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Prast, H.M.; Rossi, M.; Torricelli, C.; Druta, C.

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*Henriëtte Prast, Mariacristina Rossi, Constanza Torricelli and  
Cristina Druta*

## **Do Women Prefer Pink?**

**The Effect of a Gender Stereotypical Stock Portfolio on  
Investing Decisions**

## **Do women prefer pink? The effect of a gender stereotypical stock portfolio on investing decisions**

**Henriette Prast\***

**Mariacristina Rossi#**

**Costanza Torricelli†**

**Cristina Druta±**

### **Abstract**

We investigate whether lack of familiarity may contribute to an explanation of the gender gap in stock market participation and risk taking. We use ads in widely read women magazines to select companies that we assume to be more familiar to women than to men, and construct a “pink” portfolio. We construct a “blue” portfolio by selecting stocks from the AEX index. We ask members of the CentERpanel how they would allocate 100.000 euro of pension wealth. Half of respondents are given the choice between government bonds and a portfolio consisting of companies most traded at Amsterdam Exchanges, while the other half can choose between government bonds and our “pink” portfolio. We find that significantly more women than men choose not to respond after having seen the question and that respondents tend to allocate their hypothetical savings fifty-fifty over stocks and bonds. This could be interpreted either as going for the default choice or the 1/n heuristic. We find a pink portfolio effect among older women, and a significant of framing which is larger for women than for men. We also find that women who already own stocks allocate significantly more to the stock basket than women who do not, which may be interpreted as an effect of familiarity. We find no such effect among men. Our evidence does not show that lack of familiarity with the large companies most traded at the Amsterdam stock exchange explains the gender gap in participation and portfolio choice. What we do find, however, is that a pink portfolio reduces decision time for women, and results in women deciding quicker than men.

JEL Codes G02, G10, G11, J16, M30

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\*Corresponding author, Finance Department, Tilburg School of Economics and Management, Tilburg, the Netherlands, and Netspar. [h.m.prast@uvt.nl](mailto:h.m.prast@uvt.nl).

# Department of Economics and Finance, University of Turin and CeRP, Turin, Italy.

†Economics Department, University of Modena and Reggio Emilia and Cefin, Modena, Italy

± Master Student, Maastricht University. Part of the analysis in this paper is based on her Master Thesis Finance at Tilburg University

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## 1. Introduction

Women participate less in the stock market than men, and if they do they take less risk. Usually, this gender gap in investing is explained by lower financial literacy and risk tolerance of women compared to men. In this paper we investigate another hypothesis, namely whether the gender gap in financial decision making can be explained by differences in familiarity with investment products most traded in the stock market. Gender marketing of financial products is seldom found, something which can be explained by several factors: the household, not the individual, was traditionally the relevant unit for saving, investing and insurance decisions, and finance theory assumes a unitary financial consumer (Donni and Chiappori 2011; Chiappori 2013). Only recently there is attention for differences in financial planning preferences within the family (Chiappori 2013; Browning *et al.*, 2014).

Most policy debates on the gender gap in economics focus on the gap in employment and pay, which persists even across most developed countries, despite increased labor market participation by women (Boeri, Del Boca and Pissarides, 2005). Behavioral science research stresses unconscious bias as one of the causes, and provides solutions to reduce its effects (Bohnet *et al.*, 2014). The gender gap in the labor market results in itself in a pension gender gap, and the OECD has called for reducing the gender gap by creating financial inclusion of women, a plea which has been supported by the G20 Ministers of Finance and Central Bank Governors in July 2013, and the G20 leaders in September 2013 (OECD, 2013; G20, 2013).

Gender gaps have been consistently documented when it comes to financial behaviour, for example the allocation of assets in retirement plans (Sunden and Surette, 1998), the choice between DB and DC pension schemes, and the allocation of wealth to stocks after controlling for risk tolerance (e.g. Van Rooij *et al.*, 2007). Gender gaps have also been found in financial literacy (e.g. Lusardi and Mitchell, 2008) and self-assessed and measured risk attitudes (e.g. Eckel and Grossman 2002, Van Rooij *et al.* 2007, Arano *et al.* 2010). In fact, the gender gap in stock market participation and investing is usually explained by lower financial literacy and risk tolerance of women compared to men (e.g. Schubert *et al.* 1999, Lusardi and Mitchell 2008, Croson and Gneezy 2009, Dohmen *et al.*, 2011), or by a gap in numeracy (Almenberg and Dreber, 2012).

Explaining the gap is important in a world in which financial risk is shifted toward individuals, women (need to) rely more on themselves financially, worldwide women control more than 25% of wealth (Damisch *et al.*, 2010), the financial industry is called upon to put customers central stage and have a care duty in helping people make adequate financial decisions. It is generally assumed that a reduction in the gap should result from a change in

women's characteristics and financial behaviour – towards more financial market participation and risk taking -, even though it cannot be excluded that men participate too much and take too much risk. In fact, Barber and Odean (2001) hypothesize that excessive trading in the stock market can be explained by overconfidence. Based on previous findings that men are on average more overconfident than women, they use gender as a proxy for overconfidence and indeed find that men trade more excessively than women, with the difference being even larger when couples are excluded from the sample.

Be that as it may, research in finance as well as other disciplines (notably psychology and behavioral economics) suggests that the gap in literacy and risk tolerance may be only a partial explanation (e.g. Fellner and Maciejovsky, 2007). In this paper we investigate whether a gender gap in familiarity with the companies traded in the stock market may contribute to explaining the gender gap in investing. We are inspired by the familiarity-breeds-investment explanation of the investor home bias (Huberman, 2001), which is based on a model by Merton (1986). We investigate whether *lack of familiarity* with firms traded in the stock market may contribute to an explanation of the gender gap in portfolio choice. We do so by asking people to allocate a hypothetical amount of 100,000 euro of pension savings over a risk free asset and a basket of stocks. Half of respondents are presented with a stock basket based on the index of the stocks most traded at Amsterdam Exchanges, and the other half with a portfolio consisting of companies that advertise in women magazines.

Our main findings are that significantly more women than men choose not to respond after having seen the question, that there is a pink portfolio effect among older women, and that there is a significant of framing which is larger for women than for men. We also find that women who already own stocks allocate significantly more to the stock basket than women who do not, which may be interpreted as an effect of familiarity. We find no such effect among men. Our evidence does not indicate, however, that lack of familiarity with the companies most traded at the Amsterdam stock exchange contributes to an explanation of the gender gap in stock market participation.

The paper is structured as follows. In the next section we provide an overview of empirical findings regarding gender differences in life cycle saving and investing as well as explanations traditionally given for these gaps. Section 3 discusses the concept of familiarity applied to investor behaviour. In section 4 we describe our methodology and data and present summary statistics. Section 5 presents some descriptive findings as well as a regression analysis on gender differences in the association between familiarity and stock investing. In Section 6 we discuss results on the association between the time needed to

complete the questionnaire by gender. Section 7 summarizes and makes suggestions for further research on the gender gap in finance.

## **2. The gender gap in finance**

A gender gap in finance has been consistently documented when it comes to financial literacy (e.g. Lusardi and Mitchell, 2008), risk attitudes (e.g. Eckel and Grossman 2002, Arano *et al.* 2010) the choice between DB and DC pension schemes (e.g. Van Rooij *et al.*, 2007) and the allocation of assets in retirement plans (Sunden and Surette, 1998). Analysis of the interaction between gender and marital status in the allocation of assets in retirement savings plans using the Survey of Consumer Finances 1992-1995 in the US finds that single women take less risk (Sunden and Surette 1998). Bertocchi *et al.* (2011), using more recent data from the Bank of Italy Survey on Household and Wealth, arrive at a similar conclusion, although they find that the effect differs according to whether married women participate in the labor market. When it comes to stock market behavior, Barber and Odean (2001) use gender as a proxy for overconfidence and find that men trade more excessively than women, with the difference being even larger when couples are excluded from the sample.

Lower stock market participation and less risky portfolio choices by women are usually explained by a lower degree of financial literacy and/or a higher risk aversion of women as compared to men (e.g. Schubert *et al.* 1999, Lusardi and Mitchell 2008, Croson and Gneezy 2009, Dohmen *et al.*, 2011). Sometimes this explanation is accompanied by pleas for financial education of women, the underlying assumption being that a) the gap should be reduced, and b) a reduction of the gap should come from a change in the behaviour of women. Be that as it may, research in finance as well as other disciplines (notably psychology and behavioral economics) suggests that gender gaps in literacy and risk attitudes may be only a partial explanation of the gap in investment decisions (e.g. Fellner and Maciejovsky, 2007).

### *Interpreting the results of literacy tests*

70% of women who answer “don’t know” to financial literacy questions give the correct answers if the “don’t know” option is not available, reducing (though not eliminating) the gender gap in literacy (Bucher-Koenen *et al.*, 2012). A possible explanation is a gender gap in confidence. Moreover, stereotype threat may play a role. If reminded of their gender, females have worse math scores (Good and Harder, 2008) and negotiation outcomes (Kray *et al.*, 2002), just as white males in sports perform worse after having been reminded that they are white (Stone *et al.*, 1999). Also, in more egalitarian societies, the gender gap in math scores

disappears (Guiso *et al*, 2008).

### *Interpreting the gender gap in measured risk tolerance*

Girls are more likely to choose risky outcomes when assigned to all-girl groups (Booth and Nolan, 2012) – suggesting that context plays a role; in fact, women’s financial choices are more context-specific and sensitive to social clues than men’s (Croson and Gneezy, 2009). Women exhibit lower risk tolerance than men in investing decisions, but not in gambling decisions, and they take more risk in *social* decision making (Weber *et al*. 2002, Harris and Jenkins 2006). The authors suggest that decision making with risk may reflect not only risk tolerance, but also confidence in the ability to manage certain risks. In fact, Barber and Odean (2001) find that men expect to outperform the stock market by a significantly greater margin than women. People may know that in gambling they cannot manage risk, whereas men may be more confident than women in their ability to manage investment risk, while women may feel more confident in their capacity to manage risk in the social domain (see also Heath and Tversky, 1991). According to Barber and Odean, overconfidence may be the key to understanding excessive trading and explain why men trade more excessively than women, with the difference being larger among singles. Another potential explanation of gender differences in risky decisions may be that women process information differently than men, with the result, *inter alia*, that they tend to be more cautious in decision making (Meyers-Levy, 1989).

Despite their assumed lower propensity to take risk, women have less access to credit, be it business loans or mortgages (Hertz, 2011) and are, after controlling for relevant background characteristics, charged higher interest rates for business credit (Alesina *et al*, 2013). This may reflect less self-confidence on the part of the female client. It has been shown that anxiety results in worse negotiation outcomes especially when the belief in one's own ability is low (Wood Brooks and Schweizer, 2011). It may also be due to less explicit confidence on the part of the supplier in the ability of female clients to manage risk or set up a business. An implicit and unintended negative attitude towards women when it comes to business and finance may also play a role. Recent evidence for the labor market suggests that as soon as decision makers learn the sex of a person, gender biases are activated (Bohnet *et al*, 2013). This bias – which can be detected through an implicit association test (Greenwald *et al*, 1998)<sup>1</sup> leads to unintentional discrimination, not based on a rational expectation of future performance (Bertrand *et al*, 2005).

The gender gap in risk taking of women in stock markets and that in access to credit are intriguing, but their combination is even more surprising and calls for further research into

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<sup>1</sup> Readers can see examples of an implicit association test at <http://implicit.harvard.edu>

the determinants of the gender gap in finance. This is what the present research aims at by applying the concept of familiarity, where in this paper the focus is on (gender differences in) familiarity with the companies traded in the stock market.

### 3. Familiarity and finance

Familiarity is not new in finance. It has been used as an explanation for some stylized facts in investment behaviour.

For instance, investors hold much more stock from their home country than theory would predict, diversifying less than would be optimal according to finance theory (French and Poterba 1991, Tesar and Werner 1996). This so-called home bias has not disappeared with developments in ICT and with the removal of institutional barriers like capital controls. There is even an investor home bias within countries, with investors in US holding more stock from companies operating locally (Coval and Moskowitz, 1999). Moreover, employees hold a large fraction of their pension wealth in employer stock and Enron has not changed this (Laibson, 2005). And finally, even after excluding employer stock holdings, investors hold an excessive percentage (more than ten percent) of their portfolio in stocks of companies in the industry they work in (Doskeland and Hvide, 2011). Itzkovitz *et al* (2014) find that investors trade stocks of companies whose ticker (name) begins with a letter that appears early in the alphabet more frequently than later alphabet stocks. This may be familiarity with abc (over xyz), satisficing or a default effect.

Merton (1987) was the pioneer of familiarity and stock market investing, even he did not use the word. He constructs a model to explain why investors hold only a subset of all securities available even if they have perfect access to information and there are no regulatory barriers. He assumes that “*an investor uses security  $k$  in constructing his optimal portfolio only if the investor knows about security  $k$* ”. Note that “knows about” does not mean “has access to knowledge about”. Rather, the key aspect of his model is that there exist subsets of investors that trade in a subset of all the securities available: the securities that they *are aware of*. Hence it is not that investors have no access to information about some securities, but that they do not seek access to that information because they are not ‘aware’ of the existence of the securities: “If an investor does not follow a particular firm, then an earnings or other specific announcement about that firm is not likely to cause that investor to take a position in the firm” (Merton, 1987). Referring to Merton (1987), Huberman (2001) suggests that the investor home bias may be due to familiarity with companies that are close to “home”. Familiarity is also used by Heath and Tversky (1991), who explain why people “prefer to bet on their own judgment (as compared to a chance lottery) in a context where they consider



themselves knowledgeable or competent... our feeling of competence is enhanced by general knowledge, familiarity, and experience..." Di Mauro (2008), referring to Heath and Tversky (1991), suggests that feeling knowledgeable may explain the investor home bias. Empirical evidence shows that familiarity with stocks may also result from working within an industry or firm, or living close to an industry or firm. Any effect of familiarity may result from the fact that mere exposure to something creates positive affect (Zajonc, 1968). Moreover, in some areas of uncertainty individuals feel more competent if the source of information is familiar to them (Trautmann and van de Kuilen 2013), with higher familiarity resulting in less ambiguity aversion (Merton 1987; Boyle *et al.* 2013). In a recent study, Fuchs-Schuendeln and Haliassos (2014) hypothesize that lack of familiarity with capitalist types of financial products ("product familiarity") would result in more cautious behavior, post-unification, by former inhabitants of Eastern Germany than by their peers from former Western Germany. However, they find that familiarity plays at best a secondary role. Perhaps this is because rather than studying the effect of familiarity, they investigate the effect of a sudden (increase in) exposure, combined with many other changes that took place with the German unification.

The fundamental hypothesis underlying the analysis in this paper is that gender differences in *familiarity with the world of finance* may contribute to explaining the gender gap in stock market investing. Familiarity with the world of finance may take on many forms. The focus in this paper is on familiarity with the *companies most traded* in the stock market. In other words, this study uses 'brand' familiarity.<sup>2</sup>

When investigating the hypothesis that brand familiarity contributes to explaining the gender gap in investing, several elements play a role. Could it be that for both men and women familiarity plays a role, and that companies most traded (and talked about) in the stock market are less familiar to women than to men? Could it be that these companies are equally (un)familiar to both genders, but women are more sensitive to familiarity than men? Finally, could it be that gender differences in stock market behaviour reflect differences in the types of risk that men and women want to hedge through their investment decisions? Consumers investing for retirement face various types of risk, but often (in line with the CAPM) attention is only given to accumulated wealth until retirement. If it is accepted that the ultimate goal of investment is consumption, risk includes other risks to consumption that can or cannot be managed through portfolio choice. A "consumer services model" of investment would take account of, *inter alia*, uncertainty about future relative prices of consumption goods (Merton, 1975). If the general price level does not change but some consumption items become more expensive while others fall in price, optimal decisions from

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<sup>2</sup> Boggio *et al* (2014) study gender differences in the familiarity with financial language; it could also be that women, more than men, feel unfamiliar with the idea of an anonymous stock market.

the CAPM point of view may not buy the retiree the consumption services that he was planning to buy. An asset that would offer protection against such risk is preferable, *cp*, to assets that don't. Investing in an asset whose value is positively correlated with or even matches (as is the case with an owned home) the relative price of preferred consumption goods protects against the relative price risk. If the genders should differ on average in their preferences for types of consumption goods, this would rationally have to lead to being attracted to different portfolios, even if conventional risk return trade-offs are identical. In that case buying stocks of brands you prefer as consumption good is a way of hedging a consumption services risk (Merton 1975, 1977). In this paper we do not explicitly deal with this issue, but the consumer services model interpretation may be an alternative to the familiarity explanation of gender differences in investing preferences.

In order to test a potential gender gap in familiarity and its effect on risk taking, we ask respondents to allocate hypothetical savings to a risky and a safe asset. For the risky asset, we construct two different stock baskets. One is based on the Amsterdam Exchange Index (AEX), which the 25 most traded companies at the Amsterdam Stock Exchange. Many of these companies could be ranked as typically "masculine" (steel, beer, oil and gas, Oil equipment, semiconductors, heavy construction, chemicals and real estate), DSM (chemicals), while the remainder can be seen as fairly neutral (e.g. coffee, consumer electronics, delivery services, publishing, business training, food, banking and insurance, airlines). In what follows we will call a portfolio based on these companies "blue", in contrast to a "pink" portfolio, which we construct using companies advertising in women magazines. We would like to stress that while this is the easiest way to test differences in familiarity, it may not be the key to understanding the gender gap, as this pink portfolio is a relatively anonymous way of investing.

Measuring the effect of familiarity by constructing a pink portfolio based on advertisements in women's magazines actually amounts to assuming that women's magazines are read more by women than by men, and hence that women are more exposed to these advertisements than men. It does not require that all women read women's magazines. In fact, not all women do. and some women may regard it as offensive if they are being regarded as interested in magazines, which focus on apparel, fashion, beauty, home making and human interest (or gossip, if you like). In fact, fashion is often seen as low-brow, while architecture is regarded as high-brow even though both are applied art (Andreozzi e Bianchi, 2007; Bianchi, 2002). Intellectuals publicly stating a different view are an exception (Portnoy, 1986; Jelinek, 1983).<sup>3</sup> Other women may feel that looking down upon fashion, beauty and women magazines reflects that our culture looks down upon things that interest women

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<sup>3</sup> The authors of this paper hold different views on this subject.

more than men - with people interested in fashion being “victims, while those interested in sports are “fans, and blondes are dumb.

Be that as it may, fact is that in the Netherlands the market for women’s magazines is much larger than that of men’s magazines, both in number of different types of magazines and in sales. In fact, the category women magazines consists of 26 different types, whereas there are merely three men’s magazines in the Netherlands ([www.nommedia.nl](http://www.nommedia.nl)). An overview of sales of the top ten magazine categories is given in Table 1.

**Table 1. Top Ten Types of Magazines in the Netherlands (sales in mln euros), 2012**

1. Women’s magazines	305.2
2. Radio and television guides	202.0
3. Lifestyle	105.5
4. Opinion	55.7
5. Home and garden	49.2
6. Youth and teens	47.6
7. Sports	46.9
8. Popular science	28.2
9. Automobiles	23.7
10. Recreation	21.9

*Source: [www.mediafacts.nl](http://www.mediafacts.nl) (2013)*

Note that the category women magazines does excludes magazines that may be read mostly by (but not buy most) women, but are in a different category (gossip, lifestyle, personality). On top of this it should be stressed that Table 1 merely gives figures on Dutch magazines, whereas in the Netherlands foreign magazines abound, something which we have accounted for in the construction of the pink portfolio.

In constructing the pink portfolio our aim was NOT to construct a portfolio that is most familiar to women (optimal in terms of familiarity), but a portfolio that can be assumed to be more familiar to women than to men. This is because our focus is not on the question how a portfolio should be constructed in order to attract maximum investment by women, but much more modest: can familiarity play a role in explaining the gender gap in investment decisions. For this reason we also chose to construct the “blue” portfolio not through advertisements in men’s magazines, but based on stocks most traded. It should also be stressed that we are not recommending the pink portfolio to women.

#### **4. Methodology and data**

Our data have been collected through an internet survey in September 2013 among participants of the CentERpanel run by CentERdata at Tilburg University. CentERdata is a survey research institute that is specialized in data collection and internet surveys. The CentERpanel consists of about 2000 households representative of the Dutch-speaking population in the Netherlands. Within the household, all household members are invited to participate. Panel members fill out short questionnaires via the internet on a weekly basis. Annually, panel members provide information on individual income, household wealth, health, employment, pensions, savings attitudes, and savings behavior for the DNB Household Survey (DHS), providing researchers with a rich set of background information on the respondents. The availability of a computer or internet connection is not a prerequisite of the selection procedure, which is done by a combination of recruiting randomly selected households over the phone and by house visits. After having agreed to participate, panel members receive explanation on survey administration, which is conducted via the internet. If necessary, either a computer with internet access or alternative equipment such as a set top box for communication through the television is provided to respondents. Data collected with internet surveys display higher validity and less social desirability response bias than those collected via telephone interviewing (Chiang and Krosnick, 2009). The panel has been used for numerous studies on household and individual behavior and attitudes, including pension attitudes (see for instance Van Rooij *et al*, 2007, and Prast *et al*, 2013) and financial literacy and retirement planning in the Netherlands (see Alessie *et al*, 2011). For more information on the panel see Teppa and Vis (2012).

In order to confront the survey respondents with two portfolios that might differ in familiarity to men and women, we first constructed what we call a “blue” and a “pink” basket of stocks. The blue portfolio consisted of a selection of the large companies most traded at the Amsterdam Exchanges (AEX). The pink portfolio was constructed as follows. We collected copies of the most popular women magazines in Italy, France, the Netherlands, the UK and the US over the period January 2011 – July 2013, taking one copy of each magazine for every season of the year. We then made an inventory of the advertisements in these magazines, and selected those of companies traded in the stock market, whether or not under a different name. Of the resulting 65 companies, 24 turn out to be listed on the New York Stock Exchange, eleven on Euronext (located in Amsterdam, various European countries, seven on the exchange of Frankfurt, nine at the London Stock Exchange, two on

the OMX (Scandinavia and Baltic States Exchange), seven on the SCA, four at Borsa Italiana, and one on the BMad (Madrid Stock Exchange). More details are provided in Appendix I.

As far as industries covered they are mostly apparel, followed by cosmetics and hygiene. Two thirds of the companies that are stock listed and advertised in the magazines belong to these industries. Moreover, we find home/family related products and services (food, pet food, Disney, home furnishing), ict/social media, electronics, cars, and one financial. From the 65 companies, we qualify 14 as luxury (see Appendix). It came as no surprise that the advertisements in women magazines read by consumers are about retail products and services. This is one difference with the AEX index, which contains both raw materials/business to business, and retail producers.

In attempting to create portfolios that would be similar accept in their degree of familiarity to men and women, we made several decisions. First, we removed from the pink sample those companies that we<sup>4</sup> did not know ourselves. This left us with 49 companies, of which 14 fall in the luxury class. We then left out the products that we regarded as potentially not familiar to women of all ages (ict, social media).

From the resulting 44 companies we removed automobiles, as they may be regarded as either gender neutral or more male oriented (cars).<sup>5</sup> This left us with 41 companies to choose from. Because the AEX contains merely 25 companies, we had to further reduce the number of companies for the pink basket. Moreover, given the limited diversity of industries in both the AEX and the pink selection, we decided to limit the number of companies in both stock baskets to 15 in order to make the decision not too burdensome for respondents.

We then chose from the 41 remaining “pink” companies a selection that would mirror its industry composition: home (food, pet food, home decoration, furnishing, home electronics), hygiene, apparel and cosmetics, where some companies may be both (e.g. Dior). We took care to include both luxury and non-luxury brands. In our final selection, we decided to make one exception to the rule we applied for the advertisement selection. We added Ikea to reflect the industry “home”, even though it is not stock-listed, instead of choosing from Debenhams, Beter Bed and the various food companies. We did so because Ikea turned out to advertise in all but two Italian women magazines, while we thought that Debenhams and Beter Bed would not be familiar to most women.

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<sup>4</sup> Note that we are all females, in age ranging from early twenties to late fifties.

<sup>5</sup> As underscored by the use of women in car advertisements and the non-existence of a Pirelli (car tyre) calendar targeted at women. For illustrations see <http://mycarquest.com/2012/04/women-in-car-advertisements.html>

For the blue portfolio we selected 15 companies from the Amsterdam Exchanges Index of large companies most traded: eight raw materials/heavy industry (steel, chemicals, oil, semiconductors), two financials, three food/non-food retail products, one electronics, and one airline company.

None of the companies were included in both the blue and the pink basket. And while the pink and blue basket contain companies producing goods or services that are used by both genders – e.g. Burberry, Dior, Ralph Lauren and Ikea in the pink portfolio, and DE, KLM, Philips and ING in the blue one - we believe that the degree of femininity and masculinity of the respective baskets differs considerably.

We also felt that the stock baskets were similar in terms of diversification, something which was strictly speaking not necessary given that the question submitted to the panel members described identical risk/return expectations. It should be stressed that the pink portfolio contained not a single Dutch company, while the majority of the companies in the blue portfolio are Dutch (Shell being partly British, KLM/Air France partly French, and Corio being originally Dutch (Hoogovens) but taken over several years ago by Tata Steel from India).

The resulting pink and blue portfolios are the following:

**Table 2. Composition of the pink and blue stock basket (alphabetical order)**

<b>Pink</b>		<b>Blue</b>	
<i>Company</i>	<i>Sector</i>	<i>Company</i>	<i>Sector</i>
1 Burberry	Apparel L	1 Ahold	Food
2 Dior	Apparel/cosmetics L	2 AIR FRANCE –KLM	Airline
3 Douglas	Cosmetics	3 AKZO NOBEL	Chemicals
4 Esprit	Apparel	4 ARCELORMITTAL	Steel
5. Estee Lauder	Cosmetics	5 ASML HOLDING	Semiconductors
6. IFF	Cosmetics	6 CORIO	Steel
7.Ikea	Home	7 DE Master Blenders	Food
8. L'Oréal	Cosmetics	8 DSM	Chemicals
9. Prada	Apparel L	9 FUGRO	Oil equipment
10. Ralph Lauren	Apparel L	10 ING	Financial
11.Revlon	Cosmetics	11 Philips	Electronics
12. Shiseido	Cosmetics L	12 SBM OFFSHORE	Oil equipment
13. Svenska Cellulosa	Hygiene	13 Shell	Oil
14 Tiffany & Co	Jewellery L	14 UNIBAIL Rodamco	Real estate investment
15.Zara	Apparel	15 Unilever	Food, hygiene

Please note that in Table 2 both the pink and blue stocks are presented in alphabetical order. In the questionnaire. This differs from the presentation to the respondents (see Appendix). Note also that in the pink portfolio eight stocks have a name starting with a letter from the first half of the alphabet while in the blue portfolio this is ten. Moreover, in the blue portfolio six stock names start with a, b or c, while none of those in the pink one does.

In both conditions, panel members were given the following hypothetical situation:

Imagine you have 100.000 euro's available to put aside for retirement. You need to allocate it over government bonds with an interest rate of 4 percent, and a basket of stocks which is expected to yield a return of 8 percent. You cannot touch the money until retirement.

You do not invest in individual stock but in a 'basket' of 15 different stocks, which reduces the risk without reducing the return, as bad outcomes of one firm may be compensated for by good outcomes of another.

Upon retirement you will receive with certainty the money that you put in the government bonds plus accumulated interest, hence it is similar to a savings account with a fixed interest rate. The money you put in the stock basket is expected to increase in value eight percent each year. However, this is not certain. It is possible that it grows with more than eight percent each year, but also with less.

A numerical example.

If you put the whole amount in government bonds, it will be worth 148.000 in ten years. If you put everything in stocks, it is expected to be worth 215.000 in ten years. However, it can also be more, for example 280.000, or less, for example 130.000. Assume that you have 100.000 euro available to set aside for retirement. You can choose between risk free government bonds with an interest rate of 4 percent, and a basket of stocks with an expected return of 8 percent. You cannot touch your savings until you retire

How would you allocate the money?

Half of respondents (chosen randomly) were given the blue basket, while the other half were provided with the pink basket of stocks selected on the basis of advertisements in the most read women magazines. Hence respondents could NOT choose between different (baskets of) stocks. The question was formulated this way because we wanted to investigate the effect of pink versus blue on risk taking. Hence respondents were assigned to condition Blue or Pink.

Moreover, we wanted to see whether there was a framing effect of the question. Van Rooij et al. (2011) find that the answer on financial literacy question depends on how the words stock and bonds were used in the question. We therefore randomly assigned half of respondents to the following response ordering condition (Framing a):

How would you allocate the money?

Bonds ....euro  
Stocks ....euro

The other half was assigned to the following response order condition (Framing b):

How would you allocate the money?

Stocks ....euro  
Bonds ....euro

After having answered the question, all participants were, as is usual with questions submitted to the panel, asked about the perceived difficulty of the task, and about clarity, thought-provoking nature, interest, and enjoyability of the question. The survey participants could answer by picking a score from 1 to 5, on a Likert scale, 1 for being the least and 5 representing the most.

Did you find it difficult to answer the question?

Did you find the question clear?

Did you think the question was thought-provoking?

Did you find the topic interesting?

Did you find it enjoyable to answer the question?

The respondents were also allowed to provide comments, whereby the answer was coded as 1 if comments were given, and 2 otherwise.

Do you have any comments about this question?

Finally, the time it took an individual to complete the questionnaire was also registered. Here it should be pointed out that most respondents answer the questionnaire in one session, but there are some that start answering, do not complete the survey in one session, but return to it later (usually the next day). Responding time is measured taking the time elapsed between starting the questionnaire and finishing it, hence for those answering in two separate sessions actual decision time is overstated (even though it could be that respondents have



taken time of to reflect on and gather information relevant to the decision problem). We turn to this later.

Before turning to the answers to our main question – the allocation of pension wealth over the risk free asset and the stock basket – we present some general information and statistics.

The question was submitted in the first week of September 2013 (see Appendix II for the original Dutch version of the question) to respondents aged 18+ who are not retired (totaling 2138), and it was completely filled out by a total of 1319 respondents. Table 3 presents the summary statistics over the type of response obtained.

**Table 3. Summary Statistics, general**

Number of household members	2138	(100%)
Nonresponse	808	(37.80%)
Response incomplete	11	(0.50%)
Response complete	1319	(61.70%)

*Source: authors based on CentERpanel data*

The response rate was 61.7%, which is very low if compared to the usual level in the CentERpanel of around 80%. We have two main explanations for the low response. One is that our sample excluded pensioners, a category within the panel that usually, has a response rate that is above average (most likely because they have more time). The other is that the number of people opening the link and then closing it without answering the question was much higher than normal: 110 instead of around 20. A closer look reveals a major gender gap among the panel members who, after seeing the question, decided not to answer it: 69.1 % is female, 30.9 % male. As the question did not allow for ‘don t know” as an answer, perhaps this non-response should be interpreted as don’t know/not for me. Evidence on financial questionnaires has shown that more women than men tend to say don’t know even if they know the answer. The gender differences we find therefore comes at no surprise, but we cannot conclude that this reflects a gender gap in familiarity.

Be that as it may, the result is that our sample of respondents is biased in the sense that it consists of a gender mix that is tilted toward men more than the general population. Moreover, one might argue that it also has a survivor bias in the sense that panel members who feel less comfortable with pension wealth decisions are under-represented. As it turns out, our sample is also biased in terms of age: the average age of those who complete the questionnaire is 49, as compared to 47 among those who chose not to respond after having seen the question. Finally, the respondents are slightly higher educated than those who closed the link after having seen the question.

**Table 4. Some objective background characteristics of panel members choosing not to respond (n = 110) and panel members who answered the wealth allocation question (1330).**

	<u>Non-responders 110</u>	<u>Responders (330)</u>
Gender composition	69%F 31%M	53% F 47%M
Average Age	47	49
% higher educated	38	44

*Source: authors based on CentERpanel data*

In order to get a feel for the background of respondents, and because of the industry bias documented in earlier investor research, Table 5 gives the occupation of respondents, that is the industry they work in. What stands out from Table 5 is a) the huge gender difference in “non applicable”, which may result from both women not having an occupation and women not seeing their branch in the list of industries, b) the difference in number of men and women working in heavy industry (m>>w) and in health (w>>m), and the difference between men and women in for profit and not-for-profit, respectively (for profit: 171 women, 564 men; not-for-profit: 299 women, 179 men). We will turn to this when discussing some of our findings in Section 5 below.

**Table 5. Respondents’ occupation according to gender and industry**

	Women	Men	Profit/Not for Profit
<b>Not applicable</b>	<b>230</b>	<b>71</b>	
Agriculture	4	14	P
<b>Heavy industry</b>	<b>18</b>	<b>307</b>	<b>P</b>
Energy and water	3	9	P/NP
Construction	9	43	P
Retail, trade	63	44	P
Hotels, restaurants,cafes	7	4	P
Transport	7	32	P
Financial industry	20	32	P
Commercial services	50	79	P
Public administration	39	68	NP
Education	62	48	NP
<b>Health</b>	<b>173</b>	<b>48</b>	<b>NP</b>
Culture, sports, art	18	13	NP
Charitable institutions	7	2	NP
Total	710	618	

After the decision problem, respondents were asked, as usual, what they thought about it. Table 6 gives the evaluation by respondents of the decision task, as well as the measured time elapsed between respondents started and finished the questionnaire. We distinguish between the pink and blue condition and gender. Evaluation is the score on a scale of 1-5, decision time is in seconds.

**Table 6. Respondents' questionnaire evaluation and decision time**

	Respondents who were assigned to Pink portfolio			Respondents who were assigned to AEX portfolio			All types together		
	Male	Female	All	Male	Female	All	Male	Female	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Difficulty of task	2.01	2.45	2.24	2.05	2.54	2.32	2.03	2.50	2.28
Clearness of task	4.09	4.05	4.07	4.15	4.10	4.13	4.12	4.08	4.10
Thought-provoking	2.77	2.61	2.69	2.69	2.82	2.76	2.73	2.72	2.73
Interest in the task	3.34	2.90	3.11	3.27	3.04	3.14	3.30	2.97	3.13
Pleasure of completing the task	3.52	3.26	3.38	3.57	3.36	3.46	3.54	3.31	3.42
Decision time (secs)	4051	3060	3534	4309	8758	6739	4179	6018	5162
Observations	310	339	649	304	366	670	614	705	1319

*Source: authors based on CentERpanel data*

From Table 6 one thing stands out especially, and that is decision time. On average, respondents took 5162 seconds (86 minutes) to decide. Average decision time differed considerably across the pink and blue condition: 59.8 versus 112 minutes. This difference across the conditions is due almost exclusively to the different decision time among women: it takes women in the blue condition more than twice as long to decide than women in the pink condition (8758 vs 3060 seconds). For men, the decision time hardly differs across conditions (4309 vs 4051). As a result, the gender difference in decision time is much more pronounced (and has a different sign) in the blue than in the pink condition. While women in the pink condition decide quicker than men (an average gender difference of around 1000 seconds) it takes women in the blue condition more than twice as long to decide than men (8758 vs 4309 seconds). These differences are statistically significant and could be interpreted as reflecting gender differences in familiarity with (some of the) companies in

the pink vs blue portfolio, respectively. , averages do not say it all, and may be misleading. It is important to verify whether they are due to outliers. Moreover, with decision time being measured as time elapses between starting the survey and finishing it, it may include the time respondents took between various answering sessions. That is, a respondent may have started on day 1, stopped before finishing it, and completing it on day two. Figures 1a – 1d give the distribution of decision time for the two conditions and men and women separately.

**Figures 1a – 1d. Time elapsed between start and completion of survey, in minutes. Gender and condition**

Figure 1a Men, pink condition, distribution of time (minutes) between start and completion

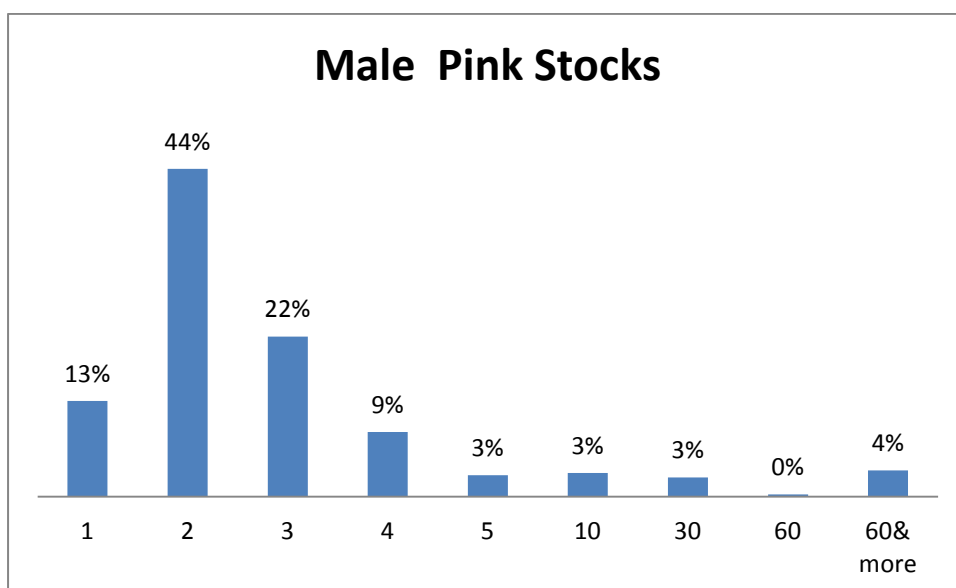


Figure 1b Men, blue condition, distribution of time (minutes) between start and completion

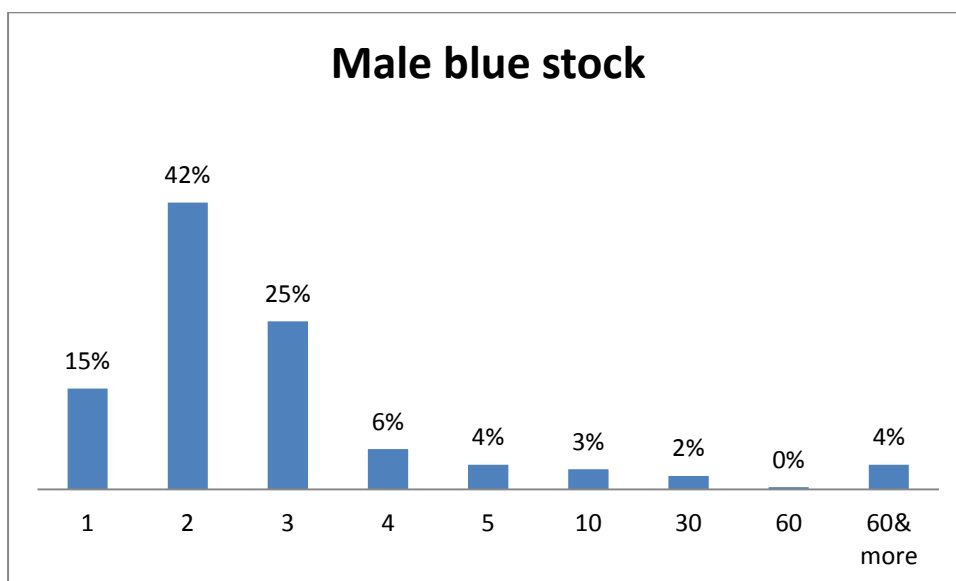


Figure 1c Women, condition, distribution of time (minutes) between start and completion

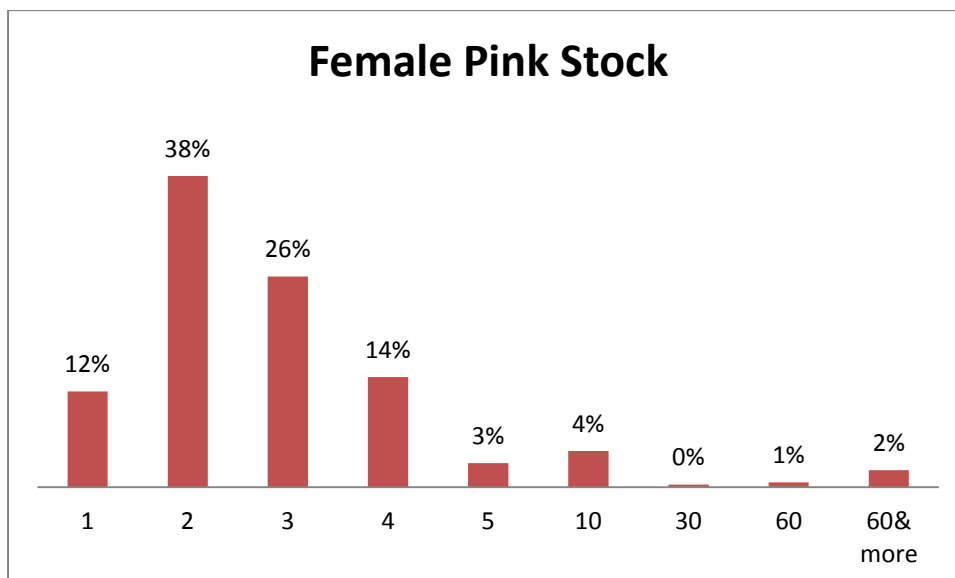
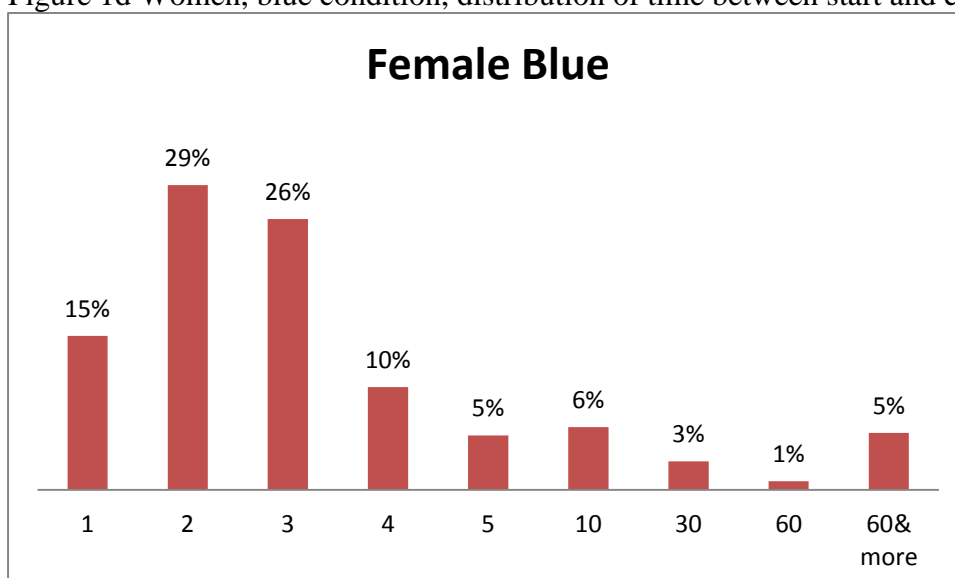


Figure 1d Women, blue condition, distribution of time between start and completion



If we regard time elapsed above 60 minutes as outliers, Figures 1a-d shows that there are outliers in both conditions and among both genders, that there are most outliers among women in the blue condition and least among women in the pink condition, with no difference among men in the pink and blue condition. Moreover, 91% of men in the pink condition completed the questionnaire in five minutes or less, for men in the blue condition this is 92%. On the other hand, 93 % of women in the pink condition finished the questionnaire in five minutes or less, against 86% in the pink condition – a difference of seven percentage points. If we limit attention to the fraction of respondents deciding in three minutes or less, we see percentages of 79 (men, pink), 82 (men, blue), 76 (women, pink) and 70 (women, blue).

We further analyse decision time across genders and condition in Subsection 5.4 below.

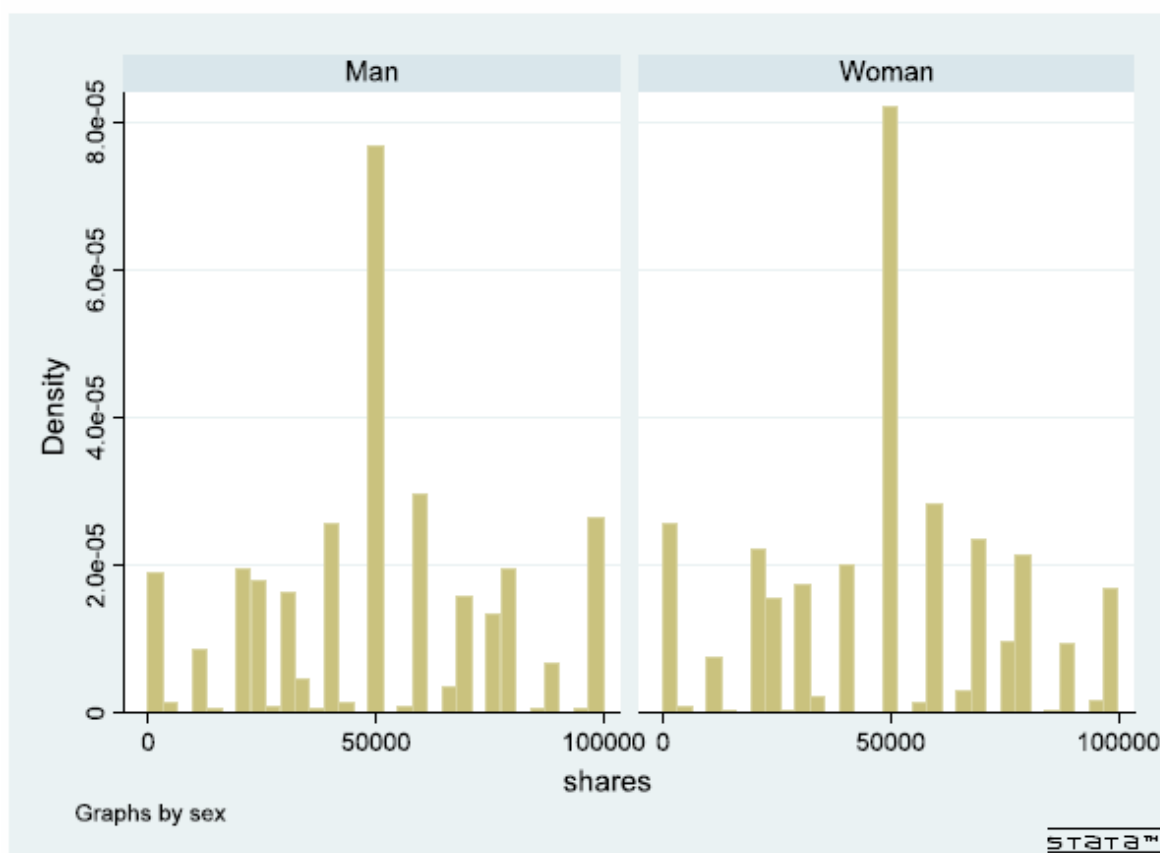
## 5. Wealth allocation decisions: a further analysis

In this section we first provide some descriptive analyses of the answers obtained which highlight some noteworthy feature, then we analyse by means of regression analysis of the data the association between familiarity in portfolio choices and household demographic and economic characteristics.

### 5.1 Descriptives and aggregate findings

We first look at differences in portfolio allocation across gender only. Figure 2 gives the distribution of the percentages allocated to the stock portfolio by gender. For both men and women the distribution shows a peak at a choice of fifty percent risk free assets, fifty percent stock basket.

**Figure 2. Distribution of percentage allocated to stock basket according to gender (pink and blue taken together)**



This is in line with evidence of a  $1/n$  heuristic used by employees in the US when allocating their pension savings among the different investment opportunities offered by the employer:

if the employer offers five possibilities, workers tend to allocate 20% of their savings to each of them, if he offers ten possibilities they allocate ten percent to each one, etcetera (Huberman and Jiang, 2006). This suggests that when deciding on how to save for retirement, people are biased towards dividing their pension wealth equally over the number of investment options available. There are various ways to interpret this result. One is that those who have no idea how to allocate, tend to divide the amount equally, because they perceive it as “not choosing”. In this interpretation, the fifty-fifty choice is a way of saying “don’t know” (don t know was not an answer category). Another is that respondents see this as the obvious way to apply the “not all eggs in one basket” rule, or as close as they can get to the default. Be that as it may, it is clear that a larger fraction of women than man chooses fifty-fifty, but further analysis shows that this difference is not significant.

Respondents had the possibility to distribute their wealth over stocks and bonds, but could also choose to put all their (hypothetical) savings to either bonds or the stock portfolio. Table 7 provides the percentage of respondents who allocate (part of) the hypothetical pension savings to the stock basket, differentiating between gender and between condition (pink or blue).

**Table 7. Respondents allocating part or all of money to stock basket (%)**

	Blue	Pink	Color Gap (B-P)
Men	95.7%	92.9%	2.8
Women	92.6%	91%	1.6
Gender gap (M-W)	3.1	1.9	

*Source: authors based on CentERpaneldata*

As Table 7 shows, an overwhelming majority of respondents allocate some or all of the hypothetical pension savings to the stock basket. More respondents in the blue than in the pink condition allocate some or all savings to the stock portfolio, and this holds true for men and women. More men than women allocate some wealth to stocks, and this holds true for the pink and the blue condition. The gender gap is higher in the blue than in the pink condition (3.1 vs 1.9). There is also a colour gap: in the blue condition more respondents allocate some or all to the stock basket than in the pink condition.

Table 8 gives the average amount of pension savings allocated to stocks. It shows that on average respondents allocate a little over 50% of savings to stocks. This holds for both genders and across conditions. The differences between genders and across conditions are not significant.

**Table 8. Average amount allocated to stocks, by portfolio colour and gender**

	Blue	Pink	Colour Gap (P-B)
Men	52,196	54,753	2,557
Women	53,150	53,762	0,612
Gender gap (M-W)	-954	991	

*Source: authors based on CentERpanel data*

**Figure 3. Percentage allocated to stocks according to age category**

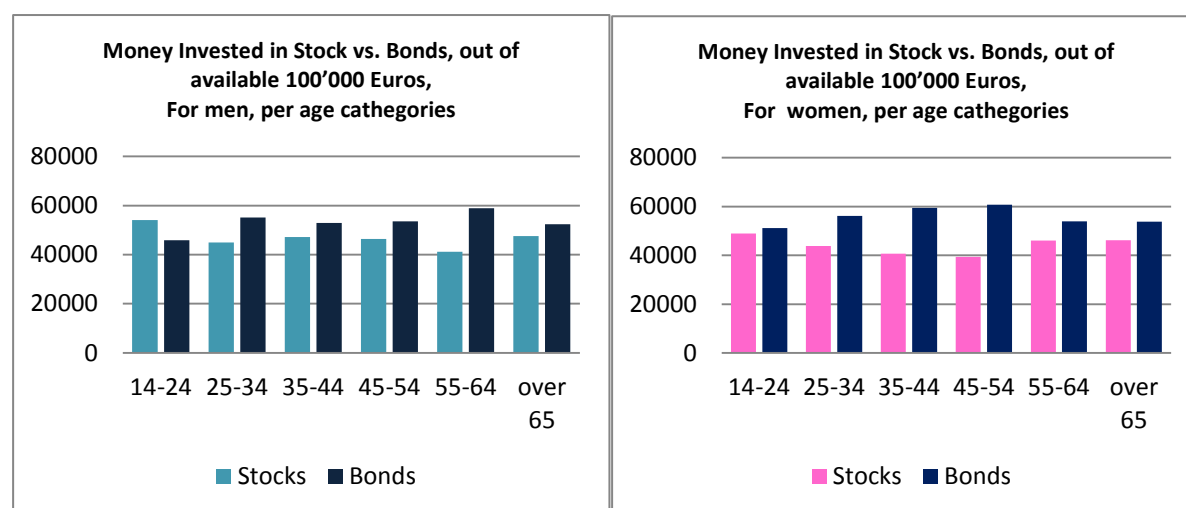


Figure 3 shows the percentage allocated to stocks according to age, for men and women separately (not distinguishing between portfolio colour). We see that young respondents of both genders on average allocate the most to the stock basket. Figure 3 suggests that women in their thirties and forties invest *less* in stocks than women in their twenties and fifties, whereas for men the opposite is true. We need to investigate this further in a multivariate analysis. However, speculating on an explanation for this difference, we note that women in their thirties and forties have children living at home which increases the probability that they combine work with caring for the family (through part-time) or choose to be a full-time home maker. This may imply that they are more home-and-family oriented, and more inclined to caring and sharing. It may also be, on top of this, that the world of investing is less familiar to them for this reason. For men, the stereotype of having to provide financially



for the family might have the opposite effect during this period in life. No doubt these effects, if they play a role, are subtle and most likely unconscious.

Finally, we focus on the effect of the response ordering. Within both decision conditions (pink and blue), respondents were randomly allocated to a question where the first line was the amount to allocate to bonds, with the remainder going to stocks, or first stocks, and the remainder going to bonds. It was NOT that after having filled in the amount to bonds (stocks) the amount to stocks (bonds) was automatically calculated: respondents had to do that themselves. Neither were they forced to fill in the first line first. Rationally, the order should not affect the decision by the respondent. However, we find a significant framing (or response ordering) effect: respondents allocate more of the hypothetical savings to the investment opportunity that is presented first (see Table 9a).

**Table 9a. Response ordering effect: % allocated to stocks**

	Men	Women
Stock basket first	56,670	60,851
Bonds first	46,623	36,866
Primacy effect (in €)	10,047*	23,985*

*Source: authors based on CentER data panel outcomes*

The difference between the response orders is large and significant, and it is considerably and significantly larger for women than for men. If stocks come first, women allocate around 24,000 € more to stocks than if bonds come first. For men the difference is smaller, both absolutely (10,000 €) and in percentage terms.

There are various possible (not mutually exclusive) explanations for this framing (response ordering) effect, as well as for the finding that it is much (and significantly) larger among women.

First, response order effects have been well documented in psychological and survey research, and they are found to be more likely for abstract questions (Dilman, 2001), to which our question definitely belongs. Both primacy and recency effects have been found in the literature. The primacy (recency) effect occurs if the first (last) option is more likely to be chosen, whatever it is (see eg Krosnick *et al*, 1996). The primacy effect has been explained by satisficing (Simon, 1956; Schwartz *et al*, 2002), tends to be more pronounced among women, and sometimes men exhibit a recency effect (Brunel and Nelson, 2003). Second, framing/ordering effects have been found when it comes to the domain of financial decisions

involving risk. Van Rooij *et al* (2011), for example, find that a slight variation in the order of alternatives in a financial literacy questions has a large and significant effect on what people respond.<sup>6</sup> Their interpretation is that some respondents tend to guess the answer – even though this does not explain in itself why guessing would lead to a response order effect.

Note that in our case respondents do not need to choose between mutually exclusive alternatives, but instead can allocate over alternatives – with choosing fifty fifty coming closest to “guessing”. A possible explanation for the primacy effect is that the first alternative, whatever it is, may be regarded as the default.<sup>7</sup> The default effect can be due to an interpretation that it is the choice recommended by experts, or the choice made by most people (Bodie and Prast, 2012). It has also been shown that default effects are larger if decisions are perceived as more difficult, and if cognitive capacity is low. Finally, the fact that we find a larger effect among women than among men is in line with findings in other domains that decision making by women is more context dependent, especially when women feel less secure (Croson and Gneezy, 2009).

As we have seen above, many respondents choose to allocate their hypothetical savings fifty fifty over bonds and stocks. If this is the result of a  $1/n$  heuristic or not-choosing, the response order should not have an impact. Table 9b shows the response ordering effect for respondents who did *not* choose fifty-fifty, where it should be taken into account that this subset contains fewer men than women (see Figure 1 above).

**Table 9b Response ordering effect**

	Men	Women
Stock basket first	36,322	33,786
Bonds first	40,064	30,041
Primacy effect (in €)	-3,742*	3,745*

*Source: authors based on CentER data panel outcomes*

From Table 9b several things stand out. First of all, the average amount allocated to stocks is lower, which is because those NOT choosing fifty fifty on average allocate less than fifty percent to stocks tend to choose for a lower rather than a higher allocation to stocks. Second, the response ordering effect is still significant among both men and women, but among men

<sup>6</sup> Their question was: Buying a company stock usually provides a safer return than a stock mutual fund (frame A) or Buying a stock mutual fund usually provides a safer return than a company stock (frame b).

<sup>7</sup> Most research on ordering effects of responses alternatives focus on questions where respondents need to choose between earlier and later alternatives, instead of allocating over alternatives as in our study

it is now a recency effect: more allocated to stocks if stocks come last. The primacy (recency) effect among women (men) is in line with findings by Brunel and Nelson (2003) when it comes to persuasive advertising.

## 5.2 Regression analysis of the allocation decision

We now turn to multivariate regression analysis of the allocation decision. In order to do so we merge the datasets containing the pink portfolio information with the datasets containing the relevant socio-economic information, drawn from the 2012 DNB Household Survey wave, published in March 2013.<sup>8</sup> Our sample consists of 1306 person-observations.

We first regress the total amount allocated to the stock basket, normalised to one. As the allocated quota can neither be lower than zero nor exceed 100%, we follow the literature on asset allocation and use a two-limit Tobit model, with lower (0) and upper(100%) censoring (e.g. Hochguertel et al., 1997, Poterba and Samwick, 1997). We run two separate sets of regressions for the male and the female subsamples so as to take into account the possibility of gender differences in the coefficients between the two groups.

Among possible determinants of the asset allocation, our crucial variable is the dummy pink, which is set equal to one if the respondent was administered a pink portfolio (assigned randomly, as explained above). The ex-ante expectation is that, if women on average feel more familiar with the pink basket (for example because it consists of brands that they are more exposed to or feel more confident about than the blue AEX ones), this would be reflected in a significant positive effect of the pink dummy. Other standard socio-demographic and economic variables are used as controls, as specified in the list of variables in Appendix IV.

As we have seen in Section 2 above, the gender gap in stock market participation is often assumed to be due to a gender gap in risk attitude and in financial literacy and expertise. Therefore we include both a measure of financial expertise and of risk tolerance as explanatories. Since the DHS contains various questions that can be used as a measure of risk attitude, we build a variable of risk attitude by using the answers to three questions on risk, as specified in Appendix IV (see variable Index risk). Since the type of intra-household decision-making pattern might impact financial outcomes (see e.g. Bertocchi *et al*, 2014), we also consider whether the respondent states that has control of the decisions, rather than deciding together with the partner by using the variable “Control”.

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<sup>8</sup> [http://cdata3.uvt.nl/dhs/files/SpaarOnderzoekCodebook\\_2012\\_en\\_1.2.pdf](http://cdata3.uvt.nl/dhs/files/SpaarOnderzoekCodebook_2012_en_1.2.pdf)

We present four different specifications in Table 10.

**Table 10. Tobit regression on the amount allocated to shares out of €100K**

	Female	Male	Female	Male	Female	Male	female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pink	-0.0279	0.143056	-0.0291	0.168056	-0.0108	0.236806	-0.0359	0.0068
	(0.0257)	(0.0270)	(0.0258)	(0.0272)	(0.0453)	(0.0419)	(0.0331)	(0.0336)
Pink*60ov	0.1466***	-0.0824	0.1545***	-0.0796	0.1581*	-0.0797	0.1572**	-0.0525
	(0.0567)	(0.0698)	(0.0577)	(0.0703)	(0.0820)	(0.1071)	(0.0625)	(0.0788)
Over60	-0.0225	0.222222	-0.0398	0.213194	-0.0500	0.417361	-0.0447	0.219444
	(0.0396)	(0.0428)	(0.0419)	(0.0435)	(0.0596)	(0.0686)	(0.0421)	(0.0494)
Net income			-0.0295	0.0083	0.1435***	-0.0104	0.0832**	0.28125
			(0.0346)	(0.0314)	(0.0505)	(0.0591)	(0.0344)	(0.0412)
Urban			0.070833	0.180556	-0.0514	0.075694	-0.0149	0.284028
			(0.0238)	(0.0273)	(0.0384)	(0.0410)	(0.0287)	(0.0327)
Partner present			0.19375	0.071528	-0.1775***	0.211111	-0.0353	-0.0131
			(0.0355)	(0.0396)	(0.0633)	(0.0775)	(0.0390)	(0.0455)
High education			-0.0141	-0.0291	-0.0390	-0.0296	-0.0741**	-0.0713**
			(0.0260)	(0.0274)	(0.0424)	(0.0475)	(0.0317)	(0.0348)
Havingstocks			-0.0245	0.0067	0.71875	-0.0237	-0.0145	0.0058
			(0.0248)	(0.0258)	(0.0779)	(0.0422)	(0.0413)	(0.0364)
Index risk					-0.0085	-0.0091		
					(0.0213)	(0.0219)		
Control					0.289583	0.0079		
					(0.0506)	(0.0564)		
Paid job					-0.0825*	0.0853*		
					(0.0443)	(0.0515)		
Amount savings					-0.0080	-0.0035		
					(0.0098)	(0.0109)		
Fin literacy							-0.0423	0.185417
							(0.0361)	(0.0343)
Cons (coeficient)	0.4934***	0.4976***	0.7146***	2.9375*	-0.3454	3.700694	-0.0662	1.389583
	(0.0168)	(0.0181)	(0.2530)	(0.2303)	(0.3747)	(0.4333)	(0.2513)	(0.3019)
Sigma	0.2998***	0.3041***	0.2985***	2.104861***	0.2903***	0.3083***	0.2891***	0.3077***
	(0.0103)	(0.0115)	(0.0104)	(0.0116)	(0.0161)	(0.0181)	(0.0127)	(0.0142)
N	699	607	690	600	270	267	452	436
R2_p								
P	0.021	0.473611	0.0875	0.5875	0.066	0.651389	0.024	0.422222

Note: Marginal effects (standard errors in parenthesis). Significance at 1%(\*\*\*) , 5%(\*\*) and 10%(\*)

Our most parsimonious specification includes only age as a dummy variable over 60, whether respondent was allocated a pink portfolio (randomly) and the interaction between the two. From the results we can infer women over 60 invest more in risky assets when offered a pink portfolio rather than a blue one. This result holds for all our specifications.

We see various explanations for this finding. First, it could be that women over 60 are more likely to read the magazines we used for constructing the pink basket. Alternatively, it could be that women over 60 are more sensitive to familiarity than younger women irrespective of whether they read women's magazines or not, just because being older these women have over time been more exposed to these brands that have been around for long. Finally, the pink brands could be less familiar and or appealing to younger women because they are too traditional or luxury. For men, the pink dummy is not significant and this may have various interpretations. Perhaps for men risk and return are the only key when it comes to investing and brand familiarity plays no role or the brands in the pink portfolio were no less familiar to them than those in the blue portfolio. Note that some pink brands also cater to men: Ralph Lauren and Burberry are traditional examples. Interestingly, in the extended specifications, men and women often differ in the sign of the coefficients of each variable, albeit the coefficients are seldom significant. This evidence justifies the use of separate regressions for men and women. While financial literacy does not seem to matter, being high educated lowers the percentage allocated to stocks among both men and women.<sup>2</sup>

Having a paid job impacts marginally on the allocation to stocks, but with different coefficients for men (positive) and women (negative). One explanation for this difference is that having a paid job has a different economic and cultural meaning for men and women in the Netherlands. For men, not having a paid job automatically implies being ill or unemployed, i.e. living on a disability or unemployment benefit. For women, it may also imply being a housewife, i.e. using human capital for household production. The regressions also show a gender difference in the impact of household income. Higher household income leads to a higher allocation to shares by women, but not by men. This, combined with the fact that having a paid job negatively impacts on risk taking by women but not men, suggests that after controlling for inter alia the risk aversion index (which has no impact on the allocation), living with a partner impacts negatively on risk taking by women and has no effect on men. Hence, single women allocate more to stocks than women with the same risk attitude living with a partner.

Living in an urban area could ex ante impact on risk taking through the familiarity channel. Assuming that cities are more sophisticated than rural areas and expose people more to the world of commerce both through the world of finance, through the probability of working in an industry with stock listed companies, and through more exposure to (international) luxury brands, one would expect a positive effect, if any. However, we find no such effect. A possible explanation is that the Netherlands is too small to find differences in exposure to/familiarity between urban and rural.

In order to perform some robustness checks on our results we run<sup>9</sup>, for male and female samples, a set of probit analysis on having less than 30% (prudent portfolio) and more than 70% (aggressive portfolio) in shares, which represents the probability of taking up more risk. We also use an additional indicator of investing fifty fifty in shares (agnostic benchmark portfolio). We present results in Table 10.

The result that older women are more interested in pink portfolio holds. Obviously, this cannot be explained by conventional risk return considerations, as in that case women over 60 in the blue condition would also allocate more to stocks. We see two alternatives. The first is that to older women the pink stocks are more “familiar” (as explained above) than the blue stocks, or that older women are more sensitive to familiarity. An alternative explanation, resulting from the consumer services model of asset choice, is that women over 60 prefer pink stocks because they are a hedge against relative price fluctuations of consumer goods they particularly prefer or cannot do without. As for men, the probit analysis confirms that signs are often opposite from those for women, but coefficients are never significant, except for one control. Urban is the only significant variable for men, indicating that belonging to an urban area decreases the probability of investing prudentially (less than 30% in stocks). The same does not hold for women, as the urban area of residence does not have any explanatory power. This result could be interpreted as reflecting familiarity in the sense that men in urban areas may be more exposed to stock listed companies eg through work, whereas the women in our sample, if they work, tend to have jobs in the not-for-profit sector (Table 10).

As for high education, the effect is significant only for women, whereby more educated women have lower chances of investing 75% or over in risky asset.

**Table 11. Probit on having percentage in shares below or equal 30%, above 70% and equal to 50%**

	<=30%	>=75	50/50	<=30%	>=75	50/50
	M	M	M	F	F	F
Pink	0.0204 (0.0359)	0.0402 (0.0358)	-0.0496 (0.0381)	0.0392 (0.0355)	-0.0032 (0.0325)	-0.0496 (0.0372)
Pink*60ov	0.0064 (0.1068)	-0.0799 (0.0832)	-0.0320 (0.0964)	-0.1123* (0.0659)	0.2349** (0.1127)	-0.0088 (0.0889)
Over 60	-0.0586 (0.0628)	-0.0239 (0.0665)	0.0835 (0.0754)	-0.0193 (0.0573)	-0.0940** (0.0445)	0.0235 (0.0616)
Net income	-0.0420	-0.0245	0.0241	0.0013	0.0049	-0.0556

<sup>9</sup> Different specification with age and age squared, response ordering effect and duration time of questionnaire completion above the median have also been tried. Results do not change

	(0.0390)	(0.0380)	(0.0417)	(0.0385)	(0.0342)	(0.0415)
Urban	-0.0610*	0.0153	-0.0380	0.0030	0.0435	-0.0121
	(0.0348)	(0.0354)	(0.0368)	(0.0339)	(0.0317)	(0.0354)
Partner present	-0.0116	0.0215	0.0254	-0.0407	-0.0158	0.0718
	(0.0489)	(0.0464)	(0.0499)	(0.0482)	(0.0429)	(0.0455)
Higheduc	0.0517	-0.0040	0.0165	-0.0239	-0.0753**	0.0029
	(0.0360)	(0.0356)	(0.0378)	(0.0341)	(0.0308)	(0.0363)
Havingstocks	-0.0399	-0.0045	0.0385	0.0110	-0.0059	0.0219
	(0.0349)	(0.0356)	(0.0380)	(0.0352)	(0.0320)	(0.0370)
N	600	600	600	690	690	690
R2_p						
P	0.454	0.881	0.386	0.575	0.092	0.672

Note: Marginal effects of probit estimates (standard errors in parenthesis). Significance at 1%(\*\*\*) , 5%(\*\*) and 10%(\*)

### 5.3 Time-to-decide on pension savings allocation

As we have seen above in Section 4, we know the time elapsed between the moment a respondent started to answer and the moment he submitted the survey. We also saw that average time elapsed differs between the pink and the blue condition, a difference entirely due to the fact that in the pink condition women decide much quicker than in the blue condition. We found that a difference remains after removing respondents who took more than an hour to complete the survey. A longer decision time may reflect that the respondent takes more time because he finds it difficult to decide, or because he finds the decision problem, or rather finding a solution to it more interesting. Further analysis shows a positive correlation between taking more time to decide and choosing fifty/fifty. Therefore we interpret a longer decision time as reflecting that people find the decision problem more demanding. Given that the risk return profiles presented in the pink and blue condition were identical, the difference in response time according to condition (pink or blue) for women, and not men, is striking. Note also that respondents are at home and could decide to take time to look up information on the internet that might be relevant to the allocation decision. The data show (see Table 4) that in the blue condition men decide quicker than women, whereas the opposite is true in the pink condition. This reversal of the gender gap in decision time results from the fact that women decide much quicker in the pink than in the blue condition, while men decide only a little bit quicker in pink than in blue.

For a more thorough analysis, we study time-to-decide in a multivariate context, adding several other explanatories. Taking time elapsed as the dependent variable, and pink/blue condition as well as several perceived aspects of the decision as explanatories, we find (see Table 11) that i) the effect of the pink portfolio on decision time by women remains large and

highly significant, ii) women who find the allocation decision thought provoking spend less time on the decision, whereas for men the opposite holds true (more thought provoking, more time spent) and iii) for men, decision time is affected negatively by how difficult they consider the decision to be.

**Table 12. Regression results: familiarity and time to portfolio allocation, by gender.**

Dependent variable = Time to completion (in secs)		
	Women	Men
	(2)	(3)
Pink Portfolio	-6132.05*** (2666.6)	-416.052 (2078.8)
Difficulty of task	666.1979 (1018)	-1856.66** (930.8)
Clearness of task	31.46901 (1446.8)	-1736.69 (1216)
Thought-provoking	-3043.38*** (1316.6)	2940*** (992.4)
Interest in the task	2769.61 (1763.1)	-2615.88 (1355.8)
Pleasure of completing the task	-1838.69 (1688)	1184.387 (1457.2)
Comments on the task	-10032.9 (7512.7)	-8761.79 (5947.1)
Observations	705	614
R-squared	0.0192	0.0236

*Note: Constant not in the regression.*



Note that we found a significant effect of pink on allocation to stocks by women over 60 but not for women as a whole. However, the effect of pink on decision time holds for the whole sample of women. We speculate that this may imply that the “blueness” of the AEX account for less stock market participation by women, and for risk taking only through the participation channel. Further research is needed to verify whether this interpretation indeed holds.

## 6. Discussion

Several findings of our analysis stand out. First and foremost, for the whole sample we find *no* pink portfolio effect on the gender gap in risk taking (in the form of allocation of hypothetical pension savings to a stock basket). The average percentage allocated to stocks does not differ significantly between men and women and across the blue and pink condition. It is much higher than the percentage found by Van Rooij *et al* (2007) for the hypothetical allocation of pension wealth of the Dutch population as assessed through the CentERpanel. This difference may be due to the fact that the sample by Van Rooij *et al* (2007) did contain retirees and ours did not. Moreover, the framing of the question and the examples of stock market outcomes differed between Van Rooij *et al* and our questionnaire. We also do not find an effect of risk attitude (measured as an index constructed by three questions on risk) on wealth allocation over the safe and the risky asset. What we do find is that older women are sensitive to the pink vs blue stock basket, and that women in general spend less time on deciding if in the pink condition.

Based on the analysis in this paper we should reject our main hypothesis – that the gender gap in financial risk taking is due to differences in familiarity with companies most traded in the stock market. The fact that women need less time to decide in the pink condition could however be interpreted as support for the hypothesis that women participate less in the stock market because of unfamiliarity with the index of most traded stocks. This is confirmed by our finding that women allocate more to the stock basket if they do already have invested in the stock market, there is no such effect among men.

There are several possible interpretations of our main finding. The first is that familiarity as such is irrelevant in explaining the gender gap in stock market participation and portfolio choice, except for older women. The second is that familiarity with companies traded in the stock market is irrelevant. The third is that our pink portfolio is not a good measure of familiarity, for example because we should have used only Dutch magazines, should have used different pink portfolios for women of different ages, should have made sure that both

the pink and the blue portfolio contained only Dutch companies/companies listed at Euronext/Amsterdam Exchanges. In fact, our pink portfolio did not contain a single Dutch company. It could also be that we should have familiarity not through companies advertisements in women's magazines, but according to the frequency with which women buy the consumption goods and services from companies. Just like Barbra Streisand: "We go to Starbucks every day, so I buy Starbucks stock" cited in Druta, 2013, which would be in line with the consumer services asset model (Merton 1975, 1977). It could also be that the portfolios we selected are not a good measure when it comes to familiarity, for example because women of different ages may read different women magazines, because the blue portfolio did contain familiar stocks, because the blue portfolio was made up of Dutch companies and the pink one was not. Moreover, the blue portfolio was not selected through a similar procedure as the pink one (advertisements in men magazines) and was more diversified than the pink one. Moreover, our results may be biased because of the exceptionally high number of CentER panel members who chose not to respond after having seen the question, among which significantly more women. Perhaps this is due to the fact that our question did not allow for a "don't know" answer (Bucker Koenen et al, 2012). We do not know whether a) more women would have participated if don't know was an option, and b) whether the percentage of don't knows would have been different in the pink vs blue condition. Further research using may shed light on which of these interpretation(s) hold(s).

We do find a large response ordering/framing effect, which differs significantly according to gender. Respondents tend to allocate more pension savings to the first asset mentioned, whether bonds or stock basket, a phenomenon which in questionnaire research is called the "primacy effect" (Brunel *et al.*, 2003). The effect is much larger among women than among men, a result which continues to hold in a multivariate regression analysis and is in line with previous research (eg Krosnick and Smith, 1997). This might reflect lower confidence among women (Croson and Gneezy, 2009).

Our finding in both the blue and pink condition, and among both men and women, that many respondents allocate the 100.000 fifty-fifty over bonds and stocks is in line with the  $1/n$  heuristic found in previous empirical research on the allocation of pension savings (Huberman and Yang, 2008). This choice may be interpreted in various ways: it may be felt as the closest to not choosing or it is perceived as the recommended choice (default effect), or it reflects people's interpretation of optimal diversification.

Finally, we find that women (but not men) who already invest in the stock market tend to allocate more of their hypothetical pension savings to stocks. This could reflect familiarity, but also risk preference and knowledge.

## **7. Summary and conclusions**

Purpose of this paper was to add to our understanding of the gender gap in finance by using the concept of familiarity (Merton 1987, Huberman, 2001). We have used a very simple measure of familiarity: stocks whose companies advertise in women magazines were assumed to be more familiar to women than to men, whereas stocks trade in the AEX were assumed to be more familiar to men.

We do not find convincing evidence that a gender difference in familiarity with stock listed companies contributes to explaining the gender gap portfolio choice, other than for women over 60. However, our finding that it takes women less time to make an investment decision if they are familiar with the stocks traded could indicate that the gender gap in stock market participation is influenced by a gender gap in familiarity with the stock market index. : Our finding that women's investment decisions are much more sensitive to response ordering than those by men may imply that the way choices are presented affects women more than men, and that language is especially important when it comes to life cycle saving and investing communication to women.

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## Appendix I Women magazine selection

We selected most popular women's magazines edited in USA, UK, France, Netherlands and Italy from 2010 through the summer of 2013. For each magazine we took one copy per season. We selected an international mix of magazines rather than a mere Dutch one for several reasons. First, the Dutch are well known for the large number of international magazines they read and that are found in bookshops. Second, with Internet people watch and read magazines online, and those may be Dutch as well as international. We did not base our selection merely on number of sales for the same reason, and because women, at least in the Netherlands, have a tendency to leave through several magazines before deciding to buy one of them.

Magazines	UK	USA	Italy	Netherlands
1	Elle	Elle	Anna	Libelle
2	Vogue	Vogue	Amica	Flair
3	Good Housekeeping	Good Housekeeping US	Donna Moderna	Viva
4	Cosmopolitan	Glamour	Gioia	Linda

Based on these magazine copies, we worked made a list of those companies that advertised at least once in these magazines and were stocklisted, could be traced down to a listed parent, i.e. to a company whose stocks are traded on the exchange. These totaled 65. The non-listed companies and their small sub-firms were excluded from the sample, as there is no actual possibility to purchase their stocks. This resulted in the following list of advertising companies:

No.	Company	Stock Exchange	Product/industry	Heard of?
1	Apple	NYSE	ict	Y
2	Diamond Pet Food	NYSE	home/family	N
3	Expedia	NYSE	travel/socialmedia	Y
4	Facebook	NYSE	ICT/socialmedia	Y
5	Fossil	NYSE	apparel	Y
6	Kraft Foods	NYSE	home/family	Y
7	Steve Madden	NYSE	apparel	N
8	Johnson and Johnson	NYSE	hygiene	Y
9	Colgate-Palmolive	NYSE	hygiene	Y
10	Disney	NYSE	home/family	Y
11	Estee Lauder	NYSE	cosmetics L	Y
12	General Motors	NYSE	automobile	Y
13	Heinz	NYSE	home/family	Y
14	KKR	NYSE	financial	N



15	Kimberly Clark	NYSE	hygiene	N
16	Coca Cola	NYSE	home/family	Y
17	L.Brands	NYSE	apparel	N
18	Nike	NYSE	apparel/sports	Y
19	Procter and Gamble	NYSE	cosmetics/hygiene	Y
20	Philips	NYSE	electronics	Y
21	Revlon	NYSE	cosmetics	Y
22	Ralph Lauren	NYSE	apparel L	Y
23	Tiffany & Co	NYSE	apparel L	Y
24	IFF	NYSE	cosmetics	Y
25	Louis Vuitton	Euronext (Amsterdam)	apparel L	Y
26	PPR Group (Kering)	Euronext	apparel	N
27	Beter Bed	Euronext	home/family	Y
28	Danone	Euronext	home/family	Y
29	Dior	Euronext	apparel/cosmetics L	Y
30	Omega Pharma	Euronext	care/hygiene	N
31	Hermes	Euronext	apparel L	Y
32	SEB SA	Euronext L	electronics	N
33	Van de Velde	Euronext	apparel	N
34	Nestle	Euronext	home/family	Y
35	L'Oreal	Euronext	cosmetics	Y
36	Adidas	FWB (Frankfurt)	apparel/sports	Y
37	Beiersdorf	FWB	hygiene	N
38	BMW	FWB	automobiles L	Y
39	Douglas	FWB	cosmetics	Y
40	Henkel	FWB	hygiene	N
41	Porsche	FWB	automobiles L	Y
42	L'Occitane	FWB	hygiene	Y
43	Associated British Foods	LSE (London)	home/family	N
44	ASOS	LSE	apparel	Y
45	Burberry	LSE	apparel	Y
46	Britvic	LSE	home/family	N
47	Debenhams	LSE	apparel/home	Y
48	LG Electronics	LSE	electronics	Y
49	Marks and Spencer	LSE	apparel/food	Y
50	Mulberry Group	LSE	apparel L	Y
51	Reckitt Benckiser	LSE	hygiene	Y
52	H&M	OMX	apparel	Y
53	Sanoma	OMX	magazines	Y
54	Svenska Cellulosa	SCA	hygiene	Y
55	PRADA	SCA	apparel L	Y
56	Hutchinson Whampoa	SCA	miscall BtB	N
57	Esprit	SCA	apparel	Y
58	Richemont	SCA	apparel L	N
59	Shiseido	SCA	cosmetics L	Y

60	Wolford	SCA	apparel L	Y
61	Benetton	Borsa Italiana	apparel	Y
62	Luxottica	Borsa Italiana	apparel	Y
63	YOOX	Borsa Italiana	apparel/social media	Y
64	TOD'S	Borsa Italiana	apparel L	Y
65	Inditex	BMAD	apparel	N

**From these companies, we selected 15 companies for further us. In making this selection, we tried to prevent**

## Appendix II Companies in the Pink and in the Blue portfolios

<i>Pink</i>	<i>blue</i>
1 Estee Lauder	1 Ahold
2 Dior	2 AIR FRANCE –KLM
3 Ralph Lauren	3 AKZO NOBEL
4 Tiffany & Co	4 ARCELORMITTAL
5 L' Oreal	5 ASML HOLDING
6 Zara	6 CORIO
7 Revlon	7 DE Master Blenders
8 Shiseido	8 RODAMCO DSM
9 Burberry	9 FUGRO
10 Ikea	10 ING
11 Douglas	11 Philips
12 Svenska Cellulosa	12 SBM OFFSHORE
13 Esprit	13 Shell
14 International Flavors and Fragrances	14 UNIBAIL
15 Prada	15 Unilever

### Appendix III Questionnaire (Dutch, and English translation)

Pension savings allocation question.

Original version in Dutch

Stel u hebt honderdduizend euro ter beschikking om te sparen voor uw pensioen. U moet dit verdelen over staatsobligaties met een rente van 4 procent en een mandje aandelen waarvan de opbrengst naar verwachting 8 procent zal zijn. U kunt pas aan uw geld komen als u de pensioenleeftijd hebt bereikt.

U belegt niet in individuele aandelen maar in een "mandje" van 15 verschillende aandelen, wat het risico vermindert zonder dat de opbrengst daardoor lager wordt. Immers, tegenvallers bij het ene bedrijf kunnen worden gecompenseerd door meevallers bij het andere.

Het geld dat u in de staatsobligaties stopt krijgt u te zijner tijd zeker terug, plus de rente die er elk jaar is bijgekomen. Het lijkt dus op een spaarrekening met een vaste rente.

Het geld dat u in de aandelen stopt wordt naar verwachting gemiddeld acht procent meer waard per jaar. Maar dat is, anders dan de vier procent rente op de staatsobligaties, niet zeker. Er is een kans dat u er meer dan 8 procent bij krijgt per jaar en een kans dat u minder krijgt.

Een getallenvoorbeeld:

Als u alles in de staatsobligaties stopt is het bedrag over tien jaar zeker gegroeid tot ruim 148.000.

Stopt u alles in aandelen, dan is het over tien jaar naar verwachting ruim 215.000. Maar het kan ook meer zijn, bijvoorbeeld 280.000 euro, of minder, bijvoorbeeld 130.000.

Het mandje bestaat uit de volgende aandelen:

<i>if arandom=1</i>	<i>if arandom=2</i>
1 Estee Lauder	1 Ahold
2 Dior	2 AIR FRANCE –KLM
3 Ralph Lauren	3 AKZO NOBEL
4 Tiffany & Co	4 ARCELORMITTAL
5 L' Oreal	5 ASML HOLDING
6 Zara	6 CORIO
7 Revlon	7 DE Master Blenders
8 Shiseido	8 RODAMCO DSM
9 Burberry	9 FUGRO
10 Ikea	10 ING
11 Douglas	11 Philips
12 Svenska Cellulosa	12 SBM OFFSHORE
13 Esprit	13 Shell
14 International Flavors and Fragrances	14 UNIBAIL
15 Prada	15 Unilever

English translation

Imagine you have 100.00 euro's available to put aside for retirement. You need to allocate it over government bonds with an interest rate of 4 percent, and a basket of stocks which is expected to yield a return of 8 percent. You cannot touch the money until retirement.

You do not invest in individual stock but in a "basket" of 15 different stocks, which reduces the risk without reducing the return, as bad outcomes of one firm may be compensated for by good outcomes of another.

Upon retirement you will receive with certainty the money that you put in the government bonds plus accumulated interest. Hence it is similar to a savings account with a fixed interest rate.

The money that you put in the stock basket is expected to increase in value eight percent each year. However, this is not sure. It is possible that it grows with more than eight percent each year, but also with less.

A numerical example.

If you put the whole amount in government bonds, it will be worth 148.000 in ten years. If you put everything in stocks, it is expected to be worth 215.000 in ten years. However, it can also be more, for example 280.000, or less, for example 130.000.

The basket of stocks consists of

<i>if arandom=1</i>	<i>if arandom=2</i>
1 Estee Lauder	1 Ahold
2 Dior	2 AIR FRANCE –KLM
3 Ralph Lauren	3 AKZO NOBEL
4 Tiffany & Co	4 ARCELORMITTAL
5 L' Oreal	5 ASML HOLDING
6 Zara	6 CORIO
7 Revlon	7 DE Master Blenders
8 Shiseido	8 RODAMCO DSM
9 Burberry	9 FUGRO
10 Ikea	10 ING
11 Douglas	11 Philips
12 Svenska Cellulosa	12 SBM OFFSHORE
13 Esprit	13 Shell
14 International Flavors and Fragrances	14 UNIBAIL
15 Prada	15 Unilever

How much would you put in government bonds and how much in the basket of stocks?

## APPENDIX IV Variables used in the regressions

VARIABLE	Description
<b>CenterPanel DATA</b> Source: <a href="http://www.centerdata.nl">www.centerdata.nl</a>	
DEPENDENT	Amount allocated to the stock basket, normalised to one
Over60	Binary variable assuming value 1 for respondents aged over 60, 0 otherwise.
Net income	Continuous variable representing household income at current values in thousand €
Urban	Binary variable assuming value 1 for respondents resident in an urban area, 0 otherwise.
Partner present	Binary variable assuming value 1 for respondents living with a partner, 0 otherwise.
High education	Binary variable assuming value 1 for respondents with education at college level or above, 0 for education at secondary school level or below.
Having stocks	Binary variable assuming value 1 for respondents already owning stocks, 0 otherwise.
Index risk	Index of risk is a built up variable, as the sum of three risk aversion measures. Risk (1) aversion is a dummy taking the value of one if the respondent gives values bigger than 5 out of ten, in agreeing to this sentence given in the questionnaire: "I think it is more important to have safe investments and guaranteed returns". Risk (2) is a variable equal to one if the respondent's answer is above or equal to 4 to the following question: "I would never consider investments in shares because I find this too risky". Risk (3) has been built up in the same way with the following statement: "I want to be certain that my investments are safe"
Control	Binary variable assuming value 1 if the respondent states that has the control of the decisions, 0 otherwise.
Paid job	Binary variable assuming value 1 if the respondent has a paid job, 0 otherwise.
Amount savings	Continuous variable representing household income at current values in thousand €
Fin literacy	Dummy equal to one if respondent's answer she is very knowledgeable or knowledgeable to the following question: How knowledgeable do you consider yourself with respect to financial matters?