Meister, Lorenz; Schulze, Karla

Research Report

How shocks affect stock market participation

DIW Roundup: Politik im Fokus, No. 142

Provided in Cooperation with:
German Institute for Economic Research (DIW Berlin)

Suggested Citation: Meister, Lorenz; Schulze, Karla (2022) : How shocks affect stock market participation, DIW Roundup: Politik im Fokus, No. 142, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

This Version is available at:
https://hdl.handle.net/10419/267487

DIW BERLIN

142

DIW Roundup
Politik im Fokus

Deutsches Institut für Wirtschaftsforschung 2022

How Shocks Affect Stock Market Participation

Lorenz Meister and Karla Schulze

How Shocks Affect Stock Market Participation

Lorenz Meister | lmeister@diw.de | **Department of International Economics at DIW Berlin**
Karla Schulze | kschulze@diw.de | **Department of International Economics at DIW Berlin**

December 2, 2022

While there is a broad consensus in the literature that stock ownership is associated with individual characteristics, such as wealth, income, risk preferences, and financial literacy, less is known about the dynamics of stock market participation (SMP). Major fluctuations in SMP are oftentimes related to political events, economic shocks, and technological disruptions. We discuss the literature that investigates some of these shocks, as well as personal life circumstances that determine SMP across various demographic groups. Consolidating the literature allows us to identify systematic drivers into and out of stock ownership, along with its distributional consequences. Major forces behind SMP fluctuations are changes in participation costs and benefits, risk exposure, economic policy uncertainty, income uncertainty, peer effects, and windfall gains.

Introduction

According to theoretical models like the capital asset pricing model (CAPM), all investors will participate in the stock market if the equity premium is positive. However, empirical evidence shows that a large fraction of the population does not own any stocks (Gomes et al., 2021). This is puzzling given the risk-adjusted expected positive return from stock holding and is at odds with theory, also known as the stock market participation puzzle (Haliassos and Bertaut, 1995; Mehra and Prescott, 1985).

In the past decades, there have been many fluctuations in the stock market participation rate. Figure 1 shows the share of the German population that holds stocks and/or funds from 1998 till 2021 (Deutsches Aktieninstitut, 2021). The share of stockholders strongly increased with the adherence of the internet in the 1990s and reached its peak at the beginning of 2000. With the bursting of the dotcom bubble SMP collapsed and has steadily fallen thereafter. Also, during the financial crisis 2007/08 many investors dropped out of the stock market. However, with low interest rates from 2014 onwards German investors have been investing in securities continuously. During the recent COVID-19 crisis once again a strong increase in

households investing in risky assets was visible that was especially driven by younger people entering the stock market. Certain events of economic, technological, or political nature therefore seem to affect individuals' decision to participate in the stock market. However, not only macroeconomic shocks but also microeconomic shocks like windfall gains have been shown to attract new investors to the stock market or crowd out others (Andersen and Nielsen, 2011; Briggs et al., 2021; Cheng et al., 2022).

This round-up aims at providing an overview of shocks that influenced households' investment decisions at the macro and micro level, possibly explaining some of the observed fluctuations in stock market participation. It further deals with distributional aspects as it looks specifically at who entered and who left the stock market during shocks and suggests directions for future research. We proceed as follows. First, we give a brief overview of the determinants of stock market participation. Then follows a discussion of relevant literature. The paper looks at macroeconomic shocks influencing households' investment decisions such as technological, political, or economic events. It then continues by investigating microeconomic shocks such as windfall gains and retirement and the last chapter concludes.

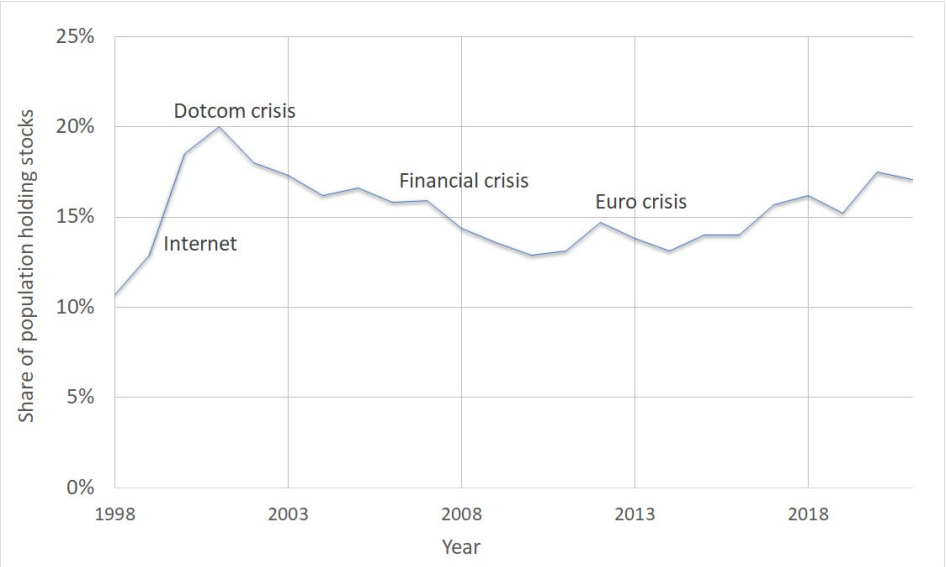

Figure 1: Stock Market Participation Rate in Germany, Source: Deutsches Aktieninstitut (2021)

Determinants of Stock Market Participation

Despite high expected return stock market participation rates have been found to be below 50% for various countries (Badarinza et al., 2016) and explaining this phenomenon of limited stock market participation is an active topic in household finance.

Various research shows that demographic characteristics determine individuals' decision to invest in risky assets. It was shown that education increases SMP and the share of financial wealth invested in stocks. While Black et al. (2018) explain this through greater financial wealth and lower fixed costs, Cole and Shastry (2009) suggest the effect of education on SMP is driven by changes in savings or investment behavior rather than simply increased labor income. Also, Bertaut (1998) shows that households with higher education and greater wealth are more likely to enter the stock market.

Moreover, cognitive ability seems important since SMP was found to be correlated with IQ and high IQ investors are more likely to hold a larger number of stocks (Grinblatt et al., 2011). Further, it was shown that individuals with low financial literacy are much less likely to invest in stocks (Van Rooij et al., 2011).

Looking at possible explanations, participation costs seem to play a very important role. They can be divided into direct costs such as monetary expenditures that are used e.g. for setting up a brokerage account and indirect costs that refer to informational cost such as resources devoted to learning about the stock market. Participation can prevent individuals from entering the stock market since e.g. poor individuals will not find it worthwhile to incur fixed costs to invest in risky assets or individuals with low financial literacy face higher information costs when entering the stock market.

In addition to that, preferences and risk exposure are important determinants of SMP. It was shown that ambiguity aversion is negatively associated with SMP and related to portfolio under diversification (Dimmock et al., 2016). Also, gender differences and the predominance of male investors is explained by overconfidence of men in areas such as finance (Barber and Odean, 2001) and higher risk-aversion of females than men in financial decision making (Jianakoplos and Bernasek, 1998). Further, a lack of trust in the stock market can affect SMP and less trusting individuals are less likely to buy stocks and will buy less if they do (Guiso et al., 2008).

Moreover, peer effects can influence participation. More sociable households are also more likely to participate in the stock market since households are more willing to participate if their peers participate (Hong et al., 2004). Recent research shows that households' decision to invest in the stock market is further strongly influenced by their perception of stockholders and that they are less likely to invest in risky assets if they have a negative image of stockholders (Henkel and Zimpelmann, 2022).

Shocks Influencing Stock Market Participation

After giving a brief overview of the general determinants of SMP we now turn to surveying the literature on shocks that influence household investment decisions, possibly explaining the fluctuations in SMP over time.

Macroeconomic Shocks

Technological Shocks

A major technological shock that led to increasing SMP rates during the 1990s was the adherence and spread of the internet. Bogan (2008) investigates this substantial growth in SMP using panel data from the Health and Retirement Survey (HRS) from 1992 to 2002. The author finds that internet using households raised stock market participation more than non-internet using households and internet usage increases the probability of participation by 7 percentage points.

While the internet continued to spread further, stock market participation rather declined in Germany after 2002. This apparent contradiction can be explained by the fact that earlier adopters of the internet were highly financial literate while more recent internet adopters had a rather low financial literacy. For the new internet users the internet doesn't has the positive impact of reduced information costs since financially illiterate households will not accept the cognitive burden of searching information in a systematic way (Glaser and Klos, 2013).

Hvide et al. (2022) study the effects of high-speed internet use on investors' portfolio allocations. They do so by investigating a program rolled out in Norway that was designed to offer broadband internet coverage at a reasonable price throughout the country. Using an instrumental variable approach, the authors exploit the exogenous variation in internet use between 2001 and 2010. They find that access to high-speed internet leads to increased SMP which seems to be driven by the increase of investments in equity funds. Additionally, the internet seems to affect investors not only at the extensive but also at the intensive margin as they report that existing investors improve their portfolio allocation by diversifying their portfolio. The proliferation of fast internet in more rural areas can also make up for some of the urban-rural divergence in stock market participation. In a Chinese study, Guo (2020) shows that mostly rural households whose income and living standards have recently grown invested into risky assets when getting access to the internet.

The previous papers explain the effect of increased SMP by lower participation costs that came along with the internet. The internet makes stock information more accessible and informational costs of participation decrease. Further, online stock trading reduces the transactional cost of participation since the cost for online brokerage are substantially lower than traditional brokerage. Additionally, the internet increases competition of online brokerage which drives costs such as fees for purchasing shocks further down.

Moreover, internet access was shown to mitigate the influence of social interaction and seems to substitute social interactions as information channel (Liang and Guo, 2015) which is also shown by Nathanael and Nainggolan (2022) who investigate the increase of SMP during COVID-19 in Indonesia and state that social media platforms and online stock communities such as Twitter, Youtube and Telegram increase stock market participation.

Political Shocks

Also, political shocks can affect households' investment decisions. Especially political uncertainty seems to lower participation rates and lead to changes in households` portfolio decisions (Agarwal et al., 2018; Gao et al., 2022; Gholipour and Dunkley, 2019; Lee et al., 2020; Park and Suh, 2019). Political uncertainty can arise from several factors. Agarwal et al. (2018) investigate U.S. gubernatorial elections and exploit this quasi-natural experiment as an exogenous source of political uncertainty. With a difference-in-differences framework, their goal is to isolate the effect on stock market participation. Gao et al. (2022) investigate the effect of changes in climate regulations and a change in US Environmental Protection Agency regulation on stock market participation of households employed by high-emission industries. They do so by conducting a triple-differences framework and exploiting that climate change action plans were adopted in different years across states in the U.S.. Further, various research looks at the relationship between changes in the economic policy uncertainty index (EPU), an index developed by Baker et al. (2016) that is based on newspaper coverage frequency of keywords related to policy uncertainty, and households portfolio allocations. While Gholipour and Dunkley (2019) investigate data from OECD countries, Lee et al. (2020) look at China and Park and Suh (2019) at Korea.

Overall, findings suggest that political uncertainty affects households' investment decisions at the extensive and intensive margin. Agarwal et al. (2018) find that political uncertainty decreases SMP by 2.7% and leads to households reallocating their capital from risky assets such as stocks to safer assets such as currency and deposits. Also, Gholipour and Dunkley (2019), Lee et al. (2020) and Park and Suh (2019) find that an increases in the EPU reduce households SMP and causes them to reallocate their savings to safer assets. Lee et al. (2020) find further evidence that also an increase in the Chinese EPU affects households' stock market participation in the U.S. since households employed in industries that heavily export to China react more sensitively by lowering their stock shares. Gao et al. (2022) state that households employed in high-emission industries relative to those in non-high-emission industries reduce their investments in risky assets by 15.4% after the change in climate-related regulations and observe a stronger effect for low-income and low-wealth households.

Most literature states that the negative effect of political uncertainty on stock market participation seems to be driven by increased labor income risk and increased asset risk which is especially binding for less wealthy and low-income households. Increased risk about future economic conditions and ambiguity then encourages households to reduce their investment in risky assets and to leave the stock market. Also, Gao et al. (2022) state that given the demographics of households employed in high-emission industries, the changing climate regulations seem to reinforce wealth inequality by crowding less wealthy households out of the stock market.

Economic Shocks

Another factor that can change the saving behavior of households are economic shocks (ING Deutschland, 2020). A very severe economic shock that has been investigated by several researchers was the financial crisis in 2007/08. Zhou (2020) investigates households' stock market participation in 2007-2009 in the U.S. using the Panel Study of Income Dynamics. Also, Chen and Stafford (2016) look at stock ownership of families in the U.S. in 2007-2009 and investigate which types of families remained active in the stock market and connect this to mortgage holding and mortgage payments. Moreover, Vu et al. (2021) analyze households` investments in risky assets before and after the great financial crisis using data from the Survey of Health, Ageing and Retirement in Europe (SHARE) covering two waves (2006-2007) and (2010-2011) in 12 different countries.

Overall, findings suggest that the financial crisis mostly led to households dropping out of the stock market and that this effect is stronger for poorer and less educated households. Zhou (2020) finds that stock ownership declined by 5.9% in 2009 compared to 2007. He further investigates which households drop out of the stock market and finds that less-educated households, poor households, and households belonging to a minority are more like to drop out. This is further supported by Vu et al. (2021) as they find as well that households with higher net wealth, higher education level, higher probability of receiving inheritance, better self-perceived health status, and more social activities tend to own risky assets before and after the financial crisis. Also, Chen and Stafford (2016) state that families when experiencing mortgage payment difficulties during the financial crisis are shown to have been more likely to drop out of the stock market. Further, families who cleared out their stock holdings in 2007 were far less likely to participate again in the subsequent years indicating that such crisis also influence households' decision to invest in risky assets years after the shock.

However, also other economic crises like the dotcom crisis (2001-2005) and the euro crisis (2012/13) influenced households' investment behavior. An analysis of the ING Deutschland investigates households saving behavior using data from the Deutsche Bundesbank and the European Central Bank (ECB). They find that with the bursting of the dotcom bubble households' investments in securities suffered a severe setback. Also, during the euro crises outflows from risky assets investments were visible. It is only since the low interest rates in 2014 that German savers have once again been investing in securities continuously, even though the corresponding saving share is still significantly lower than at the beginning of the 2000s (ING Deutschland, 2020).

The decline of SMP and shift away from risky assets during economic crisis is mostly explained by households facing liquidity constraints and increased risk. Zhou (2020) states that during the financial crisis the net worth of households fell by about 15% and participation constraints became specifically binding for poor and less-educated households crowding them out of the stock market.

Shock	*Paper*	*Data*	*Empirical Analysis*	*Findings*	*Affected Demographic Groups*
Internet	Bogan (2008)	Health and Retirement Survey (HRS) (1992 – 2002)	Univariate Probit Models	Computer usage increases individuals' probability of SMP by 7 pp.	/
	Hvide et al. (2022)	Norwegian Central Securities Depository (NCSD) (2000-2010)	Natural experiment: Broadband internet coverage	For every 10 pp increase in broadband internet use the SMP rate increases by 0.7 pp and internet leads to portfolio diversification for existing investors.	Effect stronger for least wealthy and less educated individuals
Political Uncertainty	Agarwal et al. (2018)	Survey of Income and Program Participation (SIPP) (1996-2011)	Diff-Diff: U.S. gubernatorial elections	Political uncertainty decreases the participation rate by 2.7% and leads to households reallocating to safer assets.	/
	Gao et al. (2022)	SIPP (1984 to 2021) and Intergovernmental Panel on Climate Change (IPCC)	Tripple-Diff: Changes in climate regulations	Households employed in high-emission industries reduce their investments in risky assets by 15.4% after the change regulations. One-standard-deviation increase in EPA is associated with a 4.25% decrease in the share of risky assets.	Effect stronger for households with low-income and low-wealth
	Gholipour and Dunkley (2019)	Data from OECD countries (1995 – 2016) and Economic Policy Uncertainty index (EPU)	Cointegrating regressions and estimation using the FMOLS method	A 10% increase in the EPU is associated with a 1% decline in shareholding and reallocation to safer assets.	/
	Lee et al. (2020)	SIPP (1996-2016) and EPU index	Panel Regression	One standard deviation increase in U.S. EPU is associated with 2.7% decrease of SMP and one standard deviation increase in Chinese (U.S.) EPU is associated with a 0.9% decrease of SMP.	/
	Park and Suh (2019)	Korea Labor and Income Panel Study (KLIPS) and EPU index	Probit Model, Tobit Model	When EPU doubles households' probability of SMP falls by 5.5% and they reduce their share of risky assets by 4.2%.	Effect stronger for households with higher level of income volatility
Economic Crisis	Zhou (2020)	Panel Study of Income Dynamics (PSID)	Bivariate probit regressions	Stock ownership declined by 5.9% (dropped by 2.9 pp) in 2009 compared to 2007.	Effect stronger for households that are less educated, poor and belong to a minority
	Chen & Stafford (2016)	PSID	OLS regression, logistic regression, and multinomial logistic regression	Families when experiencing mortgage payment difficulties during the financial crisis were likely to drop out of the stock market: 29.2% of stockowners as of 2007 had become nonowners as of 2009.	/
	Vu et al. (2021)	SHARE covering two waves (2006-2007) and (2010-2011) in 12 different countries	Probit regression model	Households are less inclined to hold risky assets after the financial crisis.	Households with higher net wealth, education, probability of receiving inheritance, self-perceived health status, and more social activities less affected
	ING Deutschland	Data from the Deutsche Bundesbank and ECB	Descriptive	Financial crisis, dotcom crisis and euro crisis decrease individuals SMP and lead to shift away from risky assets to safer assets. Increase of investment in fonds since interest crisis.	/

Table 1: Overview Macroshocks, Source: Authors Own Calculations.

Table 1 provides an overview of the previously discussed shocks influencing households' investment decisions at the macro level. Overall, one can state that technological innovations such as the internet have a positive effect on SMP while political uncertainty and economic crisis reduce participation rates and cause a reallocation of savings from risky to safer assets. Looking at the magnitude, the effects of political crises seem to reduce SMP by around 3-15% while the internet increases

the SMP rate between 1-7 percentage points. However, comparison should be done very carefully, and the different datasets and empirics should be kept in mind.

Microeconomic Shocks

Not only technological, economic, and political events but also personal life circumstances can influence an individuals' decision to invest in risky assets.

Windfall Gains

A shock often investigated in the literature is the effect of windfall gains on individuals' investment decisions. Andersen and Nielsen (2011) use a natural experiment to investigate the impact of unexpected inheritance due to sudden death on households' decision to participate in the stock market and thus identify, whether stock market participation is limited by participation costs. They do so by using unique-cause-of-death data from the official death certificates in Denmark. The authors find that receiving a windfall of equivalent to 137,000 Dollars increases the probability for an individual to participate in the stock market within the following three years by 21 percentage points. However, they state that most individuals who receive windfall gains continue to not participate in the stock market and actively sell the entire portfolio inherited and suggest that therefore the participation of many individuals seems not to be constrained by participation costs but rather other factors.

Another windfall gain investigated in the literature is the effect of winning the lottery on individuals' investment decisions (Briggs et al., 2021; Cheng et al., 2021). Briggs et al. (2021) exploit randomly assigned lottery prizes in Sweden by using three samples of Swedish lottery players. They condition the random assignment of lottery prizes on expenditures and participation of the gambling lotteries which is important since the probability of winning might be correlated with stock market participation. Cheng et al. (2021) investigate shopping receipt lotteries that almost every shopper participates in from administrative data in Taiwan as exogenous wealth shock. Both find that windfall gain increases individuals' probability to participate in the stock market. Briggs et al. (2021) state that a windfall gain of 150,000 Dollars increases the probability to participate in the stock market by 12 percentage points among households that did not participate in the stock market prior to winning the lottery. However, windfall gains do not seem to affect the intensive margin as effects on individuals that owned stocks before the windfall gain are small. Also, Cheng et al. (2021) find that a windfall gain of 35,000 Dollars increases an individual's probability to participate in the stock market by around 0.76 percentage points, which is an increase of around 4.43% of the average level. They further find that this effect is stronger for individuals that are female, younger, have no kids, and have lower financial wealth.

Investigating windfall gain in another setup, Kong et al. (2021) examine the effect of housing wealth appreciation on stock market participation of households in China. They do so by implementing a regression discontinuity design exploiting the situation of unexpected announcements of policies in 2006 that announced that purchasing a house with a size less than 90 m^2 faced a significantly lower down payment. The

authors find that unexpected housing wealth appreciation substantially increases households' stock market participation. They show that when the growth rate of housing prices increases by 1% the probability for an individual to participate in the stock market increases by 1.6%. Also, here, the effect is stronger for younger individuals.

In the literature, the increase in SMP after a windfall gain is explained by the windfall gain easing liquidity constraints and thus lowering participation costs to enter the stock market. Thus, especially younger individuals with lower wealth invest in risky assets.

Leaving the Labor Market

On the other hand, an event that causes individuals to leave the stock market is when individuals retire or face unemployment. Fagereng et al. (2017) investigate households' portfolio allocations over the life cycle using data on administrative records from the Norwegian Tax Registry (NTR) from 1995 to 2009. They find that investors when approaching retirement shift their portfolio away from stocks and as soon as investors leave the labor market, they also start exiting the stock market. Using the same dataset Basten et al. (2016) find a similar effect for job loss. In the years leading to unemployment, they observe that the average household reduces their holding in risky assets by 500 USD and increases savings in safe assets by 1,500 USD. After job loss, households were shown to exit the stock market which is explained by reduced labor income. Also, Addoum (2017) investigates households' portfolio allocation before and after retirement. He does so by using panel data on asset allocations from the Health and Retirement Study (HRS) and looks at the portfolio decision after retirement of couples and singles using a difference-in-difference approach. The author states that while couples significantly reduce their stock market participation by 4% after retirement, singles investment decisions remain relatively constant. The author explains this by heterogeneous risk preferences of spouses. He states that wives are on average more risk averse than their husbands and after retirement a shift of control over household resources toward the wife, therefore, increases household risk aversion which decreases the investment in risky assets.

Table 2 summarizes the previously investigated personal life circumstances that affect SMP. Overall, windfall gains increase individuals` probability to participate in the stock market while the probability seems to be higher for individuals that inherited (21 percentage points) than individuals that win the lottery (1-12 percentage points). Looking at individuals that won the lottery, a higher price seems to lead to a higher probability to participate. When winning only 35.000 USD compared to 150.000 USD the increase in the probability to participate was shown to be way lower (0.76 percentage points) than when winning 150.000 USD (12 percentage points). However, when individuals retire or lose their job, they were shown to exit the stock market and reallocate their funds to safer assets in the years leading up to unemployment or retirement.

Shock	*Paper*	*Data*	*Empirical Analysis*	*Findings*	*Affected Demographic Groups*
Windfall Gain	Andersen and Nielsen (2011)	Official death certificates in Denmark	Natural Experiment: Unexpected Inheritance	Windfall of 139,000 USD increases an individuals' probability to participate in the stock market within the following three years by 21 pp	/
	Briggs et al. (2021)	Administrative data from Sweden (Swedish Wealth Register and lottery data from Kombi, Triss and prize-linked savings)	Natural Experiment: Lottery prizes	Windfall gain of 150,000 USD increases an individuals' probability to participate in the stock market by 12 pp	/
	Cheng et al. (2021)	Administrative data from Taiwan and data from shopping receipt lotteries	Natural Experiment: Lottery prizes	Windfall gain of 35,000 USD increases an individuals' probability to participate in the stock market by 0.76 pp	Effect stronger for individuals that are female, younger, have no kinds and lower financial wealth
	Kong et al. (2021)	China Family Panel Studies (CFPS)	Regression Discontinuity: Housing wealth appreciation	When the annualized growth rate of housing prices increases by 1%, the probability of stock market participation increases by 1.6%	Effect stronger for younger individuals and employees of state-owned enterprises
Retirement	Fagereng et al. (2017)	Data on administrative records from the Tax Registry (NTR) from 1995 to 2009 in Norway	Structural Estimation of a Life-Cycle Model	Investors reduce share of risky assets less than 1pp per year from 45 years old till retirement & exit stock market after	/
	Addoum (2017)	Health and Retirement Study (HRS) from	Diff-Diff: Comparing retirement of couples and singles	Couples significantly reduce their stock market participation by 4% after retirement, no effect for singles	/
Job Loss	Basten et al. (2016)	Data on administrative records from the Tax Registry (NTR) from 1995 to 2007 in Norway	Panel analysis	In the years leading to unemployment households reduce their investment in risky assets by 500 USD and increase savings in safe assets by 1,500 USD. After job loss, households deplete 3,000 USD of their financial assets.	/

Table 2: Overview Microshocks, Source: Authors Own Calculations.

Figure 2 further provides an overview of discussed macro and micro shocks and their implications for stock market participation.

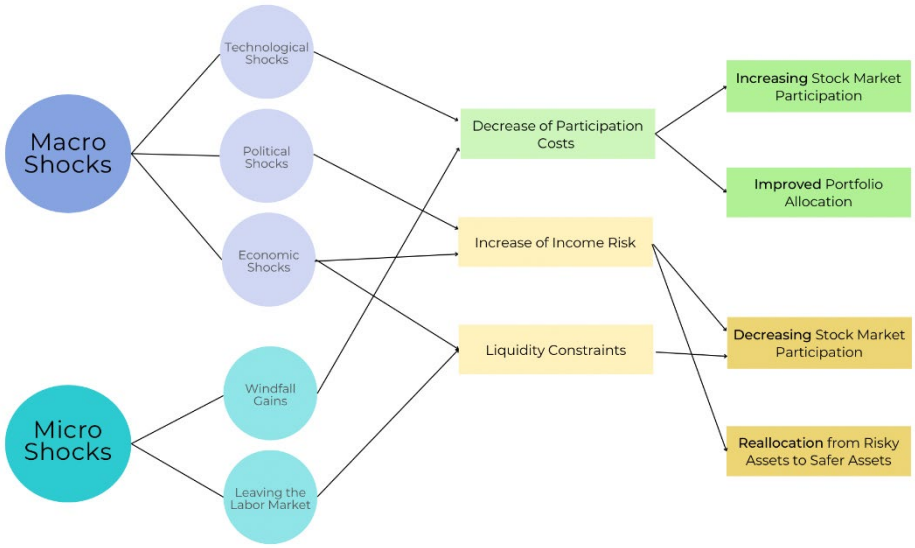

Figure 2: Shocks Influencing Individuals SMP, Source: Authors Own Calculations.

Conclusion

Overall, technological innovations such as the internet increase stock market participation and improve portfolio diversification of existing investors by lowering participation costs. Also, windfall gains such as winning the lottery or unexpected inheritance increase participation by easing liquidity constraints. The effect is shown to be stronger for individuals that are young and have lower financial wealth. As these shocks expand SMP to a broader population, high expected returns from stock holdings are no longer exclusively going to the most privileged parts of the population. Shocks that attract rather atypical investors to the stock market offer new ways of wealth accumulation to these groups, ultimately decreasing wealth and income inequality. As new entrants appear on the stock market, the topic of financial literacy gains more importance. Without knowledge on risky assets, excessive trading behavior and under-diversified portfolios could become a pitfall to new investors (Phan et al., 2018).

However, several events were also shown to reduce SMP. Retirement and job loss lead to households dropping out of the stock market with a reallocation from risky to safer assets when approaching retirement or unemployment. Also, political uncertainty and economic crises reduced stock market participation and lead to households reallocating their savings to safer assets by increasing income risk and posing liquidity constraints on households. These crises were shown to affect especially lower income and less educated households to drop out of the stock market since they are not financially sophisticated and find it too costly to stay, possibly further increasing wealth and income inequality. All in all, one could conclude that the major force behind fluctuations in stock market participation seem to be changes in transactional and informational cost of participation and increases in risk exposure.

References

Addoum, J. M. (2017). Household portfolio choice and retirement. *Review of Economics and Statistics* 99 (5), 870–883.

Agarwal, V., H. Aslan, L. Huang, and H. Ren (2018). Political uncertainty and household stock market participation. *Journal of Financial and Quantitative Analysis*, 1–55.

Andersen, S. and K. M. Nielsen (2011). Participation constraints in the stock market: Evidence from unexpected inheritance due to sudden death. *The Review of Financial Studies* 24 (5), 1667–1697.

Badarinza, C., J. Y. Campbell, and T. Ramadorai (2016). International comparative household finance.

Baker, S. R., N. Bloom, and S. J. Davis (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics* 131 (4), 1593–1636.

Barber, B. M. and T. Odean (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics* 116 (1), 261–292.

Basten, C., A. Fagereng, and K. Telle (2016). Saving and portfolio allocation before and after job loss. *Journal of Money, Credit and Banking* 48 (2-3), 293–324.

Bertaut, C. C. (1998). Stockholding behavior of us households: Evidence from the 1983–1989 survey of consumer finances. *Review of Economics and Statistics* 80 (2), 263–275.

Black, S. E., P. J. Devereux, P. Lundborg, and K. Majlesi (2018). Learning to take risks? The effect of education on risk-taking in financial markets. *Review of Finance* 22 (3), 951–975.

Bogan, V. (2008). Stock market participation and the internet. *Journal of Financial and Quantitative Analysis* 43 (1), 191–211.

Briggs, J., D. Cesarini, E. Lindqvist, and R. Östling (2021). Windfall gains and stock market participation. *Journal of Financial Economics* 139 (1), 57–83.

Catherine, S. et al. (2016). Countercyclical income risk and portfolio choices over the life- cycle. Technical report, HEC Paris.

Chen, B. and F. P. Stafford (2016). Stock market participation: Family responses to housing consumption commitments. *Journal of Money, Credit and Banking* 48 (4), 635–659.

Cheng, T.-C. F., H.-H. Huang, T.-C. Lin, T.-T. Yang, and J.-D. Zhu (2021). Pure windfall gain and stock market participation: Evidence from administrative data. Retrieved November 22, 2022, from *https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3981321*.

Cole, S. A. and G. K. Shastry (2009). Smart money: The effect of education, cognitive ability, and financial literacy on financial market participation. Harvard Business School Boston, MA.

Deutsches Aktieninstitut (2021). Deutschland und die Aktie. Eine neue Liebesgeschichte. Frankfurt am Main.

Dimmock, S. G., R. Kouwenberg, O. S. Mitchell, and K. Peijnenburg (2016). Ambiguity aversion and household portfolio choice puzzles: Empirical evidence. *Journal of Financial Economics* 119 (3), 559–577.

Fagereng, A., C. Gottlieb, and L. Guiso (2017). Asset market participation and portfolio choice over the life-cycle. *The Journal of Finance* 72 (2), 705–750.

Gao, Z., C. Jo, and S. Lam (2022). Climate change regulatory risks and households' portfolio choices. Retrieved November 22, 2022, from *https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4056360*.

Gholipour, H. F. and M. E. Dunkley (2019). Economic policy uncertainty and household financial assets. *Applied Economics Quarterly* 65 (2), 101–114.

Glaser, M. and A. Klos (2013). Causal evidence on regular internet use and stock market participation. *Social Sciences Research Network.* Retrieved November 22, 2022, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2021158.

Gomes, F., M. Haliassos, and T. Ramadorai (2021). Household finance. *Journal of Economic Literature* 59 (3), 919–1000.

Grinblatt, M., M. Keloharju, and J. Linnainmaa (2011). Iq and stock market participation. *The Journal of Finance* 66 (6), 2121–2164.

Guiso, L., P. Sapienza, and L. Zingales (2008). Trusting the stock market. *The Journal of Finance* 63 (6), 2557–2600.

Guo, R. (2020). Internet usage and household investment on risky financial assets. *Proceedings of Business and Economic Studies* 3 (4).

Haliassos, M. and C. C. Bertaut (1995). Why do so few hold stocks? *The Economic Journal* 105 (432), 1110–1129.

Henkel, L., and C. Zimpelmann (2022). Proud to not own stocks: How identity shapes financial decisions. Technical report, University of Bonn and University of Cologne, Germany.

Hong, H., J. D. Kubik, and J. C. Stein (2004). Social interaction and stock-market participation. *The Journal of Finance* 59 (1), 137–163.

Hvide, H. K., T. G. Meling, M. Mogstad, and O. L. Vestad (2022). Broadband internet and the stock market investments of individual investors. Technical report, National Bureau of Economic Research.

ING Deutschland (2020). Analyse: Wie Krisen das Sparverhalten der Deutschen verändern. Retrieved November 22, 2022, from https://www.ing.de/ueber-uns/presse/pressemitteilungen/analyse-wie-krisen-das-sparverhalten-der-deutschen-verandern/

Jianakoplos, N. A. and A. Bernasek (1998). Are women more risk averse? *Economic inquiry* 36 (4), 620–630.

Kong, D., Y. Cheng, and S. Liu (2021). Unexpected housing wealth appreciation and stock market participation. *Journal of Housing Economics* 52, 101768.

Lee, K., Y. Jeon, and C. Jo (2020). Chinese economic policy uncertainty and US households' portfolio decisions. *Pacific-Basin Finance Journal* 64, 101452.

Liang, P. and S. Guo (2015). Social interaction, internet access and stock market participation—An empirical study in China. *Journal of Comparative Economics* 43 (4), 883–901.

Mehra, R. and E. C. Prescott (1985). The equity premium: A puzzle. *Journal of Monetary Economics* 15 (2), 145–161.

Nathanael, A. and Y. A. Nainggolan (2022). The effect of interactive social media platforms on stock market participation during the covid-19 pandemic in Indonesia: Case study in the Java Island. *International Journal of Business and Technology Management* 4 (3), 104–115.

Park, J. S. and D. Suh (2019). Uncertainty and household portfolio choice: Evidence from South Korea. *Economics Letters* 180, 21–24.

Phan, T. C., M. O. Rieger, and M. Wang (2018). What leads to overtrading and under- diversification? Survey evidence from retail investors in an emerging market. *Journal of Behavioral and Experimental Finance* 19, 39–55.

Van Rooij, M., A. Lusardi, and R. Alessie (2011). Financial literacy and stock market participation. *Journal of Financial Economics* 101 (2), 449–472.

Vu, T, Li, C.-S., and C.-C. Liu (2021). Effects of the financial crisis on household financial risky assets holdings: Empirical evidence from Europe. *International Review of Economics & Finance* 71, 342–358.

Zhou, J. (2020). Household stock market participation during the great financial crisis. *The Quarterly Review of Economics and Finance* 75, 265–275.

Imprint

DIW Berlin – Deutsches Institut
für Wirtschaftsforschung
Mohrenstraße 58, 10117 Berlin

Tel. +49 (30) 897 89-0
Fax +49 (30) 897 89-200
http://www.diw.de

ISSN 2198-3925