Preparing for the tax reform: the risky French households' portfolio in 2018

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Résumé : Entre 2004 et 2014, le nombre d'actionnaires en France a diminué d'environ 50 %. Cette frilosité des épargnants observée après la crise de 2008 semble cependant aujourd'hui moins d'actualité, d'autant plus que l'année 2017 a été marquée par une réforme fiscale visant à soutenir l'actionnariat : mise en place d'une *flat tax* et suppression de l'ISF, remplacé par l'impôt sur la fortune immobilière. Nous analysons ici les portefeuilles risqués des ménages français à partir des deux dernières vagues (2014-2015 et 2017-2018) de l'enquête « Histoire de vie et patrimoine » de l'INSEE, qui présentent aujourd'hui l'avantage d'être panélisées. Bien que l'enquête 2017-2018 arrive un peu tôt pour étudier l'impact de ces réformes, cet article propose une analyse originale de la dynamique des portefeuilles risqués des ménages sur les trois dernières années, juste avant (et peu après) la mise en œuvre de ces politiques. Nous montrons tout d'abord que la demande d'actifs risqués dépend fortement du niveau de richesse des ménages et des anticipations de rendement sur le marché boursier, deux variables qui ont vraisemblablement été affectées par les récentes réformes fiscales. Ces données permettent également d'évaluer si l'annonce de ces réformes a eu une incidence sur la demande d'actions.

Abstract: Between 2004 and 2014, the number of shareholders in France fell by approximately 50%. The over-cautiousness of savers observed after the crisis now seems less topical, especially since 2017 was marked in France by a tax reform designed to support shareholding: the implementation of a flat tax and the abolition of wealth tax, replaced by property wealth tax. We therefore analyze the risky portfolios of French households from the last two waves (2014-2015 and 2017-2018) of the INSEE's "Life History and Wealth" survey, which have the advantage of being panelized. Although the 2017-2018 survey comes a little early to analyze the full impact of these reforms, this paper provides an original analysis of the dynamics of households' risky portfolios over the last three years, just before (and shortly after) the implementation of these policies. We show first that the demand for risky assets depends strongly on the level of household wealth and expectations of returns on the stock market, two variables that have likely been affected by the recent reforms. These data also make it possible to assess the extent to which the announcement of the recent tax reform has led to changes in securities holdings.

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1. Introduction

French households have an abundance of savings, amounting to nearly 16% of gross disposable income, one of the highest savings rates in Europe. While it is argued that those savings would be misdirected and too concentrated on real estate assets, however, French households' financial savings, at nearly 6% of gross disposable income, also remain above the euro area average (5%). What is more, in France, the share of regulated savings products (e.g. *Livret A* and savings accounts) and non-risky life insurance exceeds half of financial assets in 2016 (compared with 40% just ten years earlier), while securities and unit-linked life-insurance contracts account for only 35% of these assets (compared with 45% in 2006). All recent statistical surveys show that the proportion of individual shareholders (direct shareholding) has fallen by around 50 percentage points between 2008 and 2016. Even if the trend reversed slightly in 2017, the number of shareholders in France today stands at around 3.5 million, i.e. around 7% of the adult population.

This feature is confirmed by Graph 1, which shows, according to the last four waves of the "Life History and Wealth" survey carried out by the French National Institute of Statistics and Economic Studies (INSEE), the number of shareholders by type of assets. There are in fact three main ways of investing in equities: buying shares directly; buying them through mutual funds; and finally taking out unit-linked life insurance (unit-linked contracts). Risky assets (black line) include both direct and indirect equities.

[Graph 1]

Between 2004-2005 and 2014-2015, after the subprime crisis in 2008 and the sovereign debt crisis in 2011, the number of direct shareholders declined from 15.4% of total adult population to 9.9%, the number of mutual fund holders from 6.7% to 3.0%, but the number of subscribers to unit-linked life insurance contracts rose from 8.8% to 12.0%. Overall, demand for risky financial assets declined, although the increase in life insurance investments between 2004-2005 and 2009-2010 helped to mitigate this fall. The latest wave of the "Life History and Wealth" survey conducted by the National Institute of Statistics and Economic Studies (INSEE) in 2017-2018 shows the beginning of a trend reversal as direct and indirect shareholding remained stable and that of unit-linked life insurance contracts resumed its upward trend (+1.7 percentage point). At the same time, subscriptions to non-risky life insurance contracts, after having increased significantly between 2004-2005 and 2014-2015 (from 16.5% to 26.2%), fell slightly in 2017-2018

(25.9%). It therefore seems that the excessive cautiousness observed by savers after the crisis is less relevant today.

At the same time, the year 2017 was marked in France by a major tax reform designed to support direct shareholding: the implementation of a flat tax and the abolition of the wealth tax, replaced by the real estate wealth tax. Whereas they were taxable since 2013 according to the income tax scale, dividends, interest and capital gains from the sale of securities are now subject to the sole rate of 30%, withheld at source for dividends. In addition, the wealth tax has disappeared and been replaced by the *Impôt sur la Fortune Immobilière* (IFI), a new tax on real estate assets only. The base rules are slightly different, but the thresholds and rates remain the same. The policy objectives of abolishing the wealth tax are, on the one hand, to accelerate capital mobility and, on the other, to encourage long-term productive investment. Announced in May 2017 following the presidential and legislative elections, these measures were adopted in October 2017. Moreover, apart from the introduction of the flat tax and the *IFI* in January 2018, several exogenous factors are likely to have favorably influenced households' decisions regarding risky assets at the end of 2017: the stock market recovery and the ensuing optimism of expectations, as well as the recovery of household confidence.

To analyze household portfolio choices and their determinants during this period, we use the last two waves (2014-2015 and 2017-2018) of the "Life History and Wealth" survey, which have the advantage of being partly panelized. The first originality of this work lies in the analysis of the effects of subjective variables concerning both preferences towards savings (risk aversion and preference for the present), expectations on stock prices (return, volatility and ambiguity) and those on the labor market, on investment decisions in equities. In addition to the effect of usual socio-economic characteristics, such as age, wealth and education, the follow-up survey for the panelized households effectively makes it possible to refine the analysis of portfolio choices and changes, taking into account the subjective dimensions of these investments.

The econometric analysis shows that the demand for risky assets depends strongly on the level of household wealth and expectations of returns on the stock market, two variables that have been affected by the recent reforms. Although the 2017-2018 survey comes a little early to fully analyze the impact of these reforms, this paper nevertheless allows then, thanks to this panel component, an original analysis of the dynamics of households' risky portfolios over the last three years, just before (and shortly after) the implementation of these policies.

The remainder of the paper is organized as follows: section 2 proposes a brief review of the literature on the factors determining stockholding; section 3 describes the data used; section 4 specifies the econometric model and comments the results; section 5 proposes an evaluation of the effect of tax reforms on shareholding and the amount of shares; and section 6 concludes.

2. A brief review of the literature on factors affecting shareholding

The increasingly prudent behavior of households since the crisis may be due to various factors: lower risk tolerance, weaker or riskier resources, more pessimistic stock market expectations, etc. A detour through theory proves useful here, especially when the variable to be explained concerns the increasingly limited holding of equities. This is the simplest case of a static portfolio choice between a safe asset and a risky investment (equities).

Standard theory: expected utility model of portfolio choice

The investor has the choice between a risky asset (which may correspond to the market portfolio) with an expected return α and standard deviation σ, and a risk-free asset with a return r. He is assumed to maximize the (subjective) expectation of its utility function. The share p of risky assets in the wealth is then equal (for an iso-elastic utility) to:

$$p = (\alpha - r) / \sigma^2 \gamma \qquad (1)$$

The p share depends on the "risk premium" (α - r), the volatility of the risky asset (σ) and the relative risk aversion of the individual (γ). The characteristics attributed to the risky asset (α, σ) depend on the financial expectations of the saver, which in turn depend on his level of information on the financial market. Since expectations are homogeneous (rational expectations), this model therefore predicts that it is always optimal for the individual to hold risky assets, even if only for a minimal fraction of his assets.

This basic model can obviously be more sophisticated if we take into account market imperfections or incompleteness: transaction and information costs, institutional factors (taxation, regulation), exposure to other risks (income, human capital, housing, health, etc.), and liquidity constraints. In particular, the existence of an uninsurable and unavoidable risk on one's labor income (Kimball, 1993) or liquidity constraints (Gollier, 2001), reduces the share p invested

by the individual in risky assets, all the more so as this background risk or the constraints are significant and the agent's "temperance" (desire to moderate the overall risk) is high[4].

As simple as it is, this model allows two lessons to be learned. On the one hand, a change in the amount invested in risky assets may be due to a change in preferences (here γ), for wealth available, in the background risk (risk substitution), or in the price expectations of the risky asset (α, σ): this ternary explanatory scheme can be extended to other situations. On the other hand, the standard model can hardly account for a limited holding of equities: pessimistic but still "rational" price expectations, a high background risk or risk aversion reduces the *p* share of equities but does not cancel it out. Only (fixed) transaction costs, incomplete information and a negative expected risk premium (see below) can justify not participating in the equity market (Haliassos and Bertaut, 1995). To complete this list of reasons for non-participation, we can also refer to the "non-standard" theory of portfolio choice (Broihane and Orkut, 2018, Gomes *et al.*, 2020).

Loss and ambiguity aversion

How can theory account for limited shareholding? One possible way is to reject the framework of expected utility. These models thus introduce parameters of preference other than simple risk aversion, such as loss aversion and ambiguity.

In the case of loss aversion, the individual judges the profitability of a risky investment according to a reference level of initial wealth in the simplest cases, against which he evaluates gains and losses differently. The more loss averse he is, the greater is the disutility derived from a loss than the utility derived from an equivalent gain (Kahneman and Tversky, 1979). Loss aversion is the most common explanation for the disposition effect, which leads to the sale of winning securities too early and the sale of losing securities too late. Loss aversion reduces the demand for shares, but it is not sufficient on its own to explain non-holding. Non-participation can, however, be achieved either by combining loss aversion with (fixed) transaction costs, or by combining loss aversion with a *narrow framing* focused on equities. Instead of the saver carrying out, in relation to his overall wealth and budget constraints, an integrated management of all the risks he faces, he would tend to consider the results of his equity investments separately. Barberis *et al.* (2006) also show that a combination of risk aversion and focused narrow framing of stocks can explain stock market non-participation, albeit without transaction costs. In that framework, the savers, instead of practicing integrated management of all the risks they face, given their total wealth and budget

[4] Temperance depends on the fourth derivative of utility; it is a function of γ in the isoelastic case.

constraints, tend to consider the outcomes of their share investments in isolation. They cannot help considering their stock market portfolio performance separately as if it were an isolated investment operation, i.e. without factoring in the possibilities of diversification with the other risks they face.[5]

Ambiguity aversion is a more radical and effective challenge (to explain the non-holding of shares) than loss aversion. It was originally introduced to account for Ellsberg's (1961) paradox concerning the incoherent betting by guinea pigs on the color of the ball drawn from an urn of balls of three colors, of which the proportion of a single color is known. But ambiguity aversion can be considered as a "rational" reaction to "ambiguous" stock prices, i.e. when returns do not follow a known probability distribution but are uncertain (in Knight's sense). Ambiguity aversion then reflects a preference for a known risk over an unknown risk (of the same average probability). The higher this aversion is, the more the subject prefers an unfavorable case. Ambiguity aversion can hence explain stock market non-participation (Bossaerts *et al.,* 2010; Epstein and Schneider, 2010) as well as underinvestment in risky assets (Peijnenburg, 2014). More specifically, ambiguity could also explain two portfolio management puzzles: *home bias* (French and Poterba, 1991) and the *own-equity stock puzzle* (Benartzi, 2001). Home bias takes the form of low demand for foreign shares, where investors tend to prefer less favorable situations when faced with unknown probabilities; "ambiguous" investors, however, tend to opt for shares in the company in which they work.

Aversion to ambiguity may therefore be the sole reason why shares are rejected in an uncertain environment: the greater the aversion to ambiguity and/or the greater the degree of price ambiguity, the more limited the holding of shares will be, even in the case of large assets where transaction costs no longer play a role. It should also be noted that aversion to ambiguity and (lack of) confidence are partly linked: if the investor does not trust experts or financial advisers in their predictions of stock returns, he may very well abstain.

Non-rational information and expectations

The study of ambiguity aversion provides us with a natural transition to the second major path that theory takes to account for limited shareholding: the lack of information (or financial education) of savers, which is a source of non-rational price expectations (Arrondel, 2017).

[5] The investor could not refrain from considering the evolution of his stock market portfolio separately as if it were an isolated investment operation, i.e. without taking into account the possibilities of diversification with the other risks he is subject to (see Barberis et al., 2006)

Ignorance of assets and information costs of all kinds are clearly a source of incompleteness and diversity in the portfolios observed (Manski, 2004, Dominitz and Manski, 2007).

At the heart of the debate on standard models is the paradigm of rational expectations, according to which (1) (omniscient) individuals take advantage of all available information (past and present) to form their expectations (rational formation of expectations) and (2) these expectations are consistent with economic theory. These hypotheses mean that individuals are not mistaken, on average, about the future, revise their predictions only according to observed innovations (and not their emotions), and in fact share one and the same prediction. The paradigm of rational expectations thus leaves little room for lasting heterogeneity of beliefs. It is this hypothesis of rational expectations, implying for some too much predictability (combined for others with too much rationality), which has been strongly criticized by behavioral economics over the last thirty years.

This psychological strand of literature not only questions the rationality of the saver's choices, but also the rational expectations hypothesis and, through it, the homogeneity of beliefs. For Gollier (2013), "it allows people to dream of impossible returns, to refuse [relevant] information that does not suit them, or to agree to disagree with each other". These psychological biases being likely to help explain "bubbles, cycles, crashes", especially if they are reinforced by media coverage that is itself biased; he is still concerned about the "extreme pessimism of economic agents in phases of [acute] crisis", produced by a strong aversion to ambiguity combined with increasingly gloomy expectations about stock market prices.

Moreover, there is a large body of recent literature on the information-related factors that appears to play an important role in stock market participation (Arrondel and Masson, 2017): cognitive ability (Christelis *et al.*, 2010; Grinblatt *et al.*, 2011; Guiso and Sodini, 2013), trust (Guiso *et al.*, 2008), financial awareness (Guiso and Jappelli, 2005), time spent collecting information (Guiso and Jappelli, 2007), social interactions and networks ((Hong *et al.*, 2004, Arrondel *et al.*, 2021), optimism (Jouini *et al.,* 2006), and financial education (van Rooij *et al.*, 2011; Lusardi and Mitchell, 2014), emotions ("fear", Guiso *et al.,* 2018). However, the precise mechanism by which these factors influence households' financial choices (via the stock of information or expectations, etc.) remains largely to be understood.

3. Data and descriptive statistics

We use data from two waves (2014-2015, 2017-2018) of the "Life History and Wealth" survey conducted by the French National Institute of Statistics and Economic Studies (INSEE), which is representative of the entire population and provides detailed information on wealth and assets, as well as on the characteristics, preferences and choices of investors. An additional feature of the survey is that rich households, which own the largest share of wealth and are difficult to interview, are oversampled, allowing a more accurate description of their financial assets. Details on the survey design are provided in Arrondel *et al* (2016).

Our econometric study uses data from the panel component of the survey available for the first time for the 2017-2018 wave: 2,676 households were re-interviewed in both 2014-2015 and 2017-2018 (see annex 3). Individuals in panelized households also completed a "follow-up survey" between the two waves (2014-2015 and 2017-2018). This "follow-up survey", conducted in 2015, recorded changes in household composition and financial situation, but also asked about household preferences toward savings (risk aversion, time preference) and expectations (return, volatility, ambiguity) about the stock market and labor market. This survey makes it possible to overcome compositional biases related to the interpretation of cross-sectional studies and to conduct a very precise microeconomic study of the factors affecting financial asset ownership.

Indeed, the abolition of the wealth tax and the creation of a tax on real estate wealth only, on the one hand, and the introduction of a single flat-tax on the other hand, were adopted by the French Parliament in October 2017. If we assume that households, especially wealthy households, were able to anticipate the implementation of the reform on 1 January 2018, or even by proposing to focus the analysis solely on the households surveyed in 2018, then it becomes possible to draw up an initial overview - to be confirmed in subsequent waves of the survey - of the effects of the tax reform on the equity savings behavior of households, especially the wealthiest households.

An initial descriptive analysis of the main aggregates allows certain intuitions, to be confirmed in the econometric analysis. Table 2 shows the number of equity and life insurance holders for the individuals in the panel of the last two waves of the wealth survey. Firstly, we notice that the ownership rates for the various products are generally higher than in the total population (see annex 3 and Table 1: the panelized population is particularly richer in financial wealth than the overall population, 77,600 vs. 56,200 on average in 2017-2018). However, the statistics confirm the main temporal trends observed previously: 1) the stability between 2014-2015 and 2017-2018 of direct shareholding; 2) the decline in interest in euro life insurance among the wealthiest (-

6.1%) and 3) the parallel rise in unit-linked contract subscriptions in the same group (+11.7%). Hence, there does not seem to have a bias in this sub-population likely to blur the results but we should keep in mind that this population is slightly richer than the average.

[Table 1]

[Table 2]

Table 3 describes more precisely the portfolio movements between waves 2014-2015 and 2017-2018 for the households followed in the panel (unweighted statistics). Among all households that held shares directly in 2014-2015 or 2017-2018 (31.9%), it appears that nearly 61% of them held shares in both 2014-2015 and 2017-2018. From this point of view, this is the most inertial form of equity ownership, with only 48.6% of households owning stocks *via* life insurance. On the other hand, there was a clear preference for holding shares in life insurance (+3.8 percentage points =11,9-8,1) since net movements in shares are practically nil (+0.2) and negative for life insurance in euro funds (-1.7). These trends are confirmed for continuous demand (differences of more than 100 euros): there are more net buyers of multi-support life insurance (23.1%) than net sellers (+8.6), whereas there are almost as many net buyers of equities (+1.9) and euro life insurance (+2.1).

[Table 3]

Finally, Table 4 distinguishes between respondents interviewed in 2017 and those interviewed in 2018, i.e. before and after the tax reforms: flat-tax and *IFI*. It can be seen that households responding to the survey in 2018 (*N*=212) tended to move away from the equity market, while for the others, the movements offset each other. The effect of flat-tax on shareholding is therefore not perceptible at that point, on the contrary.

[Table 4]

4. Demand for risky assets: econometric analysis

An econometric analysis allows us to determine the factors explaining the demand for different risky financial products and their evolution between 2014-15 and 2017-18. The two channels chosen for investing in equities (directly or *via* life insurance) do not involve the same behavior since, in addition to risk and return characteristics, they differ in terms of transaction costs, management fees and taxation. Consequently, there is no a priori reason to consider that

households' portfolio choice decisions on these two products are equivalent and correspond to the same characteristics of individuals.

As we saw earlier, the "standard" theory of portfolio choice is based on a dual rationality: that of choices and that of expectations. It makes savers' investments dependent on three fundamental factors: present resources; (rational) expectations of return and risk on assets, but also on labor income; and lastly, the agent's preferences, particularly with regard to risk (aversion, temperance). It predicts that all savers must, at least in small quantities, hold risky assets (the amount invested is a increasing function of resources and expected return, decreasing with risk aversion and volatility). It therefore faces an empirical puzzle since share ownership is low ("stock participation puzzle"). Psychological (or behavioral) economics puts forward certain cognitive or emotional biases to explain this puzzle: aversion to ambiguity, aversion to loss, pessimism, distrust, lack of financial education, etc. Challenging the hypothesis of rational anticipation could also be a partial solution to this puzzle.

The explanatory variables: the role of subjective factors

As a consequence, our set of explanatory variables includes variables related to the socio-demographic characteristics of households (age, level of education), to financial variables (level of wealth and income), to their financial life history (existence of a gift or inheritance), to their level of education (diploma) and financial education (parent shareholders or not), to their type of employment (self-employed or not). We also include several subjective variables: preferences with regard to savings (risk aversion and time preference) and expectations on the stock market and the labor market (*cf.* annex 1 and 2). This gives us the expected return and volatility on the stock market and the future risk on household income. We have also introduced a measure of ambiguity about expectations in the stock market: individuals who answered the question on expectations but did not know how stock market returns would develop were considered to be households that see the market as ambiguous. As regards perceptions, risk aversion is measured in three ways (a scoring method, a Likert scale and a lottery) and preference for the present by a Likert scale (cf. annex 1). In this section, we look at financial asset holdings by estimating a qualitative model (dichotomous probit). Table 4 looks at the demand for direct stockholding and Table 5 at the demand for stocks *via* life insurance.

[Table 4]

[Table 5]

A strong wealth and information effect; subjective variables that are determinant

Table 4 shows the regressions (marginal effects) of direct share demand in 2014-2015 and 2017-2018 in which the two waves are stacked. The three regressions presented differ only in the measure of risk aversion (scale, score or lottery). First, we see that the time effect on direct stock ownership is negative between 2014-2015 and 2017-2018

Direct stock ownership increases sharply with wealth: the probability that the richest 1% holds shares directly is 77 probability points higher than the bottom quartile (all other things being equal. This is by far the most decisive variable. It increases continuously with age (+0.3 probability point by year). The diploma (around 20 probability points more) and financial situation of the parents (shareholders or not: 6 probability points more) also influences share ownership. These variables, which can be considered as proxies for education and financial information, are relevant in explaining households' risky portfolios.

Subjective variables also help to explain risky portfolio behavior, regarding either preferences or expectations. In terms of expected returns, an additional one percent expected return increases the demand for shares by around 15.5 probability points. Having ambiguous expectations reduces the probability of investing in equities by 5 probability points. We obtain a positive effect of income variance on stock ownership, an effect that contradicts Kimball's (1993) temperance hypothesis in the case of an independent risk background (risk diversification). Nevertheless, Arrondel et al. (2010) show that a positive effect can be explained by the existence of a correlated (non-independent) background risk: there may be complementarity of risks and not substitution if, for example, low-risk averse individuals invest in both risky occupations and portfolios. The least risk-averse and the most farsighted households also invest more often in the stock market. One additional time preference scale “bar” increases the probability of direct ownership of shares by 0.9 probability points. Risk aversion measured by a Likert scale or a scoring method influences the demand for direct ownership of shares: one additional risk scale "bar" increases the probability of direct ownership of shares by 0.9 probability points; an additional point in the risk score (the score varies between -35 and +60, *cf.* annex) increases the probability of investing in stocks by 0.2 probability points.

Table 5 concerns the same econometric analysis for the demand for multi-support life insurance on which risky products are invested. First, we see that the time effect multi-support life insurance ownership is positive between 2014-2015 and 2017-2018. As in the case of directly held shares, there is a strong wealth effect: the probability that the richest 1% will hold multi-support

life insurance is around 70 probability points higher than the bottom quartile. Age has a concave effect (not reported on table 5) with a maximum ownership at 65. Information stock (diploma and shares in the parents' portfolio) has also an important effect: +25 probability points for high diploma and 11 probability points more for the presence of share in parents' wealth. The relationship between the probability of holding and risk aversion is not linear: this investment is preferred by households with average risk aversion (6.5 probability points more), neither too risk-averse nor too risk-averse (Arrondel and Coffinet, 2019). One additional time preference scale "bar" increases the probability of ownership of multi-support life insurance by 1.0 probability points. Other effects are the following: stock market volatility has a positive effect on multi-support life insurance ownership: it seems that individuals hedge against other risks by holding this product.

Hence, we find that the demand for risky assets depends strongly on the level of household wealth and expectations of returns on the stock market. These two factors are likely to have been affected by the recent reforms: the suppression of the Wealth Tax may have increased the available wealth of some households, especially the richest ones, and therefore had a wealth effect on the demand for shares; the introduction of a simple flat tax on securities may have encouraged households to revise their expectations of stock market returns upwards. The potential effect of the two reforms is the subject of the last section.

5. Is the 2017 tax reform likely to change household shareholding behavior?

In this section, we assess the extent to which the 2017 tax reform, announced in June 2017, is likely to have changed the shareholding behavior of the households surveyed in both 2014-2015 and 2017-2018. To do so, we propose several variants of the double difference method (Ashenfelter and Card, 1985), which allows us to evaluate the effect of a treatment by comparing a group of treated and a group of untreated individuals at two different dates, one preceding the treatment and the other following it.

Methodology and first results

We are assessing how the May 2017 announcements may have resulted in a change in shareholding behavior. Thus, the treatment adopted is the introduction of the *IFI* and the flat tax at the end of December 2017. The group of households treated consists of households that would have been subject to wealth tax in 2017 if the flat tax had been maintained, but which are

not subject to property wealth tax at that same date. The aim is thus to test the hypothesis that the tax exemption effect was accompanied by an increase either in the probability of holding shares, or in their amount, or in their proportion of households' gross wealth. It is essential to specify that this is a purely statistical measure and not at all an explanatory model. We do not look precisely at the mechanisms that may have led households to avoid paying the tax, for example if, following the announcement of the measure, they sold their real estate assets to replace them with an investment in shares, or if they "mechanically" found themselves not liable to pay the tax because of the fall in the value of their fixed assets.

The tax liability threshold is 1,300,000 euros of net worth (*modulo* specific abatement rules, which we do not use here as a first approximation). This means that the households treated are those declaring more than 1,300,000 euros in net assets and less than 1,300,000 euros in real estate assets. Non-treated households are all others. The dates of interest are those corresponding to the collection of the survey data (it is clearly specified that the survey reference date is the collection date), *i.e.* between October 2014 and February 2015 on the one hand, and between October 2017 and January 2018 on the other hand. The 2017-2018 collection is not strictly speaking totally after the date of implementation of the reform (end of December 2017), which may lead to inaccuracies in the identification of the effects. Nevertheless, we consider that, given the time required for implementation, it was possible to incorporate the changes brought about by the change in shareholding regulations between the date of the announcement (May 2017) and the collection (from October 2017), since households were able to anticipate these effects before they become applicable at the end of December 2017.

With repeated cross-sections, we can write the model for an observation of any of the groups as:

$$y = \beta_0 + \beta_1 dB + \delta_0 d2 + \delta_1 d2 \cdot dB + u \tag{2}$$

where y is the variable of interest, *d2* is a binary variable for the second period. The binary variable *dB* captures the possible differences between the treatment and control groups prior to the policy change. The binary variable *d2* captures the aggregate factors that may cause changes in the variable of interest, even in the absence of a policy change. The variable of interest multiplies the interaction term, *d2.dB*, which is identical to a dummy variable equal to one for observations made in the experimental group during the second period. The validation of the effect of the measure consists, based on the estimation of the model below, in testing the hypothesis of significance of the coefficient δ_1.

In the following, we propose two variables of interest, depending on whether we are interested in direct shareholding or in the amount of financial assets held in the form of direct shares. The results are presented in Table 6, column (1).

[Table 6]

The coefficient relating to the double difference does not appear to be significant, highlighting the lack of effect of the measure on direct shareholding. If we look at the amount of assets held directly in the form of stocks or the share of direct stocks in total financial assets, we obtain results consistent with the previous one, *i.e.* not significant or even tending to show a slight decline in the share of stocks in financial assets for treated. Several interpretations are possible:

- Either the households concerned had too little time to optimize their portfolios before the implementation of the reform.
- Or they did so after the survey but not before the law came into force.
- Or the identification of treaties and control is too weak to highlight behavioral changes for sufficiently similar populations.
- Or direct shareholding remains inelastic to this change in taxation.

We have shown in the previous section that households' wealth and expectations of stock market returns have a strong influence on the demand for shares: the last hypothesis therefore does not seem relevant. In order to refine the analysis, two variants are proposed below to test the other hypotheses.

Variants

In this first variant, households in the 2017-2018 survey are considered to be those whose actual collection date is after the date of entry into force of the law. Indeed, the data collected make it possible to know the precise date of the survey and therefore the household's property situation. The results presented in Table 6 column (2) show few differences for the probability of holding but relatively larger effects for the demand of stocks held directly, even if the composition effects are not significant.

In this second variant, we do not consider households as a whole but only those close to the wealth tax liability threshold, *i.e.* on the one hand households with net assets of between 300,000 and 1,300,000 euro, regarded as the control group, and on the other hand households with net assets of between 1,300,000 and 2,300,000 euro, regarded as the treated group. The aim is to refine the identification of the households concerned by the measure by controlling for certain

heterogeneities. Once again, the results in column (3) of Table 6 do not show any effect of the measure on the holding or amount held in the form of direct equity, but significant effects on the composition of financial assets (share of direct equity in total financial assets), which are difficult to dissociate from the increase in the valuation of securities between the two survey dates (the main stock index in France - CAC 40 – recorded a +25% increase between end-2014 and end-2017).

The last column indicates that the treatment is accompanied by an increase in the share of risky assets (held directly, indirectly or in the form of life insurance units) in gross wealth. Here again, it is difficult to distinguish between households' investment behavior and the valuation of securities; nevertheless, it is at least possible to say that the reform has made it possible to maintain the holding and valuation of securities in household portfolios.

6. Conclusion

We analyze the risky portfolios of French households from the last two waves (2014-2015 and 2017-2018) of the INSEE's "Life History and Wealth" survey, which have the advantage of being panelized. We show that direct shareholding increases strongly with the level of wealth and with age; it also depends on the level of education, the financial situation of the parents (shareholder or not). Subjective variables also help to explain risky portfolio behavior, whether it be preferences for savings (risk aversion, time preference) or expectations on financial market (expected return and ambiguity). The demand for stocks via life insurance shows specific determinants: life cycle effect (age and foresighted) but fewer links with stock market characteristics. In summary, we show that the demand for risky assets depends strongly on the level of household wealth and expectations of returns on the stock market. Two variables that have been affected by the recent reforms (implementation of a flat tax and abolition of wealth tax, replaced by property wealth tax).

Double difference analysis makes it possible to quantify the effects of the 2017 tax reform on direct shareholding. Our results show no significant effect except for the amount of wealth held directly in the form of shares for the households surveyed in 2018. While the tax reform does not seem to have had any anticipated effect on the spread of share ownership, an effect on the amounts owned by households appears to be materializing, although this can be explained by the sharp rise in share prices between 2014 and 2018. Thus, the share of financial assets held directly in the form of equities, as well as the share of equities in total assets, increased slightly for the

households surveyed. These results are a necessary but not sufficient condition to conclude that tax reforms have an effect on household demand for risky assets.

All these results deserve to be examined and confirmed on the basis of the "Life History and Wealth" data to be collected at the end of 2020-2021, which is the only way to measure precisely the full effect of the tax reform, if it is not modified in the meantime. Based on the wealth of the available microeconomic base, it might also be interesting to study in detail the strategy that may have led some households to arbitrate the components of their wealth before implementation in order to provide an explanatory model of tax avoidance.

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Annex 1: Measuring Risk Preferences

Common measures of risk aversion include Likert scales, lottery choices (*à la* Barsky et al., 1997), and more qualitative portfolio questions. However, these measures have significant biases, especially when testing their stability over time (specific domain, anchor point, risk exposure bias, etc.). To remedy these shortcomings, we have adopted a new approach to assess saver preferences inspired by the work of Arrondel and Masson (2014): this is based on a scoring procedure that aggregates the answers to a set of various questions about lottery choices, but also about attitudes, opinions, or intentions in different areas of life (health, family, work, leisure, consumption, retirement, etc.).

Principle of the method

This method of measuring individual preferences involves developing a score to "profile" individuals according to their risk appetite. This synthetic and ordinal score is computed from a set of questions that cover a wide range of life domains, such as consumption, leisure, investments, work, family, health, retirement... These questions are of different kinds: they are often concrete or related to everyday life, behavioral, opinion or intention questions that are relatively easy to answer; others concern reactions to fictitious scenarios as well as more abstract lottery choices. Thus, in the scores used in this article, 34 questions were selected to measure attitudes towards risk, examples of which are given below.

From these questions, the objective was to construct for each respondent a consistent relative indicator or "score" of his or her risk preference or attitude. The score is therefore intended to be an aggregate, qualitative, ordinal measure that is assumed to be representative of the respondent's responses to a diverse set of questions.

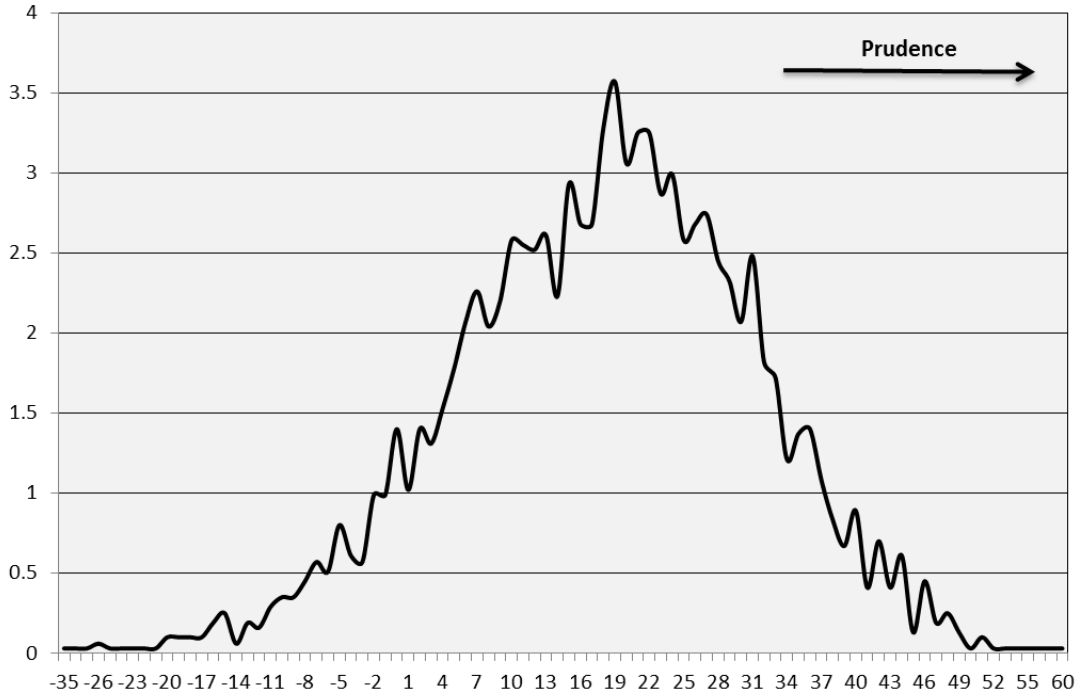
Questions used and calculation of scores

Let's give some examples of questions. In terms of attitudes towards risk, there are anecdotal cases such as: "Do you take an umbrella when the weather is uncertain", or "Do you park your vehicle in a state of offence", as well as lottery choices ("Investing a win at greater or lesser risk"), or consumer practices such as: "Have you practised or do you practise risky sports? ")," or opinions: "Do you agree with the statement that 'marriage is insurance'? ».

No single question taken in isolation is in itself satisfactory for measuring the parameter of preference. If a question is focused on theory (a lottery for example), it may appear too abstract and generate a lot of noise (especially from wave to wave). Conversely, the interpretation of

answers to everyday questions inevitably poses problems due to the effects of context and irrelevant factors: a risk-tolerant individual may, for example, out of civic-mindedness, never "park in a restricted area". The underlying idea is then that only the "average" of all the answers would make sense, provided that aggregation makes it possible to globally eliminate these parasitic dimensions (bias, context effect, endogeneity...).

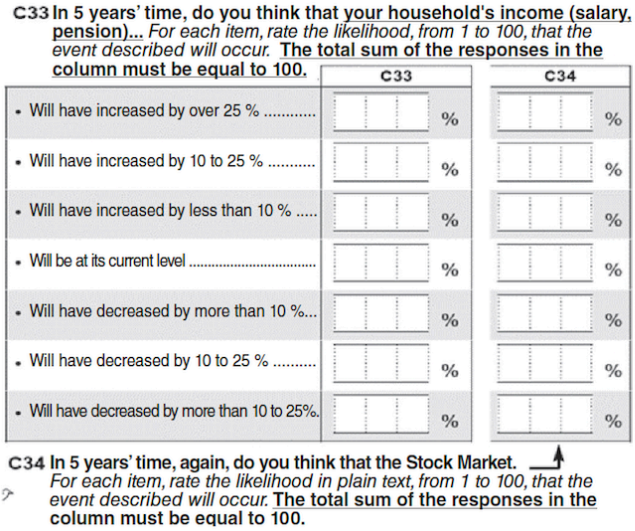
The statistical method then consists, in a second step, in coding the responses in four modalities: risk-averse: -2 or -1; neutral: 0; risk-averse: +1 or +2; then summing the "scores" thus obtained by the individual. Finally, the score is the sum of the scores reduced to the only items that proved, ex post, to form a statistically coherent whole.



*Source: Life History and Wealth Survey 2014-2015 and 2017-2018 (*authors' calculations*)*

The graph above represents the histogram of the risk score for households responding to the follow-up survey in *Life History and Wealth Survey* 2014-2015. It can be seen that the scores provide a complete distribution of the population according to their attitude towards risk, which is not always possible with the usual measures (only 4 or 10 positions).

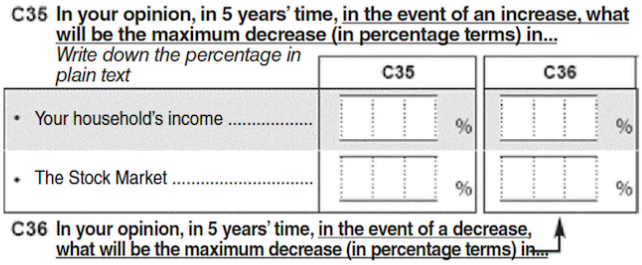
Annex 2: Measuring expectations about the labour and stock markets



C33 In 5 years' time, do you think that your household's income (salary, pension)... *For each item, rate the likelihood, from 1 to 100, that the event described will occur.* The total sum of the responses in the column must be equal to 100.

	C33	C34
• Will have increased by over 25 %	%	%
• Will have increased by 10 to 25 %	%	%
• Will have increased by less than 10 %	%	%
• Will be at its current level	%	%
• Will have decreased by more than 10 %...	%	%
• Will have decreased by 10 to 25 %	%	%
• Will have decreased by more than 10 to 25%.	%	%

C34 In 5 years' time, again, do you think that the Stock Market. *For each item, rate the likelihood in plain text, from 1 to 100, that the event described will occur.* The total sum of the responses in the column must be equal to 100.



C35 In your opinion, in 5 years' time, in the event of an increase, what will be the maximum decrease (in percentage terms) in...
Write down the percentage in plain text

	C35	C36
• Your household's income	%	%
• The Stock Market	%	%

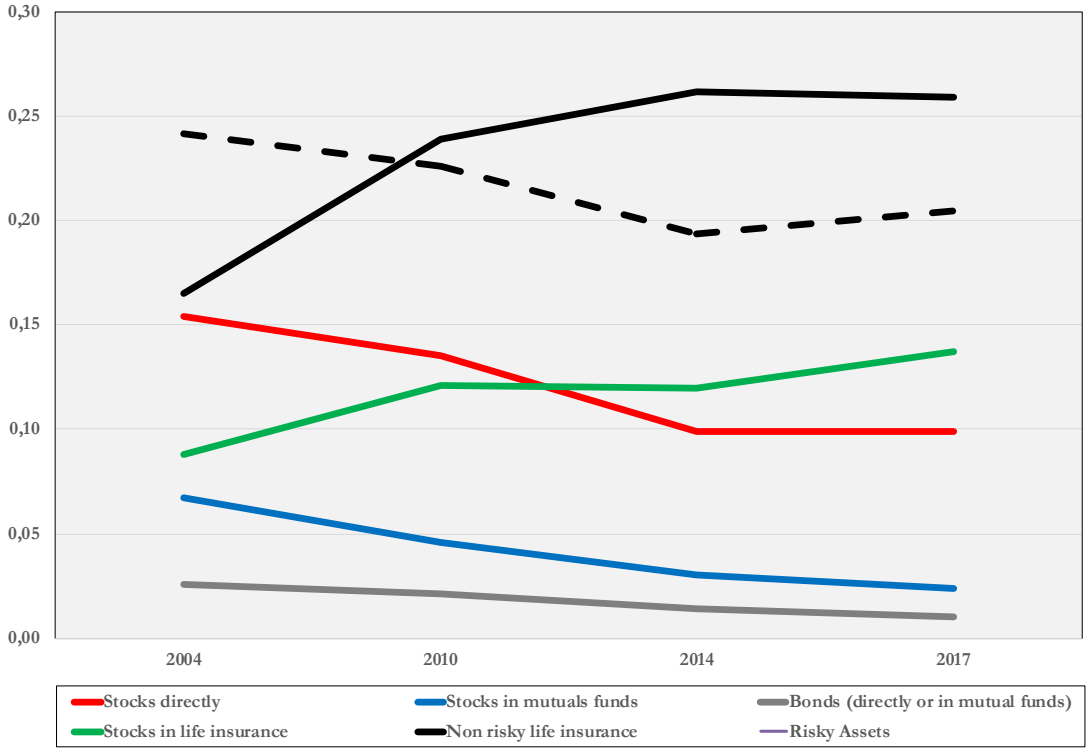
C36 In your opinion, in 5 years' time, in the event of a decrease, what will be the maximum decrease (in percentage terms) in...

Annex 3: Household characteristics in the survey and in the sample

Variable	Global sample	Panel sample
Age	54.2	55.3
Income (non capital)	35 250	41 745
Gross wealth	273 690	346 364
Financial wealth	56 175	77 573
No education	16.3	10.6
<Bac	46.0	46.7
=Bac	8.4	8.5
>Bac (short)	11.8	13.7
>Bac (long)	17.5	20.5
Equities	12.5	16.6
Life insurance	36.3	43.8
Number of observations	13 686	2 676

Source: Life History and Wealth Survey 2014-2017

Graph 1: Securities and life-Insurance ownership rate (2004-2010-2014-2017)



Source: Insee, Wealth survey 2004-2005, 2009-2010, 2014-2015, Life History and Wealth Survey 2017-2018.

Table 1: Securities and life-Insurance ownership rate according to financial wealth (2014-2017)

Table 2 : Securities and life-Insurance ownership rate according to financial wealth (2014-2017)

Percentiles	Stocks directly	Stocks in mutuals funds	Bonds (directly or in mutual funds)	Other equities	Stocks in life insurance	Non risky life insurance	Other life insurance
0-25	0.000	0.003	0.000	0.000	0.021	0.062	0.000
25-50	0.059	0.004	0.000	0.005	0.042	0.176	0.000
50-70	0.088	0.032	0.000	0.007	0.116	0.302	0.000
70-90	0.198	0.043	0.031	0.024	0.239	0.394	0.011
90-99	0.369	0.136	0.051	0.042	0.500	0.587	0.002
99-100	0.787	0.321	0.138	0.030	0.661	0.548	0.092
Total 2014	**0.140**	**0.040**	**0.016**	**0.015**	**0.171**	**0.297**	**0.005**

Source:Wealth Survey 2014(Panel)

Percentiles	Stocks directly	Stocks in mutuals funds	Bonds (directly or in mutual funds)	Other equities	Stocks in life insurance	Non risky life insurance	Other life insurance
0-25	0.002	0.002	0.000	0.000	0.008	0.049	0.000
25-50	0.035	0.002	0.000	0.006	0.060	0.189	0.003
50-70	0.085	0.013	0.007	0.004	0.151	0.325	0.000
70-90	0.184	0.045	0.017	0.017	0.290	0.395	0.005
90-99	0.391	0.103	0.034	0.035	0.506	0.508	0.005
99-100	0.786	0.152	0.145	0.101	0.778	0.487	0.044
Total 2017	**0.136**	**0.031**	**0.013**	**0.013**	**0.199**	**0.295**	**0.003**

Source: Life History and Wealth Survey 2017(Panel)

Table 2: Changes in portfolio composition between 2014-2015 and 2017-2018

	Stocks directly	Stocks in life insurance	Non risky life insurance
Former holders	6.1	8.1	13.6
Never holders	68.1	61.4	53.4
Still holders	19.5	18.7	21.1
New holders	6.3	11.9	11.9
Total	100.0	100.0	100.0

Net sellers	13.8	14.5	21.4
No movement	70.4	62.4	55.2
Net Buyers	15.7	23.1	23.5
Total	100.0	100.0	100.0

Source: Life History and Wealth Survey 2014-2015 and 2017-2018 (Unweighted Panel)

Table 3: Percentage of direct shareholdings between 2014-2015 and 2017-2018 according to the date of the interview

Interview	*2014*	*2017-2018*	**Total**
2017	25.80	26.30	2464
2018	24.60	20.75	212
Total	25.64	25.86	2676

*Source: Life History and Wealth Survey 2014-2017 (*Unweighted Panel*)*

Table 4: Demand for direct stockholding (marginal probit with pooled data-clustered s.e.)

Variable	Scale		Score		Lotery	
	Coef.	*Robust t*	*Coef.*	*Robust t*	*Coef.*	*Robust t*
Age	0.003	4.98	0.004	5.27	0.003	4.64
Wealth level (Ref.: 0-25)						
25-50	0.262	3.51	0.263	3.55	0.260	3.49
50-70	0.294	4.10	0.302	4.21	0.294	4.11
70-90	0.411	6.02	0.417	6.12	0.414	6.04
90-99	0.590	8.29	0.597	8.41	0.594	8.30
99-100	0.769	11.21	0.773	11.31	0.770	11.18
Income (log.)	0.005	0.98	0.006	1.13	0.005	0.91
Variance of income (10E-8)	3.880	3.49	3.920	3.09	3.890	3.30
Risk aversion						
Scale (from 0: risk aversion to 10: adventurous)	0.009	2.12				
Score (+: risk lovers)			0.002	2.17		
Lottery 1 (No answer)					-0.052	-1.17
Lottery 2 (Strong AR)					-0.047	-1.03
Lottery 3 (Moderate AR)					-0.007	-0.16
Lottery 4 (low AR)					-0.025	-0.50
Time preference (0: impatience; 10: forsighted)	0.009	2.05	0.010	2.39	0.008	1.97
Stock market anticipations						
Ambiguity in expectations (Ref.: Non ambiguous expectations)	-0.052	-2.43	-0.056	-2.65	-0.056	-2.60
Anticipated return	0.153	2.21	0.154	2.25	0.159	2.30
Anticipated variance	0.066	0.14	0.045	0.09	0.081	0.17
Level of diploma (Ref.: without diploma)						
Below Baccalaureate	0.089	1.68	0.092	1.73	0.086	1.63
Baccalaureate	0.110	1.78	0.112	1.83	0.107	1.74
Short Superior	0.158	2.64	0.161	2.70	0.156	2.61
Superior Long	0.206	3.73	0.210	3.82	0.203	3.71
Self-employed person	-0.031	-1.26	-0.030	-1.22	-0.028	-1.14
Parent shareholders	0.058	2.56	0.062	2.72	0.060	2.64
Inheritance or donation (Ref.: no transmission)	0.036	1.91	0.036	1.89	0.037	1.94
Wave (ref: 2014)	-0.018	-1.88	-0.019	-2.00	-0.017	-1.83
Number of observations	4428		4432		4432	
Number of individuals	2214		2216		2216	
Pseudo R2	0.2433		0.2433		0.2434	

Table 5: Demand for multi-support life insurance (marginal probit with pooled data-clustered s.e.)

Variable	Scale		Score		Lotery	
	Coef.	*Robust t*	*Coef.*	*Robust t*	*Coef.*	*Robust t*
Age	0.001	1.82	0.001	1.49	0.001	2.14
Wealth level (Ref.: 0-25)						
25-50	0.315	4.77	0.311	4.72	0.308	4.64
50-70	0.341	5.08	0.339	5.06	0.333	4.93
70-90	0.455	7.15	0.454	7.15	0.449	7.00
90-99	0.582	8.86	0.583	8.89	0.574	8.67
99-100	0.708	10.86	0.710	10.93	0.703	10.68
Income (log.)	0.002	0.36	0.002	0.31	0.001	0.24
Variance of income (10E-8)	-0.602	-0.49	-0.621	-0.50	-0.495	-0.40
Risk aversion						
Scale (from 0: risk aversion to 10: adventurous)	0.007	1.71				
Score (+: risk lovers)			0.000	-0.49		
Lottery 1 (No answer)					0.008	0.17
Lottery 2 (Strong AR)					0.049	1.07
Lottery 3 (Moderate AR)					0.073	1.51
Lottery 4 (low AR)					0.061	1.14
Time preference (0: impatience; 10: forsighted)	0.012	2.73	0.010	2.37	0.011	2.62
Stock market anticipations						
Ambiguity in expectations (Ref.: Non ambiguous expectations)	-0.013	-0.60	-0.017	-0.82	-0.010	-0.49
Anticipated return	0.043	0.62	0.053	0.77	0.033	0.48
Anticipated variance	1.118	2.43	1.162	2.53	1.099	2.41
Level of diploma (Ref.: without diploma)						
Below Baccalaureate	0.133	2.44	0.134	2.46	0.132	2.45
Baccalaureate	0.170	2.71	0.172	2.75	0.165	2.66
Short Superior	0.228	3.73	0.232	3.80	0.224	3.70
Superior Long	0.256	4.59	0.259	4.66	0.250	4.52
Self-employed person	-0.001	-0.03	0.004	0.17	0.002	0.08
Parent shareholders	0.109	4.60	0.110	4.64	0.111	4.69
Inheritance or donation (Ref.: no transmission)	0.038	2.02	0.038	2.01	0.038	1.98
Wave (ref: 2014)	0.033	2.92	0.033	2.94	0.032	2.84
Number of observations	4428		4428		4428	
Number of individuals	2214		2214		2214	
Pseudo R2	0.1842		0.1833		0.1856	

Table 6: Results of the estimation of double differences

	Ownership			**Amount**			**Composition: share of direct stocks in financial assets**			**Composition: share of risky assets in gross wealth**
Explanatory variables	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	
Time dummy	0.037**	0.017	0.786***	32,521	18,676	-36,521	0.004	0.002	-0.146***	-0.130***
Group dummy	1.569***	1.569***	0.031	386,982***	386,982***	91,028*	0.158***	0.158***	-0.010*	-0.029***
Double difference	-0.084	-0.129	-0.115	105,688	378,029***	-98,126	-0.016*	-0.007	0.012*	0.023***
Constant	-0.946***	-0.946***	-0.319***	48,059***	48,059***	169,470***	0.035***	0.035***	0.191***	0.187***

Note:

(1): The treatment adopted is the introduction of the IFI and the flat tax at the end of December 2017. The group of households treated consists of households that would have been subject to wealth tax in 2017 if the flat tax had been maintained, but which are not subject to property wealth tax at that same date.

(2): Households in the 2017-2018 survey are considered to be those whose actual collection date is after the date of entry into force of the reform.

(3): Households considered are those close to the wealth tax liability threshold, i.e. on the one hand households with net assets of between 300,000 and 1,300,000 euro, regarded as the control group, and on the other hand households with net assets of between 1,300,000 and 2,300,000 euro, regarded as the treated group.