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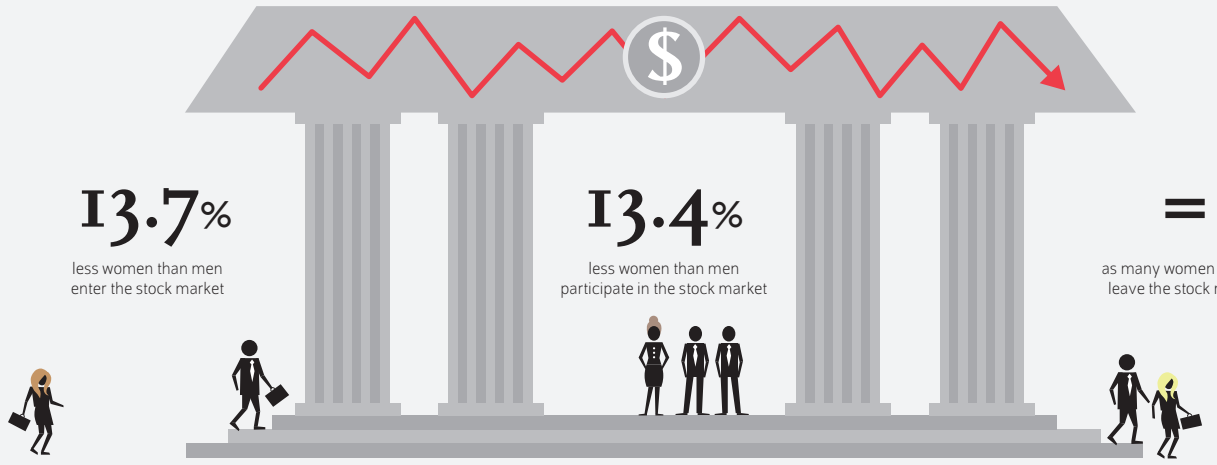
AT A GLANCE

Monetary policy can have heterogeneous effects on the investment behavior of women and men

By Caterina Forti Grazzini, Chi Hyun Kim

- This study investigates whether monetary policy affects stock market investment behavior of women and men differently
- Evidence comes from US household survey data; single female-headed households are compared to male-headed households
- A tightening of monetary policy generally leads to lower stock market participation of women
- After a monetary shock, stock trading activity of those who are already active in the stock market does not significantly differ across genders
- Higher stock market participation of women, for instance through investment plans explicitly targeting women, could help reduce gender-specific effects of monetary policy

As far as their stock market participation is concerned, women and men react differently to monetary policy
Reaction to a monetary policy shock (Fed decision that increases the one-year Treasury bond yields by 100 basis points)



Source: own depiction.

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FROM THE AUTHORS

"For households, notably in the US, stock market participation and active investment play a crucial role for their financial situation in retirement. This is an important aspect for women in particular, as they generate less income than men over the course of their career. Thus, it is problematic that a tightening of monetary policy hinder women's entry in the stock market stronger than men's, as we have shown here."

— ***Chi Hyun Kim**, study author* —

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ABSTRACT

The ultra-loose monetary policy of recent years has raised concerns that the low interest rate environment may overly benefit households with specific demographic and financial characteristics. In this context, monetary policy can be a potential driver of gender wealth inequality, since women are known to be more risk averse, less financially literate, and to participate less in the financial markets than men do. This study focuses on the stock market investment behavior of US households and examines whether monetary policy affects the investment decisions of women and men differently. While monetary policy exclusively affects stock market participation of women, we do not observe any gender difference in the active investment behavior of men and women who invest in stocks. Therefore, increasing stock market participation of women can help prevent the potential distributional effects of monetary policy across gender. Investment plans that would explicitly target female investors could help stabilize and increase stock market participation of women.

In the aftermath of the global financial crisis of 2008, potential re-distributional effects of monetary policy interventions have entered the policy debate. The public and policymakers have been concerned that the low interest rate environment would benefit only a few groups of households with certain specific characteristics, thus increasing wealth inequality in society.[1]

A few studies analyze in depth how differences in financial and demographic characteristics, such as wealth composition or age, can lead to unintended distributional consequences of monetary policy on the population.[2] Nevertheless, the recent monetary policy debate neglects a very important feature: *gender*.

Why should gender matter for the way investors respond to monetary policy? Monetary policy does not only influence the value of assets and thus the value of households' wealth, but can also affect their investment decisions. Previous literature has shown that women invest differently in the financial markets compared to men. For example, women are found to be more risk averse, to rebalance their financial portfolio less often, and to be less financially literate than men.[3] This leads to a lower female participation rate in the stock market. When they do participate in the stock market, women tend to invest less than men. These behavioral characteristics can interact with monetary policy, since monetary decisions influence asset prices and asset prices determine the risk in financial markets (see Box 1). Therefore, if women and men react to a change in asset prices differently, monetary policy may not be gender-neutral.

1 Among others, Mario Draghi, the President of the European Central Bank, addressed the topic during his intervention at DIW Berlin in 2016; Mario Draghi, "Stability, equity and monetary policy." Speech given on October 25, 2016 (available online, accessed August 29, 2019).

2 For more details, see Adam Klaus and Panagiota Tzamourani, "Distributional Consequences of Asset Price Inflation in the Euro Area," *European Economic Review*, vol. 89 (2016): 172–192; Miguel Ampudia et al., "Monetary policy and household inequality," *European Central Bank Working Paper Series* 2170 (2018) (available online, accessed August 29, 2019).

3 See Annika E. Sunden and Brian J. Surette, "Gender differences in the allocation of assets in retirement savings plans," *The American Economic Review*, vol. 88.2 (1998): 207–21; Brad M. Barber and Terrance Odean, "Boys will be Boys: Gender, Overconfidence, and Common Stock Investment," *The Quarterly Journal of Economics*, no. 116.1 (2001): 261–292; Annamaria Lusardi and Olivia S. Mitchell. "Planning and financial literacy: How do women fare?," *American Economic Review* vol. 98.2 (2008): 413–17.

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Box 1

Monetary policy and gender dependent investment behavior

Risk-taking channel of monetary policy

Monetary policy determines the risk in the financial markets. A monetary tightening decreases asset prices, thus leading to higher financial risk, and vice versa. According to the risk-taking channel, investors should adjust their financial portfolio after a monetary policy shock. If the policy rate increases unexpectedly, investors will sell their risky assets such as stocks and move into less risky products in order to readjust their financial portfolio's risk composition.

Gender differences in investment behavior

Women are known to be more risk averse than men. The literature shows how this characteristic leads to lower participation of women in the financial markets and a smaller proportion of risky assets in women's total financial portfolios. In addition, the literature shows that women are more subject to trade inertia. This means that women trade less and therefore may miss opportunities to make higher capital gains.[1]

Potential dimensions of gender-specific monetary policy effects

It is not clear whether monetary policy has heterogeneous effects on the investment decisions of women and men. If it does, the direction is not clear.

On the one hand, if we consider the stylized fact that women are more risk averse than men, one possible outcome is that:

1. women's stock market participation responds more strongly to monetary policy shocks, and
2. when they do participate in the stock market, women rebalance more actively after monetary policy decisions in order to lower the risk level of their financial portfolios.

On the other hand, trading inertia of women may have opposite consequences. If women adjust their financial portfolios in a very infrequent manner, monetary policy may not have any effects on their investment behavior. Therefore, two possibilities exist:

1. men's stock market participation choices respond to monetary policy shocks, while women's do not, or
2. men rebalance more actively after monetary policy shocks compared to women.

1 For more details, refer to Barber and Odean, "Boys will be Boys".

This Weekly Report investigates the gender-specific effects of monetary policy on the stock investment behavior of US households. The study focuses on two broad investment decisions. First, we analyze the effect of monetary policy on the stock market participation status (participation, entry, and exit). In the second step, we investigate how monetary policy affects the active investment decision (net purchase or sale) of women and men who participate in the stock market.

US household survey data allows us to visualize investment behavior of women and men

We use data from the Panel Study of Income Dynamics (PSID), a US household survey that collects data on demographic and economic characteristics. In particular, the PSID provides very detailed data on households' financial wealth (Box 2). Based on these, we construct four variables that we use to analyze stockmarket investment behavior.

We analyze US households for the following reasons. First, the stock market participation rate of households is quite high in the US compared to other industrialized countries. The participation rate in the domestic stock market is 26 percent, about three times higher than in Germany, where the participation rate is only 8.9 percent.[4] Second, for US households, stock investment has a large impact on their income after retirement, since the country has a looser social security safety net than, for example, Europe, and income in old age relies heavily on private savings. Women's lower propensity to invest in stocks could therefore translate into large differences in the accumulation of financial wealth for retirement and into a significant income gap in old age.

We divide households into two distinct groups. To analyze the behavior of women, we consider single female-headed households and for men, we use male-headed households of both marital status (single and married) (Box 3). Therefore, in the following, "women" refers to single female-headed households and "men" to single and married male-headed households.

Demographic differences across women and men decline once they participate in the stock market

Panel 1 of the table shows some demographic characteristics of the US population. The differences between women

4 Data source is from Mariassunta Giannetti and Yrjö Koskinen, "Investor Protection, Equity Returns, and Financial Globalization," *Journal of Financial and Quantitative Analysis*, no. 45.1 (2010): 135–168.

Box 2

About the data

In the Panel Study of Income Dynamics (PSID), the term "household head" refers to the husband in a heterosexual married couple or to a single adult of either sex. Therefore, the head is always a male person in the case of a married couple, regardless of whether he is the person that makes the decisions on familial financial matters or not. In some cases, the head of a married couple can be a woman, for example if the husband does not grant the interview or is in jail. Therefore, identifying the gender of the financially responsible person of a family unit is not straightforward.

Financially responsible women and men in a family unit

In order to analyze investment choices of women and men separately we proceed in the following manner. Since it is impossible to identify married couples where the woman is the financially responsible person, we only use single female-headed households to analyze the investment behavior of women. For men, we look at both married and single households where the household head is male.[1] Although this is not the most optimal way to identify the pure investment behavior of men, we are still confident that we isolate female investment choices. In particular, single women are highly exposed to poverty in old age. It is therefore very important for them to accumulate wealth (for example, through stock investment) to secure their income after retirement.

1 Focusing on single male households was not possible due to a lack of sufficient data.

and men are clear: On average, women hold only 60 percent of a man's net worth and they earn much less labor income than men (approximately 55 percent less). However, if we only consider the stock market participants in Panel 2 of the table, these differences become smaller. In particular, the average net worth of women becomes even larger than men's net worth.

Among women participating in the stock market, 76 percent hold a college degree, far more than among the overall US population of women (46 percent). The same applies to men, although the difference between the proportion of college-degree owners among the overall male population (47 percent) and among male stock market participants (69 percent) is less pronounced. This implies that investors are better educated in general than the average American.

Monetary policy affects entrance decisions of women more

As a first step, we examine the general effect of monetary policy on stock market participation status. In order to do so, we concentrate on the effects of "monetary policy shocks," policy adjustments of the Federal Reserve that are not anticipated by market participants. The decision in September 2013 by the Federal Reserve not to take any action while financial market participants expected it to begin tapering its Large Scale Asset Purchases is one example of such a shock. It surprised the market and led to large fluctuations of asset prices.[5] In order to have a straightforward interpretation of the monetary policy shocks, we examine monetary policy shocks that increase the one-year Treasury bond yields by 100 basis points.

The decision to participate in the stock market relates to an unexpected change in monetary policy: in case of a monetary tightening, the probability for men to participate in the stock market is not affected. On the contrary, women's participation rate decreases by 13.43 percent, which indicates that women are more affected by monetary changes.

We further focus on households that have entered or exited the stock market to shed light on whether the participation changes are more likely to be driven by changes in the entry or in the exit decision. Only the decision to enter is subject to a gender difference: women are 13.7 percent less likely to enter the stock market in case of a monetary policy tightening, whereas the probability of a stock market exit is the same for women and men.

No significant differences between trading behavior of women and men once in the stock market

The previous analysis shows that the change in stock market participation status following a monetary policy shock is gender-dependent. As a next step, we analyze the effect of monetary policy on stockholders' active investment behavior. In addition to changes in households' stock market participation status, monetary policy actions can induce investors who are already active to purchase or sell stocks. For instance, an increase in interest rates is associated with a decrease in asset prices (and thus with higher risk), which can cause investors to partially sell their risky investment and rebalance to safer options. This behavior is known as the "risk-taking channel" of monetary policy.[6]

The analysis confirms that households disinvest part of their stock investment after an increase in policy rates. A monetary policy tightening that increases the one-year Treasury bond yields to 100 basis points induces a net sale of stocks of 708.32 US dollars. We do not observe any significant gender-specific effects.

5 We specifically estimate monetary policy shocks by capturing the financial market responses right after FOMC meetings. As in the example, if the monetary policy decision was not anticipated by the financial markets, asset prices fluctuate right after the announcement and thus contribute to the monetary policy shock.

6 See Kent Daniel, Lorenzo Garlappi, and Kairong Xiao, "Monetary Policy and Reaching for Income," *NBER Working Paper* no. 25344 (2018) (available online, accessed August 21, 2019). This study shows how investors invest in riskier asset options when interest rates decrease.

In summary, the main finding of our analysis is twofold. On the one hand, we observe gender- specific responses to monetary policy only in the decision to enter in the stock market. On the other hand, as soon as women and men are holding stocks, we do not observe any structural difference in their decision to exit from the stock market or in the way they adjust their investment.

We obtain these results after controlling for a wide range of demographic and financial characteristics of households that should influence investment behavior (Box 3). Nevertheless, these do not help us fully explain the gender-specific responses to monetary policy shocks for entry decisions.

Risk aversion and financial literacy can explain the gender-specific responses to monetary policy with regard to entry decisions

The fact that we observe gender-specific effects only for entry decisions and not for actual investment decisions of stock market participants indicates that we are missing some unobserved characteristics that are crucial for explaining the effect of monetary policy on the investment decisions of non-participants. Two relevant characteristics that may explain the gender-specific effects on the entry decision are women's higher risk aversion and lower financial literacy compared to their male counterparts. There is a huge literature that documents structural differences along these two dimensions across gender that affect their participation decision.[7]

The fact that we do not find gender-specific effects on stock market participants implies that women and men have similar level of risk aversion and financial literacy once they invest in the stock market. Moreover, we observe in the data that other demographic and financial characteristics of women and men who participate in the stock market converge. Therefore, we can assume that the gaps in risk aversion and financial literacy between women and men close.

Conclusion: Monetary policy can have heterogeneous effects on the long-term financial well-being of women and men

The question regarding the distributional effects of monetary policy across gender has no straightforward answer. On the one hand, monetary policy affects women and men's stock market entry decisions in a heterogeneous way. On the other hand, it does not have gender-specific effects on the stock investment behavior of those who do participate in the stock market: women and men seem to have the same understanding of how monetary shocks, and thus financial risk, affect their financial portfolio, and react to it in similar fashion. One possible explanation for this could be higher risk aversion and lower financial literacy of women compared to men.

Table

Selected demographic and financial characteristics of the US population
Financial variables in US dollars

	Women	Men
Panel A: All households		
Stock holding	57,185.88	85,676.19
Stock (Percent to total fin portfolio)	9	16
Total financial portfolio	39,394.62	107,683.83
Net worth	218,638.44	370,282.18
Income	45,517.46	100,820.76
College degree (Percent)	46	47
Panel B: Stock market participants		
Stock holding	140,748.77	267,101.33
Stock (Percent to total fin portfolio)	57	60
Total financial portfolio	204,620.30	358,144.16
Net worth	1,074,876.91	849,229.62
Income	67,735.86	148,274.50
College degree (Percent)	76	69

Source: PSID, own calculations.

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The gender-specific effect of monetary policy on entry decisions can have long-term consequences for women. Compared to other financial assets, stocks offer higher mean returns in the long run and help women accumulate wealth for their retirement. Especially in countries with a loose social security safety net, such as the US, not being active on financial markets can lead to poverty in old age. Therefore, increasing female participation in the stock market is extremely important for women's financial well-being.

Our results may also be helpful for central banks to correctly evaluate the effects of their policy interventions and understand their economic and social consequences. In the context of the current monetary policy debate, our results suggest that (from this specific gender perspective) the extra-loose monetary policy interventions with long-enduring low interest rates may have benefited women in the long run: the low-risk environment persuaded them to participate in the stock market, which is crucial to accumulating wealth over time.

Nevertheless, it would be better to eliminate gender-specific effects of monetary policy. This can be achieved by increasing and stabilizing stock market participation of women. Higher provision of financial education and gender-tailored financial products can help achieve these goals.

Last but not least, we recommend including attitudinal characteristics (such as risk aversion and financial literacy) in household surveys. These features are crucial in understanding how different households react to economic phenomenon.

7 See Barber and Odean, "Boys Will Be Boys"; Lusardi and Mitchell "How do women fare?"; Antonia Grohmann and Annekathrin Schoofs, "Financial Literacy and Intra-Household Decision Making: Evidence from Rwanda", *DIW Discussion Paper* 1720 (2018) (available online, accessed August 29, 2019).

Box 3

Variables and methodology

The PSID provides information on the asset class "non-IRA stock,"[1] which comprises any shares of stock in publicly held corporations, stock mutual funds, or investment trusts, which do not include stocks in employer-based pensions or IRAs. We use this asset class and construct four variables for the analysis:

1. *Stock market participation status*: The PSID asks the households whether they own stocks or not. We use this question and construct a dummy variable, which takes the value one if households own stocks and zero otherwise.

2. *Entrance rate*: Using the stock market participation status dummy, we construct a variable that visualizes households that have entered the stock market. We define households that have entered the stock market as those who did not own stocks in the previous wave but do so in the current wave.

3. *Exit rate*: We construct a dummy variable that takes the value one if a household holds stocks in the previous wave, but no longer does in the current wave.

4. *Active savings of stocks*: PSID asks households how many stocks they have purchased and/or sold between two waves. We use this data to construct a variable that captures the net purchases of stocks between two waves.

Methodology

For the analysis, we use two different econometric frameworks. We use a probit model of equation (1) with time fixed-effects (which is captured by δ_t) to analyze the effect of gender-specific monetary policy on stock market participation, entry, and exit (which are the left-hand-side variables: $y^*_{i,t}$). For active savings of stocks ($AS_{i,t}$), we use a panel regression model of equation (2) with individual fixed-effects (δ_i) and time fixed-effects (δ_t).

Equation (1)

$$y^*_{i,t} = \delta_t + \alpha X_{i,t-1} + \beta_1 MP_{i,t} + \beta_2(MP_{i,t} \times Women_i) + \beta_3(MP_{i,t} \times W_{i,t-1}) + \beta_4(MP_{i,t} \times W_{i,t-1} \times Women_i) + \beta_5(W_{i,t-1} \times Women_i) + \beta_6 W_{i,t-1} + \beta_7 Women_i + u_{i,t}$$

$$y_{i,t} = I\,[\,y^*_{i,t} > 0\,]$$

Equation (2)

$$AS_{i,t} = \delta_i + \delta_t + \alpha X_{i,t-1} + \beta_1 MP_{i,t} + \beta_2 MP_{i,t} \times Women_i + \beta_3(MP_{i,t} \times W_{i,t-1}) + \beta_4(MP_{i,t} \times W_{i,t-1} \times Women_i) + \beta_5(W_{i,t-1} \times Women_i) + \beta_6 W_{i,t-1} + \beta_7 Women_i + \epsilon_{i,t}$$

1. *Control variables: demographic and financial characteristics of households*

The variable $X_{i,t-1}$ includes a range of control variables that we use for our analysis. We make use of both lagged demographic and financial characteristics. As financial variables, we have net worth and total family income, change in net worth and family income, total inheritance, and dummy variables that capture the ownership of mortgages. For demographic characteristics, we include the number of children and family components, age of the head, marital status, completed college education, an indicator that shows whether the head is working in the finance industry, and home ownership.

2. *Monetary policy shocks and household heterogeneity*

We identify monetary policy shocks by adapting Nakamura and Steinsson's "high frequency identification" (2018).[2] This method captures the first principal component of the surprise responses of a broad range of interest rate futures at a narrow time window around the FOMC meetings. This enables us to construct a household-specific monetary policy shock measure, which is $MP_{i,t}$.

In addition to this, we interact the monetary policy shock measure with two additional variables that capture household heterogeneity that matters for their exposure to monetary policy. First, we make use of the heterogeneous exposure of households depending on their financial wealth ($W_{i,t-1}$). The intuition is that the more financial wealth you have, the more you are exposed to monetary policy decisions.

Second, we want to test whether monetary policy has gender-specific effects. Therefore, we interact our monetary policy shock measure with the dummy variable, $Women_i$, which takes the value one for single female-headed households and zero for single and married male-headed households. Therefore, we end up with a triple interaction of the three variables: $MP_{i,t}$, $W_{i,t-1}$, and $Women_i$.

1 IRA stands for individual retirement accounts.

2 For more details, see Emi Nakamura and Jón Steinsson, "High-Frequency Identification of Monetary Non-Neutrality: The Information Effect," *The Quarterly Journal of Economics*, vol. 133.3 (2018): 1283–1330.

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