of statistics on the balance of payments/international investment position, seeking account data on own funds of non-resident companies and their percentage share of FDI. On the other side, transaction prices reported for securities in the SIET foreign securities portfolios held by residents were taken.

4.3 Transactions estimates

The above-mentioned estimates related to end-of-period positions for shares and other equity in the financial accounts. Estimates for flows were derived as follows: changes in nominal and supplementary capital were considered as transactions; changes in other own funds components were classified as price changes; reinvested earnings from FDI were later added to the transactions; and finally, capital injections made by the general government in public companies with cumulative net losses were removed from the "shares and other equity" item in the financial accounts, since these are classified as non-financial operations.

5. Main results for 1997–2006 period

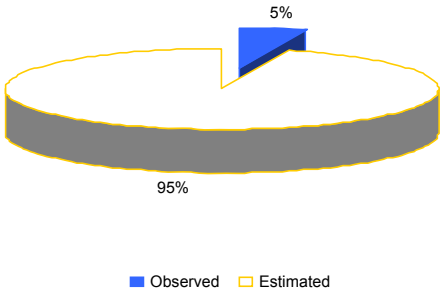
5.1 Number and valuation of non-financial corporations, by type of equity

In 2003, for a certain number of non-financial corporations (approximately 5 percent of the companies in the FUE, which served as the reference universe), 77 percent of the market value or own funds could be observed either in the SIET (quoted shares) or in the CB (unquoted shares and other equity). This meant that for approximately 95 percent of companies, 23 percent of the market value or own funds were estimates (see Figures 2 and 3).

Figure 2

2003

Number of companies

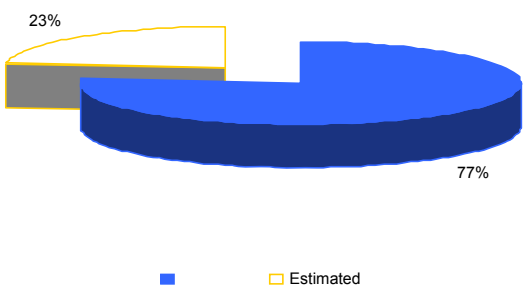


Source: Banco de Portugal.

Figure 3

2003

Market value



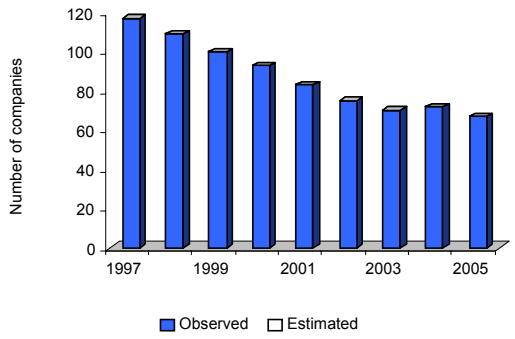
Source: Banco de Portugal.

As regards listed stocks, all figures were based on direct observation in the SIET of stock exchange prices. Most notable here are the market price fluctuations among a few companies (see Figures 4 and 5).

Figure 4

Quoted shares

Number of companies

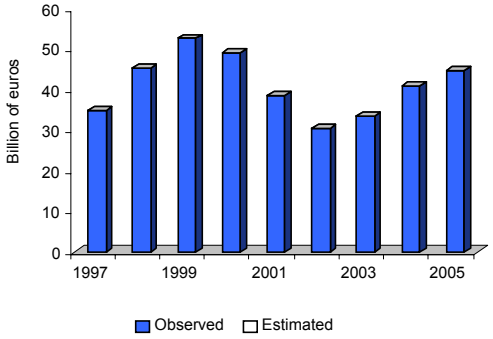


Source: Banco de Portugal.

Figure 5

Quoted shares

Stock market value



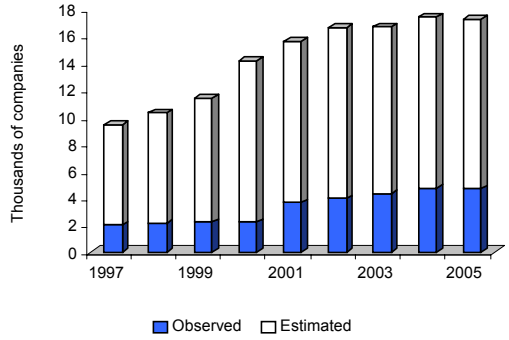
Source: Banco de Portugal.

In the unquoted shares segment, 56 percent of own funds figures were observed in the CB each year, on average, for 23 percent of SIET-registered companies. (Since 2000, the use of a sample has also contributed to greater coverage in the CB.) The salient feature here is that own funds are more stable than stock exchange prices (see Figures 6 and 7).

Figure 6

Unquoted shares

Number of companies

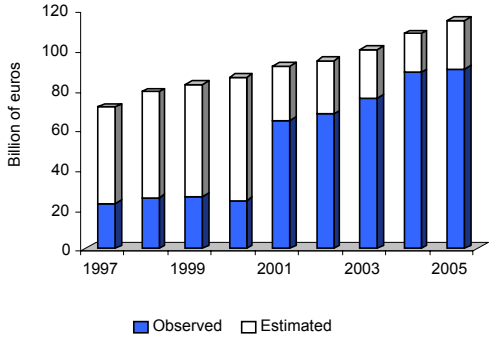


Source: Banco de Portugal.

Figure 7

Unquoted shares

Own funds value



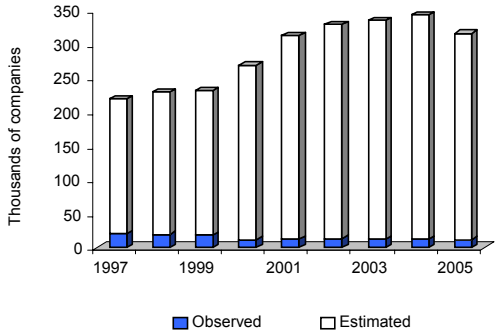
Source: Banco de Portugal.

As regards other equity, 41 percent of own funds figures were observed in the CB each year, on average, for 5 percent of FUE companies. (Since 2000, the use of a sample has also contributed to greater coverage in the CB.) The salient feature here is that own funds are again less volatile than stock exchange prices (see Figures 8 and 9).

Figure 8

Other equity

Number of companies

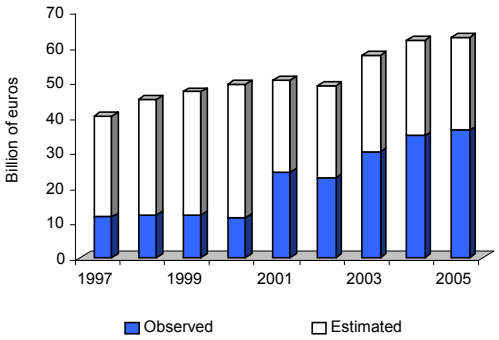


Source: Banco de Portugal.

Figure 9

Other equity

Own funds value

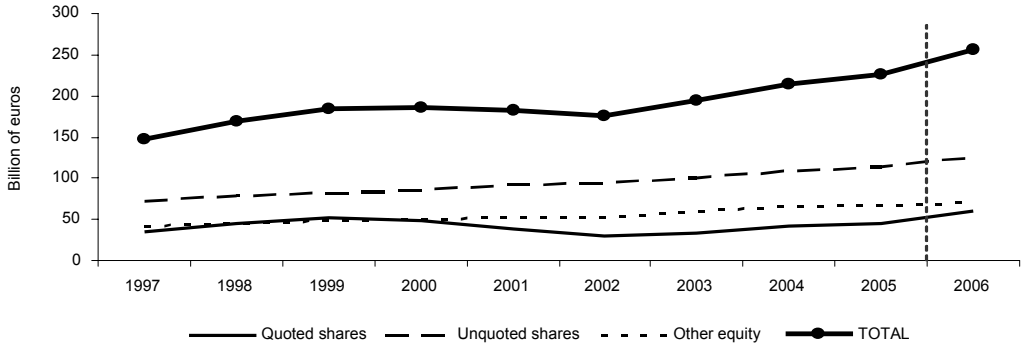


Source: Banco de Portugal.

Changes in the "shares and other equity" item for the non-financial corporations sector in the Portuguese financial accounts, which rose from approximately 148 billion euros in 1997 to almost 226 billion euros in 2005, is attributable primarily to changes in the quoted shares component. This pattern is in line with the stock market peaks of the late 1990s and the drop in the early years of the present century. However, the distribution of liabilities in shares and other equity, by type of equity, still shows unquoted shares as the main component (around half) of the Portuguese equity item (see Figure 10).

Figure 10

Non-financial corporations' liabilities in shares and other equity, by type of equity



Source: Banco de Portugal.

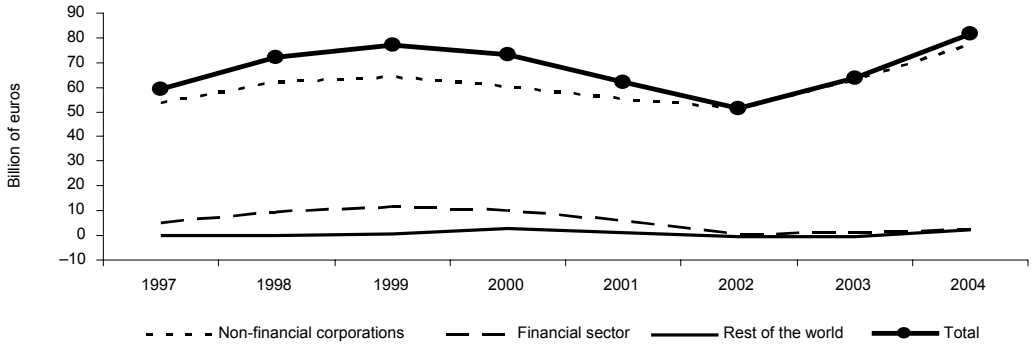
5.2 Total liabilities in shares and other equity in the financial accounts

The results obtained with the methodology presented above, which follows international recommendations regarding market valuation of shares and other equity in the financial accounts, represented an increase of approximately 68 billion euros per year in the Portuguese accounts. This increase was reflected in the stocks' accounts from 1997 to 2005, mainly as a result of price revaluations.

The institutional sector breakdown of liabilities in shares and other equity suggests that the increase in this item for the period under review is primarily attributable to the non-financial corporations sector. This sector's share in the growth of the overall economy has increased to nearly 100 percent since 2002 (see Figure 11).

Figure 11

Changes in liabilities in stocks of shares and other equity, by institutional sector



Source: Banco de Portugal.

5.3 Total shares and other equity in the financial accounts

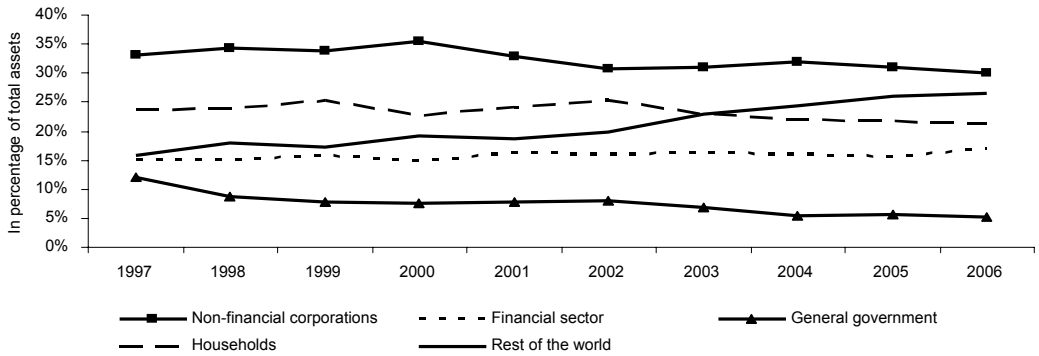
The upward revision in the liabilities in shares and other equity in Portugal's financial accounts naturally led to a corresponding increase in the assets of the same instrument . As a result, the portfolios of the various institutional sectors have become more closely aligned with the respective market values.

For quoted shares, SIET provided market price data for valuing the portfolios' holders on an investor-by-investor basis, while making it possible to attribute them to a given institutional sector. For unquoted shares and other equity, several sources were used. The Ministry of Finance provided information (at nominal value) on general government holdings; statistics on the balance of payments/the international investment position provided information for the rest of the world; financial corporations' balance sheet values were adjusted according to the sector's holdings as a percentage of the total holdings observed in SIET; and non-financial corporations, non-profit institutions serving households, and households were identified as a residual using SIET.

Changes in the breakdown of the assets in shares and other equity by institutional sector shows that the rest of the world's share, as a percentage of the total, grew from 16 percent in 1997 to 26 percent in 2006. In contrast, the general government's share decreased from 12 percent to 5 percent in the same period, a fact that may be associated with privatisations (still) under way in the Portuguese economy (see Figure 12). The average distribution of these assets for the 1997–2006 period, among the various institutional sectors, was as follows: non-financial corporations, 32 percent; households, 23 percent; rest of the world, 21 percent; financial corporations, 16 percent; and general government, 8 percent (see Figure 13).

Figure 12

Holders of assets in shares and other equity – evolution

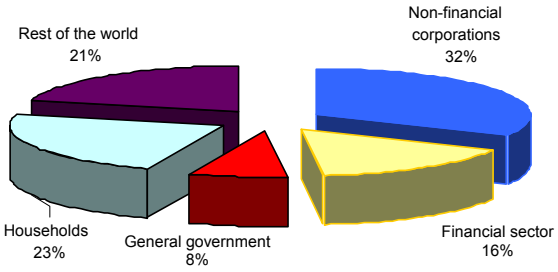


Source: Banco de Portugal.

Figure 13

Holders of assets in shares and other equity – distribution

Average 1997–2006



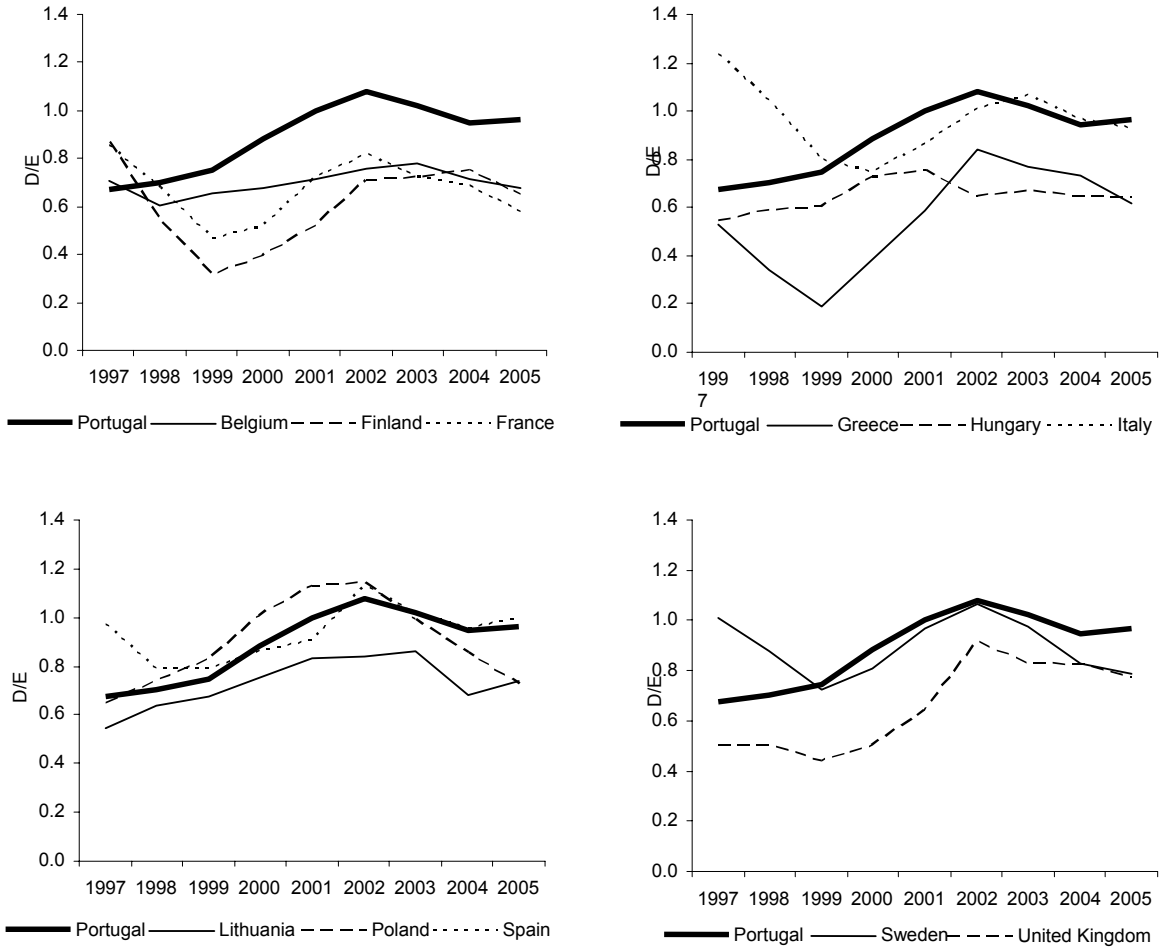
Source: Banco de Portugal.

6. International comparison

Based on international comparison of the D/E and E/GDP ratios, after reviewing the figures of the Portuguese financial accounts, one can conclude that the method for estimating own funds described above yielded values for Portugal that are closer to those of other countries (see Figures 14 and 15).

Figure 14

Debt-to-equity

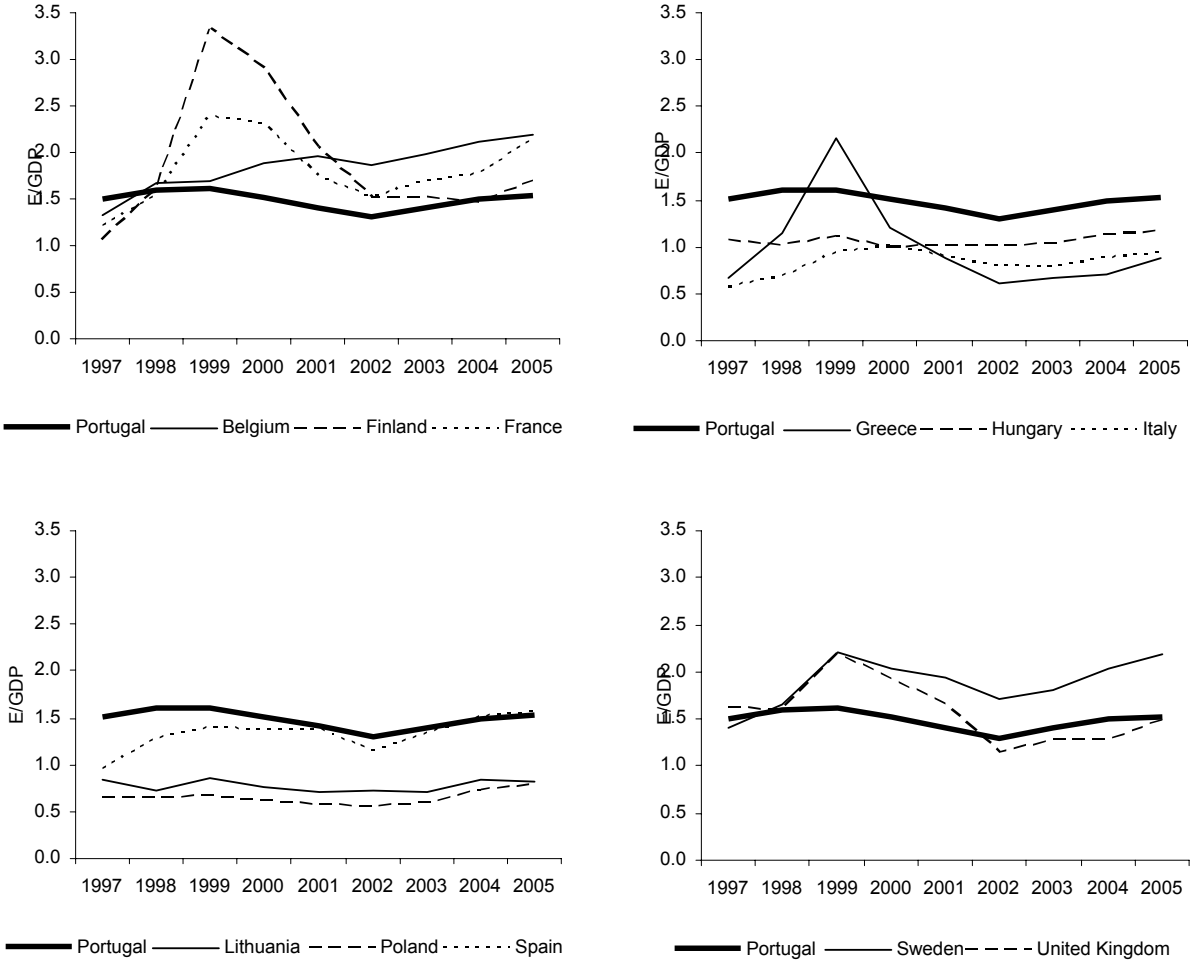


Non-consolidated values.

Source: Eurostat New Cronos.

Figure 15

Equity-to-GDP



Non-consolidated values.

Source: Eurostat New Cronos.

These ratios and others, such as return-on-equity, which is also based on non-financial companies' equity capital, play a role in determining the Financial Soundness Indicators used by the International Monetary Fund.

Measuring the value of micro-enterprises in financial accounts

Lisa Rodano[1] and L Federico Signorini[1]

Introduction and summary[2]

Census data show that in Italy approximately 3.4 million nonfinancial enterprises (out of a total of 4 million) are sole proprietorships or other unincorporated businesses.[3] Virtually all are very small "micro-enterprises". Such enterprises account for just under one half of employees[4] in the nonfinancial sector and therefore contribute significantly to overall economic activity. Likewise, their value is likely to account for a significant share of national wealth. However, the unavailability of direct statistical sources such as balance sheet data makes the measurement of their value a tricky task.

According to international statistical standards, unincorporated businesses belong to either the household sector ("producer households") or the nonfinancial sector ("quasi-corporations"), depending on size and other characteristics. This distinction makes a difference to financial accounts (FA). The financial assets and liabilities of producer-household firms, such as bank accounts or loans received, are recorded in the FA as assets/liabilities of households; on the other hand, the real assets of such firms, such as buildings or machinery, do not enter the financial accounts. The standard is different for quasi-corporations. Since quasi-corporations are treated as separate entities, their total net worth should appear in the FA both in the household sector, as an asset in the form of "shares and other equity", and in the nonfinancial sector, as the counterpart liability in the same financial instrument. However, this component of equity in the FA is usually difficult to estimate and, consequently, it appears to be missing in the published data for many countries – including, so far, Italy.

This paper explains the strategy that the Bank of Italy is developing for estimating the net worth of nonfinancial quasi-corporations in order to fill the gap in the national FA. This strategy is mainly based on survey data from the Bank of Italy Survey on Household Income and Wealth (SHIW), which contains questions on households' equity holdings in all types of businesses. It also makes use of banking statistics and other financial statistics.

Parallel work, based on a similar methodology, is under way concerning the estimation of the value of nonfinancial assets of micro-enterprises that are not quasi-corporations (producer

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[1] Bank of Italy, Economic and Financial Statistics Department.

[2] We are indebted to Luigi Cannari and Ivan Faiella for their useful comments and suggestions. We also wish to thank Gabriele Semeraro and Laura Bartiloro. We remain responsible for any mistakes. The views expressed here are our own and do not necessarily reflect those of the Bank of Italy.

[3] Sole proprietorships are defined in Italian law as "*ditte individuali*". We use the term "unincorporated businesses" to mean "*ditte individuali*" plus all types of business partnerships, as defined by Italian law, in which partners (or some of them) have unlimited liability: *società in nome collettivo, società in accomandita semplice*, *società semplici*, *società di fatto*. Certain types of unincorporated businesses (*società in nome collettivo*, *società in accomandita semplice*) are required to hold a complete set of accounts, whereas others are not. None is required to publish accounts.

[4] In this paper, we use the word "employee" as synonymous with "worker". This usage is somewhat loose, as the employer and his/her family may also count as workers in firms' statistics even if they are not employees. The distinction can make a significant difference among micro-enterprises.

households), with a view to producing a comprehensive account of household wealth. This work does not directly impact the FA and will not be described here.

Using micro data on micro-enterprises for the estimation of macro statistics presents some difficult conceptual and practical problems. We discuss, among other things, issues of definition and the treatment of nonreporting behaviour, as well as the compatibility of estimated totals with independent macroeconomic information.

Background

Italy is a country of small firms. According to census data, the average number of employees of firms engaged in nonfinancial activities was 3.7 in 2001. Approximately 4 million nonfinancial enterprises were actively operating in Italy in the same year, some 90 percent of which had five employees or fewer. Enterprises with up to five employees accounted for nearly 40 percent of total employment in nonfinancial businesses, thus representing a very significant share of economic activity. Figures have been evolving only very slowly over time, with the average number of employees increasing by 0.1 percentage point in four years, with the most recent updates largely confirming this fact. Fully accounting for micro-enterprises in macroeconomic statistics, including financial statistics, is therefore very important. It is also a challenging task.

For financial accounts, it is not too difficult to account for small enterprises, as long as they take the form of corporations. However, a large majority of micro-enterprises are constituted as sole proprietorships or some form of unlimited partnership. Some 3.4 million nonfinancial enterprises are unincorporated; virtually all unincorporated businesses are small. Legally, such entities are not required to publish their balance sheets or even, in many cases, to keep a separate set of accounts in any form. One way or the other, they escape statistical recording, hence their value is unknown and needs to be estimated.

Unincorporated businesses fall into two categories for the purposes of statistical classification. According to international recording standards as set out in ESA95, some of them are called “quasi-corporations” and are included in the nonfinancial sector. Quasi-corporations are defined as organisations not having independent legal status, that keep a full set of accounts, and whose economic and financial behaviour is different from that of their owners. This is a rather general description and it has to be operationalised at the national level. In Italy, the operational definition of nonfinancial quasi-corporations includes all firms with more formal types of unlimited partnerships (*società in nome collettivo, società in accomandita semplice*), regardless of size; it also includes simpler partnerships (*società semplici, società di fatto*) and sole proprietorships (*ditte individuali*), provided they have more than five employees.[5] Enterprises falling within this category are assumed to possess the character of quasi-corporations and are therefore to be recorded in the nonfinancial sector. The rest (ie simple partnerships and sole proprietorships with up to five employees) are to be recorded in the producer households subsector.

This distinction makes a difference to financial accounts (FA) and, more generally, to macroeconomic statistics. In the case of producer-household firms, no separation is assumed to exist between the firm and its owner(s). Consequently, the financial assets and liabilities of such firms, such as bank accounts or loans received, are recorded in the FA as

[5] The five-employee threshold is a national convention. Other countries may use different thresholds and/or criteria.

assets/liabilities of households. On the other hand, the real assets of the same firms, such as buildings or machinery, do not enter the financial accounts.

The standard is different for quasi-corporations. Quasi-corporations are treated as separate entities with respect to their owners. Their total net worth should therefore appear in the FA in the form of "shares and other equity", the financial instrument representing items associated with property rights in corporations and quasi-corporations. In line with double-entry accounting rules, this value has to be recorded twice: as an equity holding (asset) of the household sector, and as the counterpart liability of the nonfinancial sector, ie as the net equity (or own funds) component of the liability side of the micro-enterprise's notional balance sheet. However, the value of the net equity of quasi-corporations is usually difficult to estimate, as its estimation presents some nontrivial conceptual and practical problems. Consequently, it appears to be absent in the published FA for many countries. At the moment, the value of quasi-corporation equity is not recorded in Italian financial accounts.

This paper focuses on quasi-corporations; more specifically, on the estimation of their net worth for the purpose of compiling the FA. A similar methodology to the one we develop here for quasi-corporations can be applied to producer households, in order to estimate the value of the nonfinancial component of the assets of those micro-enterprises that do not qualify as quasi-corporations. As noted above, this component is not included, by definition, in the FA, but it is part of the national private wealth. Parallel work on producer households is therefore under way, with a view to producing a comprehensive account of household wealth. This work will not be described here.

In Italy, according to the national definition, quasi-corporations comprise nearly 850,000 firms, 77 percent of which are "micro-enterprises" with up to five employees. These firms account for one third of total employees in the nonfinancial sector and are mainly engaged in trade and other services. Table 1 presents more data on the significance and distribution of these firms.

Table 1

Quasi-corporations in Italy in 2001

Nonfinancial quasi-corporations	
Number of quasi corporations	849,168
of which:	
– with up to five employees	77.1%
Employees of quasi-corporations	3,465,301
Share of quasi-corporations in total for non-financial corporations and quasi-corporations	
Number of units	58.2%
Number of employees	29.0%
Value of output	22.1%

Source: ISTAT (census data, ASIA archive, national accounts).

Methodology and results

How much are quasi-corporations worth? As we mentioned earlier, balance sheets of unlimited partnerships, as well as those of sole proprietorships, to the extent that they exist at all, are not publicly available. Therefore there is no direct information even on the order of magnitude of their value. In what follows, we examine three independent methods for estimating this value, and suggest an overall strategy that combines two of them.

The first two methods are based on data from the Bank of Italy's Survey on Household Income and Wealth (SHIW),[6] which contains direct questions on the value of households' equity holdings in all types of businesses.

The third method exploits information, available from supervisory statistics, about the financial debt of quasi-corporations towards the banking system, and makes an attempt to assess the value of quasi-corporations in an indirect manner.

All three methods involve consistency checks with available macroeconomic information. Each method has advantages and drawbacks; comparing estimates obtained using different sources and criteria provides the benefit of independent appraisals. It turns out that, for the year 2004, the range of estimates is quite small, which is an encouraging sign that reasonably reliable statistics may be compiled by making use of this information.

Method 1: SHIW-based, net equity per enterprise. In the Bank of Italy Survey on Household Income and Wealth, households are directly asked to give an estimate of the value of any enterprise(s) they own. Since the survey also contains information on the legal type and the number of employees of such enterprises, in principle it is possible to identify the subset *QC* of households whose firms qualify as quasi-corporations, based on the national definition explained above. The total value of quasi-corporations could then be estimated by using the following straightforward formula:

$$Total\ value\ of\ quasi-corporations = \sum_{i \in QC} VAL_i \cdot WGHT_i \ , \qquad (1)$$

where VAL_i is the market value of quasi-corporations owned by household *i*, as declared by the same household, and $WGHT_i$ is the population weight[7] of the household. In other words, once households owning quasi-corporations are identified, the value of their firms is simply expanded to the population total.

However, not all households that declare ownership of a business specify its legal type, therefore it is likely that *QC* is in fact a subset of quasi-corporation owners, and that the estimator (1) has a downward bias. The evidence also points in this direction. The number of quasi-corporations actually reported in the SHIW, once expanded, is 44% lower than the number of active quasi-corporations provided on a macro basis by the National Statistical Institute figures (ASIA archive). It is thus reasonable to assume that the total value of quasi-corporations is underestimated.

Moreover, among those households that do declare the legal type of their firm, there are some that do not report the firm's value, which must be estimated.

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6 Bank of Italy (2006).

7 The population weight is the inverse of the probability of inclusion for a given household in the sample. When it is applied to the whole survey, it reflects the sampling design and reproduces the whole Italian population. See Faiella (2006).

Estimates have therefore to be adjusted for two types of item nonresponse:[8] nonreporting of the legal form, and nonreporting of the value of the business.

There are two ways to adjust the estimates for nonreporting of the legal form: (a) re-weighting the survey data to match the population totals by means of a post-stratification procedure; or (b) imputing omitted responses through hot-deck methods. Both procedures increase the variance of the estimates, but this is unavoidable. In this paper, we use the second procedure.

Hot-deck imputation requires that a subset of eligible "donor" households be identified. "Donors" are households that (a) own a business; (b) did not specify the legal type of their business; but (c) did specify other features of that business (such as type of business, branch of economic activity and number of employees), which are similar to those of quasi-corporations identified for other households. Once a subsample of suitable records is selected, a number of donors are randomly drawn. Random draws are constrained to match the total number and the geographic composition of quasi-corporations resulting from macroeconomic data compiled by the National Institute of Statistics, ISTAT. In this way, a new subset of households is defined, $QC^* = QC \cup$ *randomly drawn "donors"*. Estimates adjusted for nonresponse can be obtained by replacing QC with QC^* in (1).

Concerning the second type of nonresponse, ie declared quasi-corporations with unreported value, we imputed a value given by a weighted average of the value of similar firms in the SHIW, controlled for branch of activity and geographic location.

Table 2 reports the total estimated value of quasi-corporations before and after the adjustments. The estimate is about 108 billion euros before any correction. This rises to 167 billion after the first adjustment and to 187 billion after the second.[9]

Method 2: SHIW-based, net equity per employee. As mentioned above, both hot-deck imputation and post-stratification increase the variance of the estimator (1). An alternative way to estimate the value of quasi-corporations by means of a more efficient estimator involves the so-called "ratio estimation".[10]

As in the previous exercise, the set of households declaring ownership of a quasi-corporation, QC, is selected from the SHIW. Then the average net equity per employee is computed on QC by means of the following formula:

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[8] On nonreporting behaviour in the SHIW, see Cannari and D'Alessio (1993).

[9] As mentioned in the text, the adjustment for item nonresponse necessarily increases the total variance of the estimator. Specifically, the hot-deck procedure adds to the variance of the estimator because of the random draw of "donors". However, it turns out that the additional variability is not large. We performed a Monte Carlo simulation of the variability caused by the hot-deck procedure, by iterating the process of estimation 1,000 times. The outcome is reported below:

[10] Even though slightly biased, ratio estimation can be more accurate than number-raised estimation if the auxiliary variable is correlated with the variable of interest. Basically, the ratio estimator is, in principle, more efficient than the simple estimator (1) because its variance is lowered by the effect of the covariance between the numerator and the denominator. Furthermore, it does not require hot-deck imputation of missing data, as will shortly be explained.

Table 2

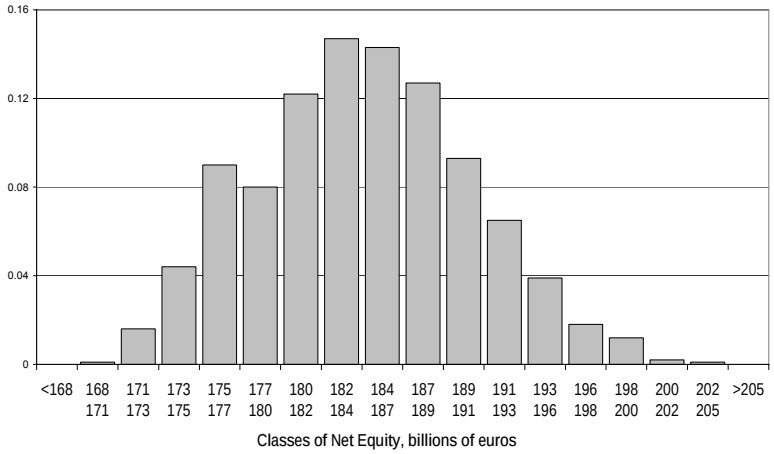
Method 1: estimates

Millions of euros

Total value of quasi-corporations		**2004**
Before any adjustment		107,800
After adjustment for non-reporting of legal type		167,600
After further adjustment for non-reporting of business value		187,800
Memorandum items:		
Geographic distribution of firms	**ISTAT**[1]	**SHIW**
North	58.2%	59.8%
Centre	20.5%	17.4%
South	21.3%	22.8%

[1] Source: ASIA (2004).

Distribution of the outcomes of 1,000 iterations



Source: author's calculations based on Bank of Italy data.

As the chart shows, most estimates are concentrated within a range of 175-195 billion euro, while their distance from the mean is on average 6 billion euro.

$$\overline{\left(\frac{Net\ Equity}{Employees}\right)} = \frac{\frac{\sum_{i \in QC} VAL_i \cdot WGHT_i}{\sum_{i \in QC} WGHT_i}}{\frac{\sum_{i \in QC} EMPL_i \cdot WGHT_i}{\sum_{i \in QC} WGHT_i}} = \frac{\sum_{i \in QC} VAL_i \cdot WGHT_i}{\sum_{i \in QC} EMPL_i \cdot WGHT_i} \quad , \qquad (2)$$

where $EMPL_i$ is the number of employees in quasi-corporation *i*, and other variables are as in (1). Hence the estimated net equity to employees ratio (left-hand side of the formula) is the ratio of two weighted averages: the weighted average value of quasi-corporations in the numerator and the weighted average of the number of employees in the denominator.

In this case, we make no correction for unreported holdings of quasi-corporations. Indeed, unlike under Method 1, such a correction would only be necessary in case of selection bias, ie if unreported quasi-corporations had systematically larger or smaller net equity per employee than reported quasi-corporations. While this cannot be ruled out in principle, there is no obvious reason why this should be the case, nor would there be an indication of the size or even direction of such a bias. On the other hand, computing the ratio on *QC** instead of *QC* would increase the variance of the estimator.

To check whether this procedure gives plausible results, we compute the ratio (2) separately for five size classes, and we compare the results with the same ratio for other types of firms for which the value of the ratio is known. For this purpose, we choose unquoted corporations (which may be assumed to be somewhat closer in their financial structure to quasi-corporations than quoted corporations, so that such a comparison is meaningful). Table 3 reports evidence on net equity per employee.[11]

Table 3

Net equity per employee

Thousands of euros

	Unquoted corporations	**Quasi-corporations**
Firm size (employees)		
1–5	59	59
6–9	43	37
10–30	49	29
31–100	64	31
>100	134	n.a.
Average net equity per employee	94	54

Source: Bank of Italy, SHIW ; CEBI/CERVED for unquoted corporations.

[11] We use Italian Central Balance Sheet Office (Centrale dei Bilanci) data. Balance sheet data do not actually report the number of employees. We estimate their number by means of total compensation per employee.

For all size classes, the ratio is similar in magnitude in unquoted corporations and quasi-corporations, but somewhat smaller in the latter. This seems reasonable; the choice of organising a firm as a corporation rather than as an unlimited partnership, other things equal, is likely to be determined in part by the easier access to capital enjoyed by more structured entities; it is therefore to be expected that corporations should have, on average, a higher capital ratio than simpler partnerships of similar size.

Having established the plausibility of the estimates based on (2), we proceed to estimate the total value of quasi-corporations by multiplying the average value of equity per employee in *QC* by the total number of employees of quasi-corporations given by macroeconomic sources (ie ISTAT's ASIA archive). The results are presented in Table 4.

Table 4

Method 2: estimates

Millions of euros, year 2004

Number of workers in quasi corporations	3,533,670
Net equity per employee[1]	53.7
Net equity of quasi corporations (Method 2)	189,659
Memorandum Item:	
Net equity of quasi corporations (Method 1)	187,800

[1] Thousands of euros.

Source: Bank of Italy, SHIW ; (*) Thousands of euro.

The estimate is very close to that given by Method 1, which is encouraging.

However, one caveat is in order. While the SHIW underestimates the number of quasi-corporations (as explained above under Method 1), it overestimates the number of workers that quasi-corporations employ, compared to the macro-total provided by ISTAT. In other words, those quasi-corporations that households in the SHIW do report in full are, on average, larger than the population mean in terms of number of employees. In principle, this is a further potential source of bias. We leave the investigation of this point to future research.

Method 3. Banking data, equity/bank credit ratio. Methods 1 and 2 both rely on SHIW data. The SHIW is unique in providing direct information on the net worth of quasi-corporations; on the other hand, such information may be biased, as the survey sample is designed to be representative of households, not firms owned by them. Indeed, as shown above, even estimating the number of quasi-corporations or the number of their employees on the basis of the SHIW alone would lead to biased results. In order to provide an independent check of these, it is therefore useful to search for evidence, albeit indirect, that is based on totally different sources.

As banking supervisor, the Bank of Italy regularly collects a rich set of data from credit institutions. This includes information on bank credit broken down by counterparty

(sub)sector. Data on the debt of quasi-corporations towards (Italian-based)[12] banks is thus available.

The idea behind the third approach is to estimate the total value of equity for quasi-corporations from total bank credit, by assuming that the average ratio between the two (which we term, somewhat loosely, the "banking leverage ratio") is the same for quasi-corporations as for some set of corporations that can be assumed to be reasonably similar to them, and for which data are available. Again, we choose unquoted corporations. Given that the average number of employees of quasi-corporations is four, we compute the banking leverage ratio for unquoted corporations with one to five employees, based on balance sheet data.[13] Then we compute:

$$Total\ value\ of\ quasi-corporations = \frac{Banking\ debt\ of\ quasi-corporations}{Banking\ leverage}, \qquad (3)$$

where *Banking leverage* is computed on small unquoted corporations, as just explained.[14] As Table 5 shows, the point estimate (179 billion euros) is again very close to estimates from Methods 1 and 2.

Table 5

Method 3: estimates

Millions of euros, year 2004

Banking debt of quasi corporations	81,419
"Banking leverage ratio"	45.5%
Net equity of quasi corporations (Method 3)	178,972
Memorandum Items:	
Net equity of quasi corporations (Method 1)	187,800
Net equity of quasi corporations (Method 2)	189,659

Source: Bank of Italy, SHIW.

Discussion and conclusions

The main advantage of Methods 1 and 2 is that they rely on the only direct piece of information on the net worth of quasi-corporations that is available, namely the SHIW. Moreover, if the macro estimate of net worth is based on survey micro data, then it is possible to perform microeconomic analysis in a way that is consistent with macro

[12] Given the nature of nonfinancial quasi-corporations, it is unlikely that adding transactions with non-Italian banks would make any difference.

[13] Italian Central Balance Sheet Office (Centrale dei Bilanci).

[14] In fact, we do not use the overall average leverage ratio of small corporations. We compute a weighted average of the banking leverage ratios of small-scale (five employees) corporations belonging to those branches of economic activity where quasi-corporations are typically specialised. However, further refinement of this procedure is under way.

aggregates. It is also possible, in principle, to derive estimates at various levels of disaggregation in a consistent way, though there is a limit inasmuch as the sample size of the SHIW is too small to give reliable estimates for small subsets of corporations (eg by region, industry or size class).

The main weakness of Method 1 is that its results are suspect, as the SHIW underestimates the universe of quasi-corporations. Any correction for this (eg post-stratification or hot-deck imputation) increases the total variance of the estimator.

Method 2 is, in principle, more efficient than Method 1, and it is also more transparent and easier to compute, as it does not require any special manipulation of the data. On the other hand, it also suffers from the limitations of the SHIW as a sample of quasi-corporations. A point that is especially relevant to Method 2 is that the SHIW overestimates the number of workers that quasi-corporations employ. Therefore the estimated net equity to employees ratio may well be biased, although even the direction of any bias is unclear.

A common problem with SHIW-based methods is that the SHIW is available only every two years. Therefore any estimates must be interpolated and updated in some way to serve as input to the financial accounts, which are compiled quarterly.

Method 3 is as simple to compute as Method 2, and it provides a useful independent check on the other two methods. It is also available at high frequency (monthly). However, it relies on the strong assumption that the banking leverage ratio of quasi-corporations is equal to that of corporations with up to five employees. This assumption may not be unreasonable, but there is no direct evidence to corroborate it. Furthermore, while the indirect evidence provided by the comparison with SHIW-based estimates is surely welcome, it is worth noting that estimates based on Method 3 are rather sensitive to the exact definition of the reference set. For example, changing the reference set to unquoted corporations with up to 10 employees (instead of five) would increase the banking leverage ratio by 8 percentage points, from 45.5 to 53.5, and would therefore shrink the estimate of the total net equity of quasi-corporations by 15 percent (about 27 million euros).

All in all, it seems reasonable to use a SHIW-based method as a benchmark. Given that the estimator of Method 1 has, in principle, a higher variance, Method 2 seems preferable. Method 3 can be employed as an auxiliary method for interpolation and extrapolation and, in addition, as a way to cross-check the results.

It is encouraging that, when applied to 2004 data, all methods give very similar results, all in the rather narrow range of 178–190 billion euros. While further robustness checks are warranted,[15] we feel confident that this is a good starting point for developing a method for regular estimation of the total value of nonfinancial quasi-corporations.

Revising financial accounts to insert this estimate would result in significant changes in some important financial aggregates. The total amount of the “shares and other equity” instrument would increase by approximately 25 percent; the value of households’ financial assets would be revised upwards by about 5–6 percent, and that of the nonfinancial sector’s liabilities by 7–8 percent.

[15] By end-2007, data from a new wave of SHIW (2006) will become available.

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