# Do Privatizations Boost Household Shareholding?
# Evidence from Italy

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**Summary**

It is believed that privatizations substantially contributed to boost stock markets through the 1980s and 1990s. However, trough which channels did that materialize? We test whether privatizations –improving households' acquaintance with the risk and return characteristics of stocks through the massive accompanying advertising campaigns– boosted demand for stocks by enlarging the set of households willing to invest in shares. We use a unique micro-data set collected for a large sample of Italian households on Public Offerings (PO) during 1995-99, the climax of privatizations in Italy. We show that advertising increased the notoriety of the incoming PO at households, and through this furthered households' propensity to subscribe that PO. Furthermore, the propensity to subscribe the incoming PO also increased as households became better informed about past privatizations. Thus, privatizations expanded households' share participation in Italy.

**Keywords:** Household portfolio choice, Information, Privatizations

**JEL Classification:** D140, D820, E440, G110

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## INTRODUCTION

Countries endowed with better developed capital markets may be advantaged, particularly during phases of intense technological change, as they enjoy a quick reallocation of resources to innovative sectors (Allen and Gale, 2000). In this respect, Italy made a big leap forward in the 1990s: the ratio of stock market capitalization to GDP went from 10 percent in 1990 to 70 percent in 2000 (Figure 1). This noticeable growth of the Italian stock exchange materialized along with a prolonged phase of raising share prices but also along with the completion of a massive privatization program: the share of the state owned enterprises on the country's total value added was close to one fifth in 1990 and almost zero by 2000. Indeed, in the 1990s, Italy ranked first among the main developed counties in terms of both the volume of privatizations as well as the recourse to Public Offerings (POs) on the stock market to accomplish them (Table 1).

This paper tries to evaluate the extent to which privatizations contributed to breed the stock market. We identify two complementary channels through which such contribution possibly ensued. First, a mechanical boost impact resulted as new companies became listed and/or the share of state ownership in already listed companies decreased: this provided an increase in the supply of traded shares, possibly increasing risk sharing opportunities for investors (Pagano 1993). Second, privatizations may have had a much farther reaching boost impact on the stock market by disseminating information on the risk and return characteristics of stocks at households and, thus, making them more lenient to invest in shares: this effect may have increased the demand for shares. Our empirical analysis focuses on the latter of these two effects.

We test the occurrence of this effect on a unique micro-data set that collects potential investor surveys on the main Public Offerings (POs) during 1995-99, the period when privatizations took momentum in Italy. We use two different methods: a cross-section and a panel analysis. For each PO, at least two surveys were conducted: before and after the advertising campaign to promote such PO (sometimes there were also one or two intermediate surveys while the campaign was ongoing). While descriptive statistics show that advertising campaigns were indeed effective at making households better informed on the incoming PO, the cross-section analysis finds that the propensity to subscribe that PO increased as its notoriety at households rose. Furthermore, the panel analysis confirms that the propensity to subscribe the incoming PO increases as savers become better informed about past privatizations. Thus, our evidence suggests that privatizations played an important role in expanding Italian households' share participation, which in fact went from 7.9 to 12.7 percent between 1995 and 2000.[1]

The rest of the paper is organized as follows. Part 1 lays out the background on Italy's privatization process and describes the progress of privatization during the 1990s. Part 2 focuses on our hypothesis to be tested: namely, whether, by spawning public information on stocks, privatizations made Italian households more inclined to invest in shares. Thus, section 2.1 contains a brief review of the relevant literature. Section 2.2 describes the database used in our empirical analysis. Descriptive statistics on the relationship between privatizations and savers' intention to subscribe POs are presented in Section 2.3, where the hypotheses to be tested are also detailed. The main results of the econometric analyses (both the cross-section

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[1] Source: Survey of Household, Income, and Wealth (SHIW). The survey regards Italian households and is run every two years by the Banca d'Italia.

and panel analyses) are reported and discussed in Section 2.4.  Some conclusions and policy implications are drawn at the end of the paper.

## 1. A SNAPSHOT ON THE INITIAL FRAMEWORK AND ITS EVOLUTION

An in-depth analysis on the economic and political determinants of the privatization process in Italy is beyond the scope of this paper.[2]  However, some background is in order to help sketch the initial framework in which the Italian privatization program made its first steps: (i) a soaring level of budget deficit and public debt with high government bond spreads; (ii) a mounting drag exerted by State Owned Enterprises (SOEs) on the public budget; (iii) the pressure stemming from the external anchor of the European Monetary Union (EMU), which required Italy not only to meet quantitative fiscal and monetary targets (thus setting a discontinuity that affected the cost-benefit analysis of policy options) but also to shift from a mixed economy to a fully market-based system calling for a much lighter role for Government; (iv) an underdeveloped and illiquid domestic capital market; (v) an obsolete legal and institutional framework that was unsuitable to modern and open financial and currency markets; (v) a currency breakdown (1992-1993), as well as a political and institutional crisis, partly reflecting the delay in the adjustment effort required by the EMU convergence process.  The 1992 political and institutional crisis was the key turning point that forced policymakers to face up to unresolved structural issues, while allowing them for an unprecedented room of maneuver.

However, the first official statement on privatization objectives and priorities was made prior to the crisis and it is included in the "Report to the Minister of Treasury" that was set up by the so-called Minister Carli's Committee in 1990.  The report identified five objectives of the privatization program: (i) fiscal adjustment; (ii) the development of domestic financial markets; (iii) their openness to international capital flows; (iv) improvement in corporate efficiency; (v) the strengthening of competition and its introduction in previously uncompetitive sectors.

Being Italian policymakers well aware of the importance of financial markets in public asset disposals, two out of the five policy objectives revolved around capital markets; capital market development was both a condition for the achievement of the other objectives (corporate efficiency and revenue maximization) and a goal in itself.[3]

Clearer indications on prioritization among potentially conflicting objectives as well as on the optimization of underling tradeoffs were provided by the "Green Book" and by the "SOEs' Restructuring Program", which were both submitted by the Treasury to the Parliament in November 1991.  Both documents reaffirmed the objectives identified by the "Report to the Minister of Treasury", while downgrading public deficit reduction to a lower rank.

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[2] For an empirical analysis on economic and institutional determinants in privatization programs see, e.g., Bortolotti, Fantini, and Siniscalco (2001).  A complete overview on empirical studies on privatization is provided by Megginson, and Netter (2001), whilst Bortolotti, and Siniscalco (2003) tackle on the economics of privatizations.  A comprehensive review of the privatization operations undertaken by the Italian Government from 1996 to 2001 is provided in Ministry of the Treasury of Italy (2001).  Finally, Goldstein (2003) presents an assessment of the privatization process in Italy.

[3] Levine, and Zervos (1998) point to market liquidity as one of the most robust predictor of long term economic growth.

## 1.1 The Scope and Size of Italy's Privatization Program

At the beginning of the last decade the pervasiveness of government involvement in the economy was still far above the OECD average: State Owned Enterprises (SOEs) accounted for 19% of the value added, 25% of fixed gross investments and 16% of non-agricultural employment.[4] SOEs operated in various sectors, including infrastructures, iron and steel industry, metallurgy, oil integrated systems, financial sector. Since then the bulk of state assets in those sectors has been sold. As to privatization proceeds in the last decade Italy ranks well above the OECD average and it was first among EU countries.

Italy also tops all the other EU countries as to the share (roughly 87%) of state-owned assets disposed through public offerings; a preliminary, though raw, evidence that supports the view that Italian policymakers perceived capital market development as a long-medium term objective, to be pursued also by means of complementary reforms (corporate governance), rather than a constraint to be eluded through different sale methods.[5]

**Table 1 - Proceeds From Privatizations in UE Countries (1990-2001, in billions of dollars)[6]**

| Country | Proceeds from privatizations | GDP % | Public offerings/Total % | Trade sales/Total % |
|---------|------------------------------|-------|--------------------------|---------------------|
| Italy   | 111.30 | 0.82 | 87.30 | 12.70 |
| Spain   | 38.40  | 0.58 | 59.64 | 40.36 |
| Germany | 25.06  | 0.10 | 58.03 | 41.97 |
| France  | 75.92  | 0.47 | 84.63 | 15.37 |
| UK      | 42.81  | 0.30 | 51.26 | 48.74 |

*Sources: OECD and Datastream.*

## 1.2 Italy's equity market development and the privatization process

In the period 1992-2001 Italy's stock market capitalization rose by over five times (518.4%), with most of the gain being ripped during 1997-1999 three year lap. This positive momentum of the domestic equity market – alongside the favorable trend of international stock prices – was fed by several internal factors. Among the latter, a major role was played by the decline in yields on government bonds and the stabilization of the Italian currency – prompted by the

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[4] Source: Ceep, mentioned by Goldstein, and Nicoletti (1996).
[5] Bortolotti, Fantini, Siniscalco, and Vitalini (1999) found a negative coefficient, statistically significant at the 10 percent level, between the ratio of PO to total sales in privatization programs and the occurrence of French-type civil law regimes, under which shareholders enjoy more limited legal protection.
[6] Figures refer only to transactions carried out by the central government and by (entirely) state-owned enterprises. Figures on Public Offerings/Total and Trade Sale/Total ratios refer to the period 1992-2000 and have been elaborated on the basis of IFR - Thomson Financial International data.

achieved Italian compliance with Maastricht requirements – and the liberalization of the financial sector.

**Figure 1- Increase in Italy's Stock Market Capitalization (1979-2002)**
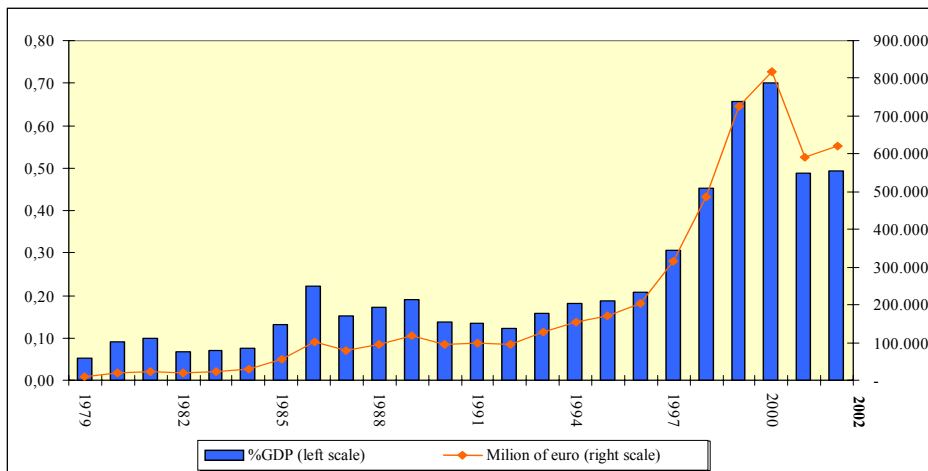


*Source: Italian Stock Exchange*

During the same period the liquidity indicators of the domestic equity market showed an even more pronounced improvement: trading volumes grew by over 35 times, while the turnover ratio[7] increased from 18.33 percent in 1992 to 80.40 percent in 2001.

**Figure 2 – Trading Volumes and Turnover Ratios in Italy's Stock Exchange (1980-2002)**
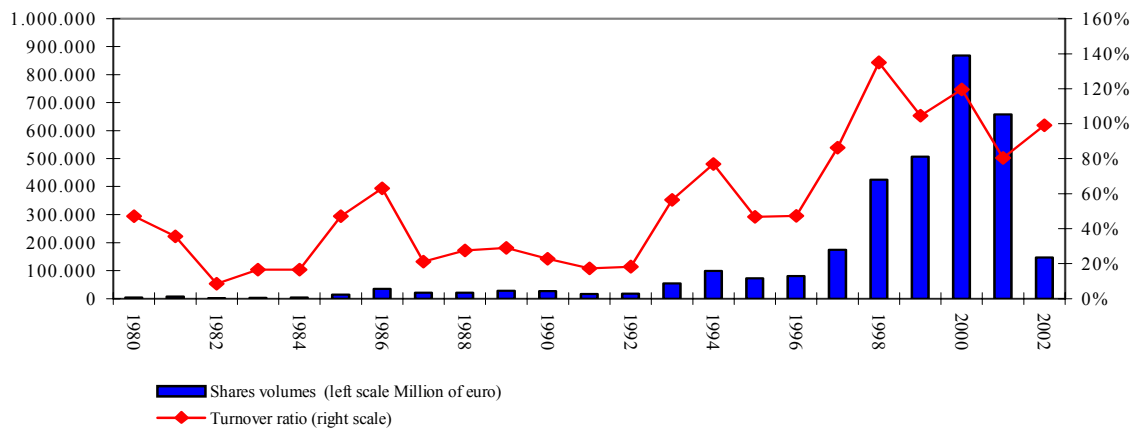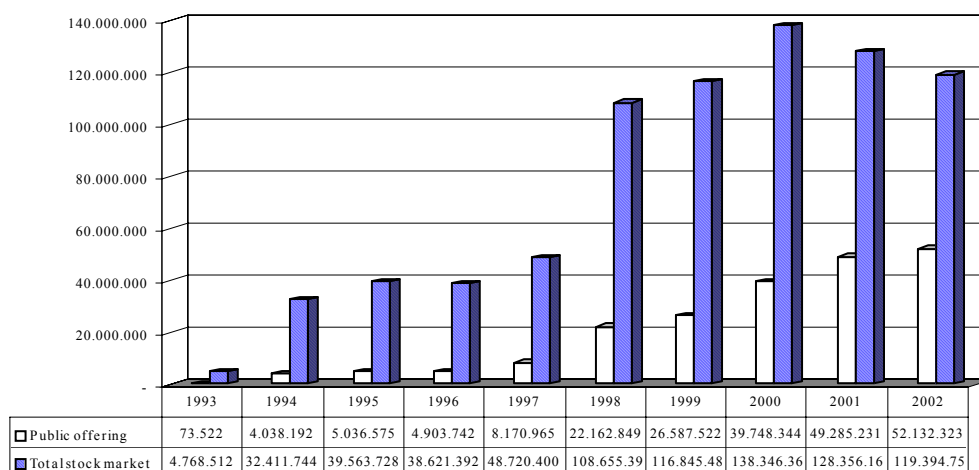


*Sources: Datastream and Italian Stock Exchange*
*As to end march 2002; figures for 2002 turnover ratio are forecast.*

It is perhaps arbitrary to infer a causality link from privatization to equity market development. However, evidence appears to support the view that the state asset disposal program provided an important mechanic contribution. In 2001 the number of fully and

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[7] The turnover ratio is equal to the total value of shares traded over a particular year divided by prior year-end total market capitalization.

partially privatized companies' traded shares[8] accounted for roughly 48 percent of the total trading volume in the Italian stock exchange. Concerning the rise in market capitalization, at end March 2002 about 42 percent of Italian equity market capitalization was accounted for by partially or fully privatized companies.[9]

**Figure 3. – Number of Traded Shares in the Italian Stock Exchange (1993-2002)**



| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| □ Public offering | 73.522 | 4.038.192 | 5.036.575 | 4.903.742 | 8.170.965 | 22.162.849 | 26.587.522 | 39.748.344 | 49.285.231 | 52.132.323 |
| ▨ Total stock market | 4.768.512 | 32.411.744 | 39.563.728 | 38.621.392 | 48.720.400 | 108.655.39 | 116.845.48 | 138.346.36 | 128.356.16 | 119.394.75 |

*Source: Datastream and Italian stock exchange*

## 1.3 Impact on Portfolios.

The outlined stock market performance is matched by an equally impressive evidence when looking at the impact on transactions undertaken by savers. Public offerings involved almost 20 millions investors,[10] including about 467,000 employees of the privatized firms. This was largely due to the decision to resort to public offerings. Although share ownership structures in partially and fully privatized companies showed a trend towards concentration,[11] at end May 2001 stockholders of privatized firms were over 8.2 millions, not so far from the figure of 10 million shareholders crated by British privatizations.

Meanwhile, the composition of household saving and enterprise liabilities has deeply changed during the 1990s. At the beginning of the program (1991), household investments in stocks and mutual investment funds (generally featuring some equity investment) accounted for, respectively, 18 and a mere 2.3 percent of their total assets. At end 2000 stocks and mutual funds accounted for, respectively, 23.7 and 15.1 percent of household assets.

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[8] Telecom Italia, San Paolo Imi, Seat-Pagine Gialle, Finmeccanica, Eni, Enel, Unicredito Italiano, Bca. Naz. Lavoro, Banca Di Roma, Alitalia, Autostrade, Intesa Bci , Banca Monte dei Paschi di Siena.

[9] Telecom Italia, San Paolo Imi, Seat-Pagine Gialle, Finmeccanica, Eni, Enel, Unicredito Italiano, BNL, Banca di Roma, Alitalia , Autostrade, Intesa Bci

[10] R&S Mediobanca (2000), pp. 61-62. The figure includes the applicants for all the public offerings in the period. Since a certain number of investors may have subscribed to more than one offering the number may entail some overlap.

[11] This is consistent with the findings of Megginson, and Boutchkova (2000); on a sample of large transactions with more than 100,000 initial stockholders, they found that the number of shareholders declined on average by 33 percent in the five years subsequent to the issue.

[14] Source of data on assets and liabilities of households and enterprises: Banca d'Italia (various years).

The composition of enterprise liabilities experienced similar patterns. The shift towards equity funding began in the 1980s and strengthened in the 1990s; the share of bank loans declined from 34 percent in 1991 to 22.0 in 2001, while that of equity increased from 48 to 54.5 percent in the same period.[14]


## 1.3 Promotion of the Equity Culture

The international comparison as to the share of state-owned assets disposed through state offering, on a revenue basis, supports the conjecture that policymakers assigned a high rank to the goal of capital market development.

A frequently used proxy for the "political" nature[15] of the pricing in state asset disposals is the extent of underpricing.[16] As to the Italian program, the weighted average of underpricing for the 8 operations that were tracked by the database *Abacus* was around 9 percent. The number is much lower than the mean level (34.1 percent) that Jones, et al. (1999) found on a sample of privatization issues undertaken by 59 governments (including developing countries). Though the significance of the comparison is sensitive to the institutional framework as well as to the computation method, this comparison supports the view that the cost for the Italian government to make capital markets substantially more liquid and deeper was relatively low.


## 2. DO PRIVATIZATIONS SPREAD INFORMATION BOOSTING HOUSEHOLD SHAREHOLDING?

## 2.1 Review of the Relevant Literature

The previous section charted the main features of the privatization process in Italy during the 1990s. We provided an assessment of its quantitative impact in several directions: proceeds raised by the Italian state, increase of the stock market capitalization and amount of small savers becoming shareholders of privatized companies. We also reported our understanding of the general setting in which the privatization can be framed. The combined strategy to improve on the equity culture and to sell mostly through public offerings rather than traded sales is the one key feature of the privatization process.[18] We ended up reporting large changes in Italy's financial accounts. In particular, households' portfolio recorded a relevant increase in the proportion of equity holdings (either held directly or via mutual funds).

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[15] Broadly speaking, the term here stands for whatever political and economic goal other than revenue maximization. Besides, underpricing can strategically signal the government commitment towards a long term privatization process, thus strengthening its credibility (Bortolotti, Fantini, Siniscalco, Vitalini, 1999).

[16] That is, the percentage difference between the issue price and the stock price at the end of the first day's trading; it is a measure of one-day return an investor who purchased shares at the offering price could earn by reselling those shares at the end of the first day's trading.

[18] Alongside, it should be recognized the effort undertaken by Italian authorities to improve on the institutional framework through the privatization of the stock-market itself and the improvement of corporate governance.

Here we attempt to explain the relevant increase in the participation rate by households (i.e., in the percentage of households that own private stocks), with a demand side effect induced – also – by the privatization process itself. In line with other authors (Sudrahmanyam, and Titman, 1999; Bortolotti, at al., 2002), we expect that the increased amount of information available to the "average" small saver led to a reduction of participation (i.e. entrance) costs to the stock market.

This explanation complements the approach usually taken in the literature that studies households' stock market participation decisions. We start by reviewing the main contributions in this field covering both theoretical aspects and empirical findings; furthermore, special attention is devoted to the information available for Italy.

Determinants of the participation rate are usually founded on portfolio decision theory. Additionally, they recognize the need to take into account social and demographical aspects and the possible existence of entry barriers, possibly enhanced by institutional factors.

The relationship between age and financial investment is quite controversial. King and Leape (1987) point out that the process of learning and of increasing sophistication of the financial investor should be related to the life cycle; therefore portfolio diversification should increase with age. Paxons (1990) reaches similar conclusions claiming that the young are more subject to liquidity constraints than adults and, for this reason, they would tend not to invest in risky assets. The view of Bodie, Merton and Samuelson (1998) is different. They argue that the young are more flexible (i.e. employable) in the labor market, allowing them to compensate more easily for possible setbacks; as a consequence, the young should be more prone to take risk. Furthermore, the shortening of the available horizon related to ageing deprives individuals of opportunities to diversify shocks through time (Gollier, and Zeckhauser, 1997).

The impact of income uncertainty on portfolio decision is less intensely debated. In general, it is accepted that if an household faces an income risk that cannot be insured, it will downsize its exposition to risks that it can control (Gollier, 2001). A self-employed worker will face a relatively high amount of labor income risk, as a consequence it is expected that ceteris paribus he will prefer a low level of risk for his financial investment.

Guiso, Jappelli and Terlizzese (1996), giving rise to a body of empirical literature devoted to Italy, address exactly this issue. They relate exposure to risk of a representative sample of Italian households (contained in the household survey SHIW) to their perception of future income risk. In a subsequent paper, Guiso and Japelli (2000) show that participation decision to financial markets obey different rules from those related to the – logically subsequent – decision on the share of savings to be put on that form of investment. The decision to undertake a risky investment is related to wealth and education, whilst the relationship with age is parabolic. The relevance of wealth can be explained with regressive entry costs. The authors find also that background risks can influence the participation decision, as a proxy for this sort of risk they use the unemployment rate of the province where the household is located. This result is largely consistent with the theories of substitution of multiple risks. Finally, Jappelli, Jiulliard and Pagano (2001) add a slightly different perspective studying how social and demographic features affect participation to new, for the Italian market, financial products, e.g.. investment funds.

An additional relevant input for our paper is represented by a body of research that looks at the interaction between privatization and financial market developments. In their reviews Chiesa and Nicodano (2003) concentrate on the determinants of market liquidity. They

indicate public available information and riskiness of the market portfolio as two key drivers. The latter factor, in particular, was modeled in Pagano (1993), where the underlying idea is that a boost of PO's due to the privatization can largely increase the diversification opportunities of market participants and lead to an higher level of investment – and therefore of liquidity – in the market. Bortolotti et alt (2002) in their empirical contribution find a relevant impact of privatization on market liquidity. Indeed, higher market liquidity can arise due to higher investment of agents already operating in the market or to an increased participation. Here we use the same kind of arguments to look directly at the impact of the mentioned factors on household portfolio decisions.

## 2.2 Information Available on Italian Households and Our Database

The goal of the econometric analysis in the next sections is to empirically test our conjecture on the impact of privatizations on Italian households' financial choice. For this sake, the widely used SHIW surveys are not suitable,[19] and we rely on a different database. Namely, we use data from surveys administered from 1995 to 1999. The launch of every large PO was preceded by a number of surveys run at several stages. The first survey was dispensed immediately before the start of the PO advertising campaign, the last one was carried out at the end of the campaign, when the PO was about to be launched. Table 2 shows the main features of our database, i.e.: the list of surveyed POs, the specific number of survey stages – from a minimum of two to a maximum of four – for each PO, the total number of interviewed households in each stage.

**Table 2 – ABACUS Surveys by Stage**

|  | ENI 1 | ENI 2 | ENI 3 | TELECOM | ENI 4 | BNL | ENEL | AUTOSTRADE |
|---|---|---|---|---|---|---|---|---|
|  | *November 1995* | *October 1996* | *June 1997* | *October 1997* | *May 1998* | *November 1998* | *October 1999* | *November 1999* |
| **Total** | **3,048** | **4,515** | **3,015** | **6,010** | **3,005** | **6,004** | **6,007** | **4,508** |
| Stage 1 | 1,004 | 1,504 | 1,511 | 1,504 | 1,501 | 1,500 | 1,501 | 1,500 |
| Stage 2 | 1,005 | 1,506 | 1,504 | 1,502 | 1,504 | 1,504 | 1,500 | 1,504 |
| Stage 3 | 1,039 | 1,505 | - | 1,504 | - | 1,500 | 1,500 | 1,504 |
| Stage 4 | - | - | - | 1,500 | - | 1,500 | 1,506 | - |

Surveys aimed to monitor the attitude of households toward each PO and the privatization process in general. In addition to social and demographic data and to the portfolio of the interviewed, survey questionnaires provided information of great importance to our end, covering: notoriety of the company, willingness to subscribe, attitude towards the company to

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[19] Interviewed individuals report only whether their portfolio includes shares of privatized companies. Information concerning either subscription intentions or actual purchase of separate POs is not included.

be privatized and, as general information, view on the financial market situation and on the profitability of equity investment. The appendix reports more details.

The aim of the initial stage of our analysis is twofold: we report some evidence on how social and demographic factors interacted with the evolution of participation rate from 1995 to 1999; at the same time we benchmark these findings against what was evicted from the SHIW survey and from an ad-hoc survey (Centro Einaudi) in the above mentioned papers.

The relationship between age and participation is represented in Figure 4; reporting both the evidence from our dataset and that from the SHIW survey (as presented by Guiso, and Jappelli, 2000). The *x* axis represents different classes of age (five year intervals), the *y* axis features the participation rate, i.e. the percentage amount of households having stocks in their portfolio. Each observation for each class has one observation for each year; average values for each class are joined by a line. This gives, in both cases, a hump-shaped relationship. However, in our case the participation rate of the elderly class is much higher. This divergence can be explained observing that the Guiso and Japelli information dates back to the period 1989-1995, when the privatization process had not yet taken speed. The data, therefore, suggest that elderly classes were more intensely involved in the subscription of POs in the 1995-99 period.

**Figure 4 – Participation By Age**
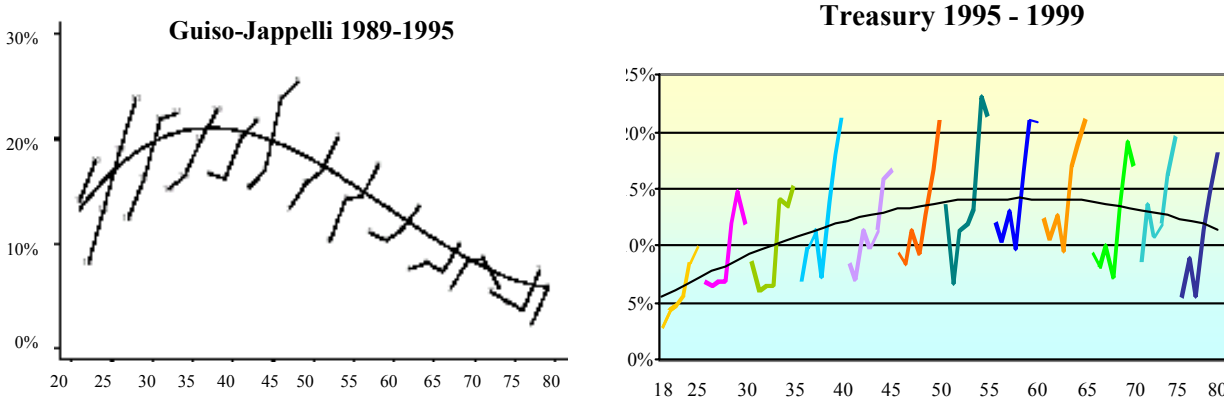


Consistently with theory predictions and with SHIW survey evidence, we also find a positive link between participation and education. The analysis is less straightforward for professions as two dimensions are potentially involved: (i) a wealth effect (related to the different income level); (ii) the previously mentioned risk effect. Although a few professions seem to be more risky, namely managers and directors, for them the wealth effect is certainly prevailing.

The high participation rate of the retired – that is consistent with the age related evidence –, may be interpreted in at least two ways: (a) multiple risk theory suggests that income risk becomes very low for pension-holders; (b) in Italy severance payments are quite high, thus the one-off wealth endowment could be used in some proportion to enter financial markets.

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**Figure 5 – Participation By Profession**
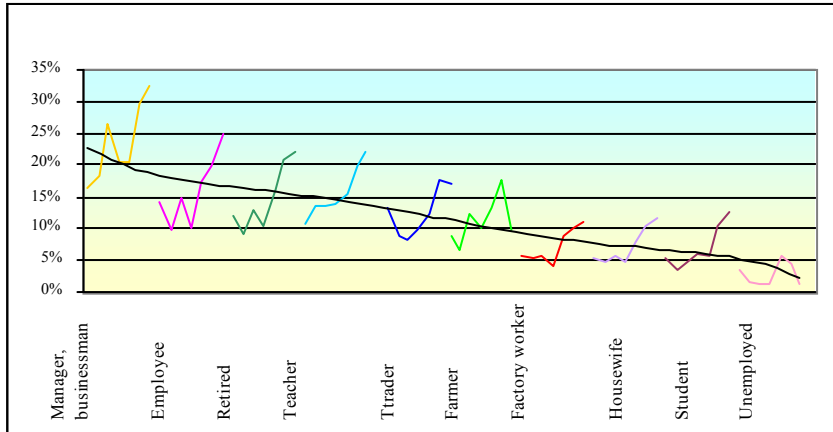


**2.3 Households' Intention to Subscribe POs: Descriptive Evidence and Hypotheses to Be Tested**

The surveys enable us to evaluate the impact of additional variables on the decision to subscribe public offerings. We focus on two issues: (i) whether and to what extent advertising campaigns boosted the decision to purchase POs; (ii) whether and to what extent the privatization process on the whole contributed to attract new savers to financial markets. We start reporting the evidence that surveys gathered, econometric analysis follows.

On the first issue, we find that advertising campaigns were always effective at increasing the notoriety of the company. Figure 6 reports for each privatization: a) the notoriety of the PO in the first-stage survey, i.e. before the promotional campaign, and b) the increase in notoriety achieved by the final stage. The rise in notoriety was relevant (sometimes almost 20 percent).

**Figure 6 – Notoriety of POs Before the
Advertising Campaign and Increase After the Campaign**
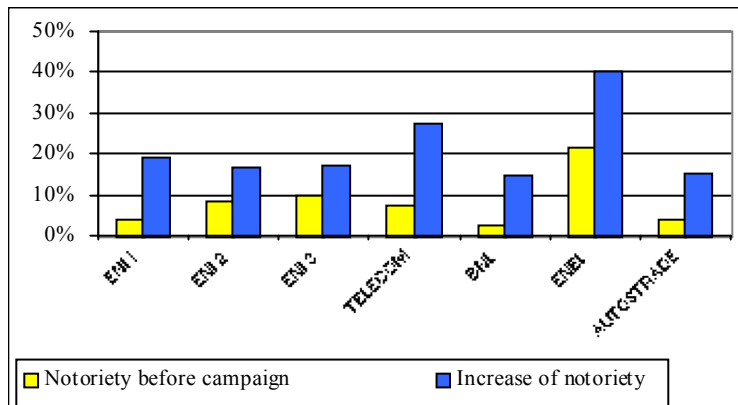


As an indirect impact of the increase in notoriety, we expect a rise in the share of households answering that they intend to purchase; however, this is not always true at face value: in three cases (ENI-1, Telecom, BNL) the share actually decreases during the campaign.

**Figure 7 - Propensity To Purchase POs**
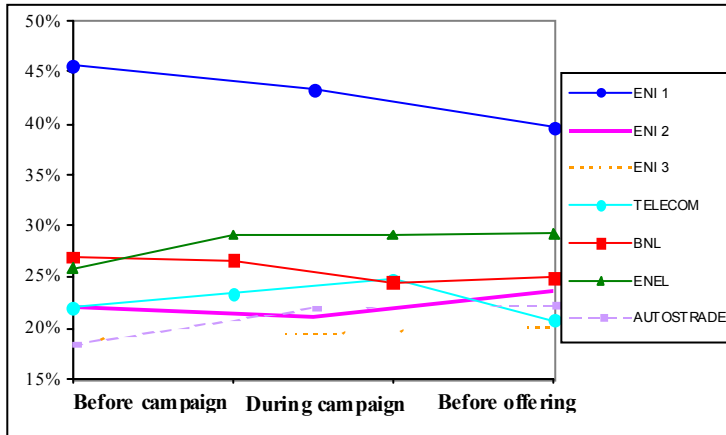


Nevertheless, there might be additional factors that change individuals' perception during the campaign, e.g., the stock market behavior: short term (in this case one or two months) changes of direction could influence the intentions to purchase stocks.

Figure 8 shows the Italian index MIB between September 1995 and November 1999, the period enclosing the privatizations we are studying. The time frame of each PO, from the initial survey to the final one, is clearly marked.

**Figure 8 – Stock Market Behavior During the Privatization Process**
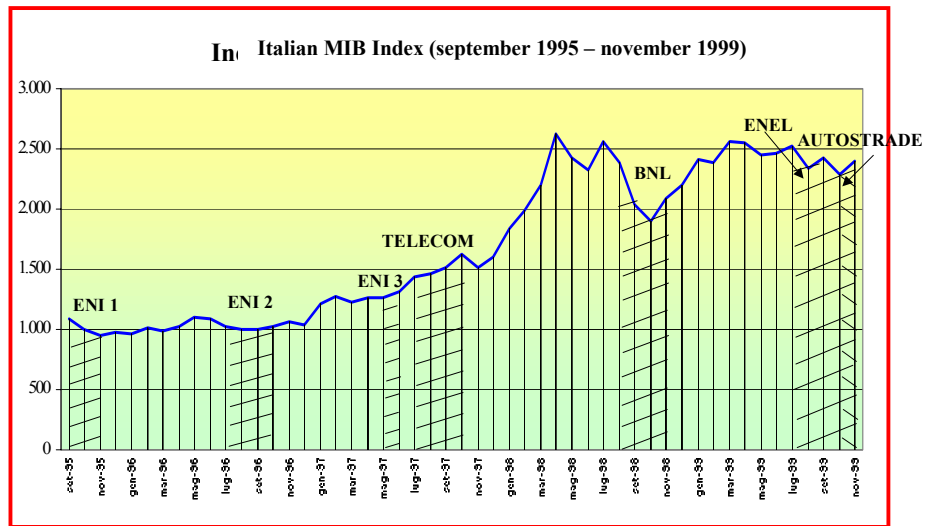


Our surveys contain two questions regarding the perception of the interviewed with respect to the past and future behavior of the stock market. The answers are aggregated and displayed in Figure 9. Inspection of Figures 8 and 9 reveals that changes in the perception of the stock market behavior are quite close to the changes of the stock market index.

We suggest that what matters is the perception of the stock market behavior by our representative households. We find indeed that in the case of ENI-1 and Telecom, there is a worsening in expectations. We shall pursue this issue in the econometric analysis to follow.

**Figure 9 – Perception of the Stock Market Behavior in the Past and for the Future**
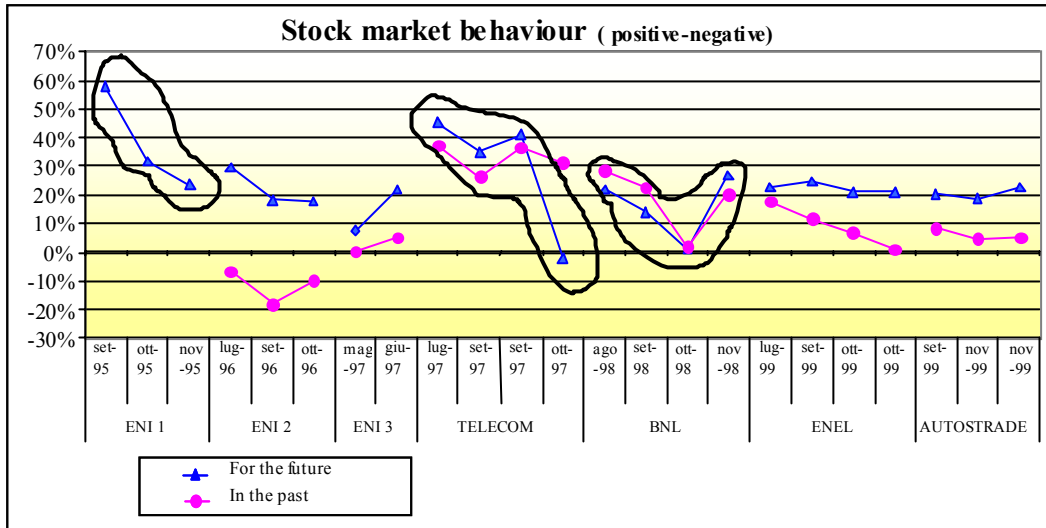


Marketing efforts and stock market fluctuations can considerably influence individuals' decisions. However, if we analyze a markedly different time frame, i.e. the whole period for which we have data, the same conclusion would hardly hold. More structural and deeply rooted factors are needed to explain why a significant share of Italian savers opted to subscribe POs generating a relevant increase of the participation rate. Figure 10 presents some evidence in this respect. It shows the percentage of households that, at the time of the survey, had no shares and were willing to subscribe the new PO. The progression in the increase of the participation rate suggests that, not only initial shareholders remain in the market, but that new entrants keep arriving thanks to the privatization process.

**Figure 10 – Participation and privatisation**
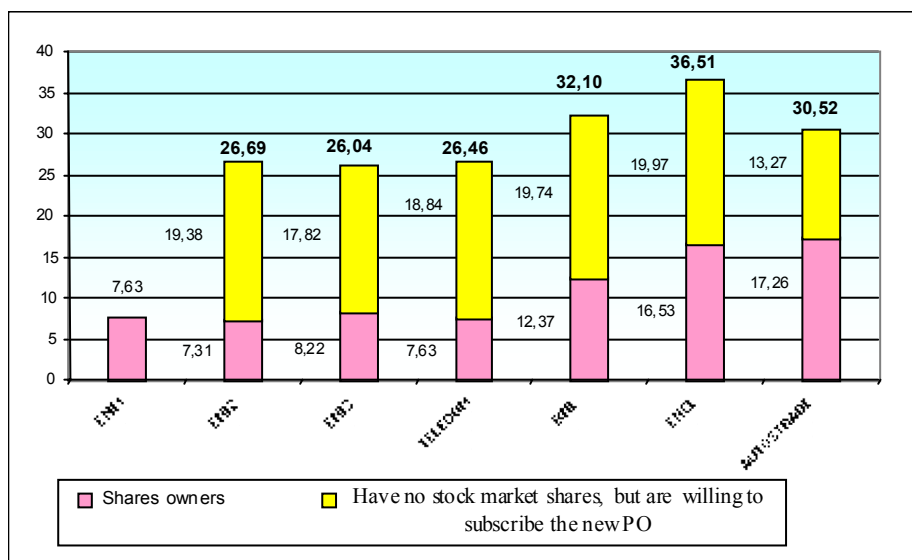
Valuable information can be extracted from a group of questions that give a picture of households' attitude toward financial markets. Interviewed people were asked to rank their degree of assent with five statements: "stock investment is a bet", "I frequently considered the idea to invest in stocks", "I do not know how to invest in stocks", "stock market investment is more profitable than holding government securities", and "stock market investment is rewarding only for well-off people". The degree of assent could be: I agree completely, I agree, I do not know, I do not agree and I do not agree at all. We built a quantitative index giving to each answer respectively the following score: 2, 1, 0,-1, -2.

Table 3 summarizes the values of the five variables. It shows, first of all, that households were increasingly considering investing in stocks. At the same time, the perception of the profitability of investing in stocks grew over time in two directions: it was perceived increasingly more rewarding than government bonds and it became less obvious that stock market investment is a good investment only for rich people (although ENI-2 data is a bit difficult to explain). Information seems to improve as we detect a decrease in the agreement with the statement "I would not know how to invest in stocks". The perception that this form of investment is risky remains stable.

**Table 3 – Considering Investing in Stocks**

| | Stock market investment | | | | |
|---|---|---|---|---|---|
| **Survey** | …is a bet | I frequently considered the idea | .. I don't know how to invest | … is more profitable than government obligations | … is rewarding only for well-off people |
| **ENI1** | - | - | - | - | - |
| **ENI2** | 0.436 | -0.656 | -0.325 | -0.140 | 0.272 |
| **ENI3** | 0.451 | -0.518 | -0.377 | 0.018 | 0.568 |
| **TELECOM** | 0.420 | -0.533 | -0.259 | 0.158 | 0.535 |
| **BNL** | 0.519 | -0.289 | -0.432 | 0.233 | 0.472 |
| **ENEL** | 0.453 | -0.193 | -0.429 | 0.324 | 0.338 |
| **AUTOSTRADE** | - | - | - | - | - |

## 2.4 Econometric analysis

The above descriptive evidence provided some support to our argument that the privatization process triggered a demand side effect that accompanied the mere issuing of stock shares. In this section we provide more solid ground founding our argument on econometric analysis.

We resort to two types of regressions: they deal, respectively, with subscription intensions within each PO and through the whole sample period. In both cases information related to the privatizations plays a major role in explaining the increase in intentions to subscribe. However, the content of information changes markedly: in the first case it is notoriety of the company, as affected by the promotion campaign, in the second it is the general increase in information provided by the privatization process. The former analysis is more clear-cut. The latter is more challenging as it is hard to disentangle the impact of the privatization process from that of institutional/market changes undergoing in the five years considered.

Before reporting the results of our regression we need to cover one issue concerning data. In fact, the data in the surveys are not a panel, i.e. in each survey a different random drawing of households to be interviewed was made. The drawing criteria were, however, designed so

that each sample was representative of the population of potential subscribers. This allows us to build, following Deaton (1985), a pseudo panel. We keep track of groups representative of the population. We transform the dataset so that each observation is the mean values of the individuals pertaining to a given group. Notably, the intention to subscribe a PO – rather than a binary (0,1) variable – becomes a continuous variable included in the interval (0,1). The main criterion according to which an individual is assigned to a group is age, so that groups are identified by cohorts. However, subdivisions are also possible; Deaton distinguishes between manual and non manual workers. We opted for the following criterion: age (three cohorts – young, middle age, and mature), education (low education and high education), profession (three income-related subgroups); for a total of eighteen classes.

### 2.4.1 Cross section analysis

In this section we want to pin down the impact of the advertising campaigns on demand. In this case we use, as dependent variable, the change in the intention to subscribe occurred between the initial survey and the final survey of each PO $prop_{it}$. As outlined above, we want to use as regressors the change in the company's notoriety $notoriety_{it}$ and, as a control, the change in expectations of the stock market profitability $stockEx_{it}$. We also tried additional specifications including more controls to capture the attitude toward the investment in the stock market as described in the previous section.

$$\Delta\, prop_{it} = \alpha\, \Delta notoriety_{it} + \beta\, \Delta stockEx_{it} + \gamma\, \Delta attitude_{it}$$

with $t$ representing each PO and $i$ each group:

Table 4 gives the result of a panel regression. Information for the supplementary control variables was not available in two surveys, the different sample is accounted for in the table.

The constant term (i.e. the $i$th class specific parameter) was deliberately omitted as it was canceled out by the difference operator.

### Table 4-Cross-sectional Regressions: Benchmarking

| | | Propensity to purchase POs | | | | | 7 tranches |
|---|---|---|---|---|---|---|---|
| Notoriety | coef. | 0.042 | 0.036 | 0.047 | 0.042 | 0.070 | 0.075 |
| | t-Student | (2.3) | (1.8) | (2.5) | (2.2) | (3.4) | (3.7) |
| Perception of the stock market behaviour | | 0.100 | 0.073 | 0.088 | 0.081 | 0.138 | 0.192 |
| | | (3.4) | (2.3) | (2.6) | (2.3) | (3.6) | (5.5) |
| **Degree of assent with *investment on shares*** | | | | | | | |
| I frequently considered the idea | | 0.123 | 0.130 | 0.154 | 0.153 | | |
| | | (5.1) | (5.1) | (6.2) | (5.9) | | |
| I don't know how to invest | | -0.015 | -0.031 | | | | |
| | | (-0.7) | (-1.4) | | | | |
| ...is rewarding only for well-off people | | -0.115 | -0.091 | | | | |
| | | (-3.5) | (-2.9) | | | | |
| ...is a bet | | 0.038 | | 0.004 | | | |
| | | (1.4) | | (0.18) | | | |
| is more profitable than government obligations | | -0.029 | | -0.060 | | | |
| | | (-1.0) | | (-2.15) | | | |
| *R-squared* | | *0.68* | *0.54* | *0.46* | *0.38* | *0.17* | *0.22* |
| *F-statistic* | | *29.11* | *24.65* | *17.80* | *26.53* | *17.80* | *33.96* |

*n. obs=90*
*n. obs for 7 tranches=126*

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The main result is that we found the variables included in the base specification (notoriety and stock market expectations) to be correctly signed and almost always significant. The variables included in the specification provide a sensitiveness and robustness check. The order of their exposition in the table is suggestive of their decreasing "closeness" to the intention to subscribe. For instance, the statement "I frequently thought over buying shares" is highly related to the decision itself to subscribe a PO and a positive coefficient is definitely expected. The statement, "purchasing a share is a bet" is less clearly related although a negative sign should be expected: if the perception that shares are risky decreases one would expect an increase of the intentions to subscribe. Whilst the change in notoriety is clearly directly related to the advertising campaign, we are less confident that all attitude variables would be affected in a clear and systematic way. Therefore, although most of the sings seem to be correct, we put less emphasis on the extended specifications.

### 2.4.2 Panel analysis

The second set of regressions intends to evaluate the impact of the privatization process on households' participation rate to financial markets. This is achieved indirectly, checking whether the increase overtime in the propensity to purchase was related to the enhanced dissemination of information that the privatizations brought about.

In order to do that, we introduce as the dependent variable the level of the propensity to purchase. Its level, generally increasing through time, has to be explained with more deeply rooted factors than the effects of advertising campaigns. Identifying privatization related increases in information is the most difficult task. Our specification tries to capture this in two ways. To start with, we introduce again the attitude variables. However, also in this case, it is difficult to isolate the impact of the privatization process from other causes. For instance, the decreasing assent with the statement "I would not know how to invest in stocks", can be explained with several factors. Advertising campaigns provided information (or stimulus to gather more information) but also banks' effort to sell new products to their clients generated an increase of knowledge.

We therefore built a variable aiming to proxy the information purely related to the privatization process. That information was the percentage of past PO known to interviewed people. We do find that this percentage is increasing over time and we regard it as a cumulated increase of information.

Consistently with the literature reviewed on the participation decision, we introduced additional explanatory variables related to geographical, demographic and social features of the interviewed and to their portfolio composition (ownership of stock market shares).

A factor that we also wanted to control for was the quality of the PO as perceived by potential subscribers. The surveys included a set of statements that were designed to convey this image, as explained, interviewed were asked to express their agreement or dissent with them. We used four such questions[20]: 1) the company owns advanced technology; 2) the company operates in international markets; 3) it has a sound financial position; 4) it works in strategic sectors of the Italian economy. Assent with these statements was to be interpreted with a positive judgment. In order to save degrees of freedom and to eliminate multicorrelation

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[20] Answers follow a scale from 1 to 10 (for Telecom we performed a transformation form a 1-5 scale to a 1-10 scale).

problems, we extracted a principal component out of the four. The factor explains 59% of the variability, all loads are positive: in the same order as above 0.38, 0.35, 0.30, and 0.26.

We built a panel tobit with random effects, groups are the same used in the previous set of regression.

The model can be described with the following equation:

$$prop_{it}^* = f(Know\_cum_{it}, StockEx_{it}, Invest_{it}, Shares_{it}, Demograph_{it}, Perception_{it});$$

$$prop_{it} = \begin{cases} -1 & \text{if } prop_{it}^* \leq -1 \\ prop_{it}^* & \text{if } 1 -< prop_{it}^* < 1 \\ 1 & \text{if } prop_{it}^* \geq 1 \end{cases}$$

where, for each tranche $t$, and each cohort $i$:

$Know\_cum_{it}$ is the percentage of past POs of which interviewed are aware, $StockEx_{it}$ is the perceived behavior of the stock market; $Invest_{it}$ is a set of variable capturing the household's attitude toward stock market investment, $Shares_{it}$ is a dummy variable taking value 1 if the household invests in stocks and zero otherwise; $Demograph_{it}$ is a group of demographic controls; $Pereception_{it}$ measures households' qualitative assessment on how well known/important is the company under PO.

We ended up with the specification illustrated in Table 5. Households' propensity to subscribe is significantly affected by the cumulative knowledge variable, by ownership of shares and by the perception of the company (as synthesized by the factor variable). Also a few demographic variables matter (sex and being head of the household). Volatility of the stock market and stock market behavior are no longer relevant; whilst the variable that gives the information content on how to invest is correctly signed but still insignificant.

**Table 5 – Panel Analysis – Tobit Model Estimations[21]**

| Propensity to purchase POs | | |
|---|---|---|
| | Coefficient | Student's t |
| Cumulative Notoriety | .948 | 1.98 |
| Perception of the Company (I Principal Component ) | .024 | 2.34 |
| Stock Market Behavior | .042 | 0.98 |
| Stock Market Volatility | -.045 | -1.22 |
| Information About Stock Market | -.056 | -1.90 |
| Return On Shares | .056 | 1.53 |
| Transactions Costs | .045 | 1.37 |
| Past Ownership Of Shares | .577 | 3.53 |
| Geographic Area | -.079 | -1.64 |
| Town Size | -.011 | -0.41 |
| Sex | -.210 | -3.78 |
| Head Of the Household | .197 | 4.00 |
| *Constant* | *-.455* | *-2.99* |

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[21] Tobit estimation was adopted because of the accumulation of observations at the –1 extreme caused by the structure of the questionnaire. Future research will entail additional effort on this matter.

## 2.5 Conclusions

It is widely believed that listings of formerly state-owned companies substantially contributed to boost stock markets –particularly in developed countries– as privatization programs ensued through the 1980s and 1990s. However, the channels through which such effect materialized are still insufficiently explored. This paper contributed to fill the gap exploring the hypothesis that privatization programs –beside mechanically increasing the supply of listed shares– boosted demand for stocks by enlarging the set of households willing to invest in shares. The effect would result as privatizations triggered massive advertising that improved households' acquaintance with the risk and return characteristics of stocks: in turn, the enhanced dissemination of information may have increased –perhaps permanently– households' participation in shareholding.

We tested the occurrence of this effect on a unique micro-data set collected for a large sample of Italian households on eight Public Offerings (PO) during 1995-99, the period when privatizations took momentum in Italy. We used two different methods: a cross-section and a panel analysis. For each PO, households were surveyed at least twice: before and after the advertising campaign to promote such PO. While descriptive statistics showed that advertising campaigns were indeed effective at making households better informed on the incoming PO, our cross-section analysis found that the propensity to subscribe that PO increased as its notoriety at households rose. Furthermore, the panel analysis confirmed that the propensity to subscribe the incoming PO increased as households became better informed about previous privatizations. Thus, our evidence suggests that privatizations played an important role in expanding Italian households' share participation, which in fact went from 7.9 to 12.7 percent between 1995 and 2000.

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**APPENDIX**
**Synthetic survey questionnaire**

1. Geographic area
2. City size
3. Sex
4. Age
5. Present profession
6. If retired: last profession
7. Head of the household?
8. Profession of the head of the household
9. At the moment do you own: current account; savings bankbook; insurance policy;     investment trust; treasury bills/bonds; shares?
10. When you decide to invest your savings, what is more important? (high short-term revenue, high long-term revenue, safe investment, liquidity)

*Degree of assent with* (I agree completely; I agree; I do not know; I do not agree; I do not agree at all):
>  11. Investing in stocks is a bet
>  12. I frequently considered investing in stocks
>  13. I don't know how to invest in stocks
>  14. Investing in stocks is more profitable than holding government securities
>  15. Investing in stocks is rewarding only for well-off people

16. Do you know any company on whose shares the Government is going to make a PO?
17. Which companies have been privatized by the Government over the last three years?
18. Which ones are the most profitable companies among those the Government is going to privatize?

*Now focus your attention on company X; how much do you agree with the following assertions?* (scale from 1 to 10):
19. It's profitable
20. It's bureaucratic/inefficient
21. It's a precursor on technology
22. It's state owned, influenced by politics
23. It's international
24. It's solid and safe
25. It works in the main sector of the economy
26. It's worth owning its shares
27. How much are you interested to buy shares of company X?
28. For which reasons aren't you interested to buy shares of company X?
29. For which reasons are you interested to buy shares of company X?
30. How likely will you buy shares of company X?
31. Have you decided yet to buy shares or you're waiting for more information?
32. How much money might you invest on shares of company X?
33. If you decided investing in shares of company X, how long are you planning to hold the shares before selling them?
34. In the past have you ever bought shares of the company below?
35. Are you still holding these shares?
36. In your opinion, how good an investment was subscribing Pos in the past?
37. Do you favour the program of POs made by the Government?
38. How do you consider the state of the stock market over the last year it?
39. And what will, in your opinion, be the stock market state in the next months?
40. The Government is also going to make a PO for another company Y. How interested might you be in buying shares of it?
41. The Government is also going to make a public offering for another company Z. How interested might you be in buying shares of it?
42. Which is your education level?
43. Which is the education level of the head of the household?

**Table 1- Portfolio Composition by Education – Percentage**

| | Composition | None | Primary | Secondary | High secondary | University |
|---|---|---|---|---|---|---|
| **ENI1** | current account | - | 11.38 | 32.32 | 44.29 | 11.61 |
| | savings bankbook | - | 13.29 | 36.14 | 42.29 | 8.00 |
| | BOT,CCT (*) | - | 10.13 | 27.95 | 47.18 | 14.49 |
| | shares | - | 7.67 | 19.51 | 53.31 | 19.51 |
| | investment trust | - | 5.88 | 18.63 | 57.84 | 17.65 |
| | none | - | 18.32 | 34.35 | 38.93 | 5.34 |
| **ENI2** | current account | 0.53 | 11.51 | 32.84 | 44.18 | 10.95 |
| | savings bankbook | 1.49 | 13.76 | 35.47 | 43.86 | 5.43 |
| | BOT,CCT (*) | 0.56 | 11.06 | 27.09 | 46.77 | 14.53 |
| | shares | 0.00 | 4.55 | 21.21 | 55.76 | 18.48 |
| | investment trust | 0.00 | 6.88 | 26.72 | 51.06 | 15.34 |
| | none | 5.41 | 26.67 | 31.57 | 32.83 | 3.52 |
| **ENI3** | current account | 0.37 | 10.93 | 30.42 | 46.70 | 11.58 |
| | savings bankbook | 0.49 | 13.30 | 32.62 | 46.70 | 6.89 |
| | BOT,CCT (*) | 0.42 | 10.42 | 27.36 | 47.78 | 14.03 |
| | shares | 0.35 | 5.54 | 22.15 | 52.60 | 19.38 |
| | investment trust | 0.27 | 5.21 | 24.38 | 51.51 | 18.63 |
| | none | 2.71 | 21.50 | 37.79 | 34.86 | 3.13 |
| **TELECOM** | current account | 0.63 | 10.78 | 32.53 | 44.95 | 11.11 |
| | savings bankbook | 1.40 | 13.17 | 33.58 | 45.12 | 6.73 |
| | BOT,CCT (*) | 0.26 | 10.02 | 29.27 | 44.99 | 15.46 |
| | shares | 0.00 | 6.44 | 20.37 | 52.39 | 20.79 |
| | investment trust | 0.00 | 6.13 | 26.23 | 48.77 | 18.87 |
| | none | 2.36 | 21.21 | 34.18 | 39.35 | 2.90 |
| **BNL** | current account | 0.28 | 8.25 | 27.54 | 50.28 | 13.64 |
| | savings bankbook | 0.52 | 10.02 | 29.77 | 51.06 | 8.64 |
| | BOT,CCT (*) | 0.45 | 7.24 | 22.40 | 52.38 | 17.53 |
| | shares | 0.27 | 4.70 | 17.45 | 55.97 | 21.61 |
| | investment trust | 0.20 | 3.56 | 21.34 | 54.94 | 19.96 |
| | none | 0.81 | 16.46 | 32.73 | 44.24 | 5.76 |
| **ENEL** | current account | 0.46 | 9.03 | 26.08 | 50.79 | 13.65 |
| | savings bankbook | 0.77 | 11.62 | 28.08 | 49.62 | 9.91 |
| | BOT,CCT (*) | 0.30 | 9.94 | 22.85 | 51.19 | 15.73 |
| | shares | 0.21 | 4.83 | 18.29 | 58.79 | 17.88 |
| | investment trust | 0.08 | 5.54 | 19.04 | 55.70 | 19.63 |
| | none | 2.10 | 17.46 | 34.81 | 42.10 | 3.54 |
| **AUTOSTRADE** | current account | 0.32 | 9.07 | 28.48 | 49.30 | 12.84 |
| | savings bankbook | 0.58 | 10.69 | 30.97 | 49.68 | 8.09 |
| | BOT,CCT (*) | 0.22 | 8.67 | 22.89 | 49.78 | 18.44 |
| | shares | 0.26 | 5.14 | 21.21 | 55.27 | 18.12 |
| | investment trust | 0.27 | 6.28 | 20.22 | 53.28 | 19.95 |
| | none | 2.78 | 18.33 | 33.47 | 40.56 | 4.86 |

(*) BOT=Treasury bills; CCT=Government bonds.

**Table 2 - Portfolio Composition by Age – Percentage**

| | Composition | 18 - 24 | 25 - 34 | 35 - 44 | 45 - 54 | 55 - 64 | 65 and more |
|---|---|---|---|---|---|---|---|
| **ENI1** | current account | - | 26.81 | 28.68 | 21.44 | 17.21 | 5.87 |
| | savings bankbook | - | 30.86 | 29.86 | 18.71 | 14.71 | 5.86 |
| | BOT.CCT | - | 22.44 | 26.03 | 22.56 | 21.15 | 7.82 |
| | shares | - | 25.49 | 27.45 | 24.02 | 17.16 | 5.88 |
| | investment trust | - | 23.34 | 22.65 | 23.69 | 24.04 | 6.27 |
| | None | - | 25.95 | 21.37 | 16.03 | 26.72 | 9.92 |
| **ENI2** | current account | 10.09 | 21.76 | 20.30 | 17.66 | 16.57 | 13.62 |
| | savings bankbook | 17.18 | 23.06 | 18.09 | 15.44 | 13.24 | 12.98 |
| | BOT.CCT | 7.97 | 18.28 | 16.87 | 17.43 | 20.15 | 19.31 |
| | shares | 8.20 | 21.43 | 21.16 | 17.72 | 16.67 | 14.81 |
| | investment trust | 5.45 | 17.58 | 20.91 | 16.97 | 22.42 | 16.67 |
| | None | 25.28 | 15.47 | 11.45 | 14.34 | 13.08 | 20.38 |
| **ENI3** | current account | 10.56 | 20.65 | 20.60 | 19.07 | 15.81 | 13.30 |
| | savings bankbook | 19.13 | 23.20 | 19.42 | 15.73 | 13.20 | 9.32 |
| | BOT.CCT | 9.31 | 16.53 | 18.47 | 18.61 | 20.83 | 16.25 |
| | shares | 8.77 | 21.10 | 25.21 | 15.07 | 18.08 | 11.78 |
| | investment trust | 6.92 | 14.53 | 22.49 | 20.42 | 20.76 | 14.88 |
| | None | 28.39 | 19.42 | 13.78 | 13.15 | 13.15 | 12.11 |
| **TELECOM** | current account | 10.12 | 22.21 | 20.32 | 18.80 | 16.25 | 12.29 |
| | savings bankbook | 18.95 | 23.26 | 16.65 | 14.91 | 13.45 | 12.78 |
| | BOT.CCT | 8.38 | 18.39 | 16.75 | 18.57 | 21.59 | 16.32 |
| | shares | 5.67 | 21.32 | 21.32 | 20.55 | 17.02 | 14.11 |
| | investment trust | 8.52 | 17.26 | 19.33 | 22.45 | 18.50 | 13.93 |
| | None | 25.48 | 16.77 | 14.23 | 13.15 | 13.51 | 16.86 |
| **BNL** | current account | 9.51 | 24.17 | 23.62 | 20.21 | 13.71 | 8.78 |
| | savings bankbook | 19.00 | 25.47 | 21.69 | 16.03 | 10.07 | 7.73 |
| | BOT.CCT | 8.37 | 19.80 | 19.68 | 20.36 | 17.99 | 13.80 |
| | shares | 7.02 | 23.72 | 24.60 | 19.47 | 15.71 | 9.49 |
| | investment trust | 6.44 | 24.56 | 22.15 | 19.73 | 17.99 | 9.13 |
| | None | 24.65 | 20.10 | 17.78 | 16.16 | 12.22 | 9.09 |
| **ENEL** | current account | 9.87 | 21.40 | 21.38 | 19.26 | 15.87 | 12.22 |
| | savings bankbook | 17.17 | 23.30 | 19.29 | 16.40 | 13.10 | 10.74 |
| | BOT.CCT | 8.46 | 14.84 | 14.54 | 20.77 | 22.11 | 19.29 |
| | shares | 6.63 | 20.64 | 20.30 | 19.80 | 18.46 | 14.18 |
| | investment trust | 7.50 | 18.29 | 20.76 | 21.27 | 19.01 | 13.16 |
| | None | 28.40 | 17.35 | 16.02 | 12.15 | 12.93 | 13.15 |
| **AUTOSTRADE** | current account | 10.19 | 23.02 | 21.04 | 18.58 | 15.84 | 11.30 |
| | savings bankbook | 18.48 | 24.12 | 19.93 | 14.30 | 13.29 | 9.89 |
| | BOT.CCT | 10.00 | 16.89 | 19.11 | 17.33 | 18.89 | 17.78 |
| | shares | 7.65 | 18.17 | 21.04 | 20.90 | 18.85 | 13.39 |
| | investment trust | 8.35 | 17.22 | 21.59 | 21.21 | 18.77 | 12.85 |
| | None | 25.28 | 18.06 | 15.56 | 12.64 | 13.06 | 15.42 |

(*) BOT=Treasury bills; CCT=Government bonds.

**Table 3 – Propensity to Purchase the PO in Progress**

|  | Stage | | | |
|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 |
| ENI 1 | 45.62% | 43.28% | 39.56% | |
| ENI 2 | 22.14% | 21.05% | 23.52% | |
| ENI 3 | 18.86% | 20.15% | | |
| TELECOM | 22.01% | 23.44% | 24.80% | 20.80% |
| BNL | 26.87% | 26.66% | 24.40% | 24.87% |
| ENEL | 25.78% | 29.07% | 29.07% | 29.22% |
| AUTOSTRADE | 18.40% | 22.01% | 22.27% | |

**Table 4 - Notoriety of the PO in Progress**

|  | Notoriety before campaign | Increase in notoriety from the beginning to the end of the campaign | Notoriety on average |
|---|---|---|---|
| ENI 1 | 4.08% | 19.11% | 11.08% |
| ENI 2 | 8.31% | 16.54% | 16.79% |
| ENI 3 | 9.79% | 16.93% | 18.26% |
| TELECOM | 7.45% | 27.55% | 18.38% |
| BNL | 2.67% | 14.80% | 6.46% |
| ENEL | 21.59% | 40.37% | 41.60% |
| AUTOSTRADE | 4.13% | 15.28% | 10.11% |

## Note about cohorts

We used three variables to construct the cohorts: age, profession/revenue, education, according to the following groups:

**age**: young (18-30)
adult (31-55)
senior (56 e and more);

**profession**: high revenue (manager, employee, teacher, retired)
medium revenue (trader, farmer, factory worker)
low revenue (unemployed, housewife, student)

**education**: high (high secondary, university)
low (none, primary, low secondary).

**Tab. 5 - Cross section analysis – Variables used**

| Acronym | Variable | Scale | Construction |
|---|---|---|---|
| $\Delta$Prop | Propensity to purchase POs | (-1=no, 0=I don't know;1=yes) | Differential on simple index |
| $\Delta$Know | Notoriety of past POs | (1= at least one past PO, 0= none) | Differential on simple index |
| $\Delta$StockEx | Perception of stock market behavior | (1=positive,0=neutral,-1=negative) | Differential on simple index |
| $\Delta$Consider | I've considered the idea to invest in stocks | synthetic index with weight: I agree completely =2, I agree =1, I do not know=0, I do not agree =-1, I do not agree at all =-2 | Differential on weight index |
| $\Delta$Volatil | Investing in stocks is a bet | synthetic index with weight: total agreement=2, enough agreement=1,not agree, not disagree=0,little agree=-1, not at all agree=-2 | Differential on weight index |
| $\Delta$Return | Investing in stocks is more profitable than holding government securities | synthetic index with weight: total agreement=2, enough agreement=1,not agree, not disagree=0,little agree=-1, not at all agree=-2 | Differential on weight index |

**Table 6 - Cross Section Analysis – Best Model**

Dependent Variable: Δ PROP

Method: GLS (Cross Section Weights)

Number of cross-sections used: 18

Total panel (balanced) observations: 90

One-step weighting matrix

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| ΔKnow | 0.046922 | 0.018613 | 2.520880 | 0.0136 |
| ΔStockEx | 0.087631 | 0.033641 | 2.604840 | 0.0108 |
| ΔConsider | 0.154140 | 0.024963 | 6.174688 | 0.0000 |
| ΔVolatil | 0.004378 | 0.024831 | 0.176293 | 0.8605 |
| ΔReturn | -0.060243 | 0.028039 | -2.148515 | 0.0345 |

| Weighted Statistics | | | |
|---|---|---|---|
| R-squared | 0.455842 | Mean dependent var | 0.010725 |
| Adjusted R-squared | 0.430235 | S.D. dependent var | 0.137186 |
| S.E. of regression | 0.103551 | Sum squared resid | 0.911447 |
| F-statistic | 17.80118 | Durbin-Watson stat | 2.097566 |
| Prob(F-statistic) | 0.000000 | | |

| Unweighted Statistics | | | |
|---|---|---|---|
| R-squared | 0.236501 | Mean dependent var | -0.003911 |
| Adjusted R-squared | 0.200572 | S.D. dependent var | 0.120450 |
| S.E. of regression | 0.107695 | Sum squared resid | 0.985849 |
| Durbin-Watson stat | 1.804096 | | |

**Table 7 – Panel Analysis – Variables Used**

| Acronym | Variable | Construction | Scale | Note |
|---|---|---|---|---|
| Prop | Propensity to buy POs' shares | | -1;1 | -1=no;0=I don't know;1=yes |
| Know_cum | Notoriety of past POs | Average on cohort and stage (number of POs known/number on the list) | 0;1 | |
| StockEx | Stock market's state perceived | Weighted Average on the stock market state opinion | -2;2 | weight:-2,-1,0,1,2. |
| Volatil | Investing in shares is a bet | Weighted Average on the opinion | -2;2 | weight:-2,-1,0,1,2. |
| Info | I don't know how to invest in stocks | Weighted Average on the opinion | -2;2 | weight:-2,-1,0,1,2. |
| Return | Investing in shares is more profitable than holding public securities | Weighted Average on the opinion | -2;2 | weight:-2,-1,0,1,2. |
| OnlyRich | Investing in shares is profitable only for the rich | Weighted Average on the opinion | -2;2 | weight:-2,-1,0,1,2. |
| Shares | Shares possession | Average percent of shares' owners | 0;1 | |
| Area | Geographical area | Average | 1;3 | 3=North ;2=Center, 1=South |
| Town_size | Town size | | 1;5 | 1=up to 10 thousand; 2=10-30 thousand …5=mode than 25 thousand |
| Sex | Sex | | 1;2 | 1=M; 2=F |
| Household Head | Head of household | | 1;2 | 1=yes;2=no |

| Acronym | Variable | Construction | Scale |
|---|---|---|---|
| **f1** | First principal component on the variable: imm_techno; imm_internat; imm_solid; imm_importance | equation: .38 * imm_techno + .30 * imm_internat + .25 * imm_solid + .35 * imm_importance | |
| imm_techno | Company precursor on technology | Average vote on cohort and stage | 1;10 |
| imm_internat | International company | Average vote on cohort and stage | 1;10 |
| imm_solid | Company solid and safe | Average vote on cohort and stage | 1;10 |
| imm_importance | Company that works in main sectors of economy | Average vote on cohort and stage | 1;10 |

**Table 8 - Principal Component Analysis**

```
Principal component factors


  Factor    Eigenvalue    Difference      Proportion    Cumulative
--------------------------------------------------------------------------------

      1       2.35047       1.41871          0.5876        0.5876
      2       0.93177       0.50031          0.2329        0.8206
      3       0.43146       0.14515          0.1079        0.9284
      4       0.28631             .          0.0716        1.0000




Rotated Factor Loadings (varimax rotation)


    Variable        |    1 factor   Uniqueness
--------------------+-------------------------------

imm_techno          |     0.89076     0.20655
imm_internat        |     0.70895     0.49739
imm_solid           |     0.59909     0.64109
imm_importance      |     0.83397     0.30450




Scoring Coefficients


    Variable        |    1 factor
------------------+---------------

imm_techno          |     0.37897
imm_internat        |     0.30162
imm_solid           |     0.25488
imm_importance      |     0.35481
```

**Table 9 – Panel Tobit Estimation**

Random-effects tobit regression | Number of obs = 306
Group variable (i) : cohort | Number of groups = 18

Random effects u_i ~ Gaussian | Obs per group: min = 17

Wald chi2(12) = 117.73
Log likelihood = 108.8808 | Prob > chi2 = 0.0000

| Prop | Coefficient | Std. Err. | z | P>|z| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| Know_cum | .948 | .478 | 1.98 | 0.048 | .0104 | 1.885 |
| fl | .024 | .010 | 2.34 | 0.019 | .004 | .044 |
| StockEx | .042 | .043 | 0.98 | 0.326 | -.042 | .127 |
| Volatil | -.045 | .037 | -1.22 | 0.223 | -.117 | .027 |
| Info | -.056 | .030 | -1.90 | 0.058 | -.115 | .002 |
| Return | 056 | .036 | 1.53 | 0.126 | -.016 | .127 |
| OnlyRich | .045 | .033 | 1.37 | 0.172 | -.019 | .109 |
| Shares | .577 | 0.17 | 3.53 | 0.000 | .256 | .897 |
| Area | -.079 | .048 | -1.64 | 0.100 | -.174 | .015 |
| Size_town | -.011 | .027 | -0.41 | 0.683 | -.063 | .041 |
| sex | -.210 | .056 | -3.78 | 0.000 | -.320 | -.101 |
| HouseholdHead | .197 | .049 | 4.00 | 0.000 | .100 | .293 |
| _cons | -.455 | .152 | -2.99 | 0.003 | -.753 | -.156 |
| | | | | | | |
| Sigma_u | 4.40e-19 | .02535 | 0.00 | 1.000 | -.0496852 | .0496852 |
| Sigma_e | .1609039 | .0066536 | 24.18 | 0.000 | .1478631 | .1739446 |
| Rho | 7.48e-36 | 8.62e-19 | | | | |

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