

Peer effects in stock market participation: Evidence from immigration¹

Anastasia Girshina², Thomas Y. Mathä³, Michael Ziegelmeier⁴

This draft: November 2017

Abstract

This paper studies the effect of stock market participation of foreigners on the participation decision of natives. To identify the peer effect we exploit the unique composition of the Luxembourg population with 42% of foreigners by using variation in stock market participation among different immigrant groups. We solve the reflection problem by instrumenting foreigners' stock ownership decision with the lagged participation rates in their countries of origin. We separate contextual and correlated effects from the endogenous peer effect by controlling for neighbourhood and individual characteristics. We find that foreign peers' stock market participation has sizeable effects on that of natives. We also document evidence of *social learning* as a channel through which this peer effect is transmitted. However, *social learning* alone cannot account for the total effect and we conclude that *social utility* might also play an important role in peer effects transmission.

JEL: D14, D83, G11, I22

Keywords: peer effects, stock market participation, social utility, social learning

¹ The results in this paper are preliminary materials circulated to stimulate discussion and critical comment. References in publications should be cleared with the authors. This paper uses data from the Eurosystem Household Finance and Consumption Survey. This paper should not be reported as representing the views of the BCL or the Eurosystem. The views expressed are those of the authors and may not be shared by other research staff or policymakers in the BCL, the Eurosystem or the Eurosystem Household Finance and Consumption Network. We thank Mario Padula and Giacomo Pasini for insightful suggestions. We are grateful to Jian Li for the excellent discussion. For useful comments we thank Laszlo Sandor, Paolo Sodini, Ulf von Lilienfeld-Toal, and the participants of the BCL and the Ca' Foscari University of Venice seminars and of the 4th Household Finance Workshop, Eurosystem Household Finance and Consumption Network research seminar, 1st RGS/RWI Workshop on the Economics of Migration, the 2017 Royal Economic Society Annual Conference in Bristol, the fifth Conference on Household Finance and Consumption in Paris. We thank Anastasia Litina for her help with the European Social Survey data. We are grateful to Statec for providing the Census 2011 data.

² Swedish House of Finance at Stockholm School of Economics, anastasia.girshina@hhs.se

³ Banque centrale du Luxembourg, thomas.mathae@bcl.lu

⁴ Banque centrale du Luxembourg, michael.ziegelmeier@bcl.lu and Munich Center for the Economics of Aging

1 Introduction

There is vast literature that studies the role of peers choices on one's own economic behaviour in many dimensions. Indeed, it has been widely documented that economic behaviour is influenced not only by the environment where one grew up, but also by the culture and social norms where one lives (e.g., Guiso et al., 2004). In particular, it has been shown that consumption (Boneva, 2014), stock market participation (Haliassos et al., 2016; Hvide and Östberg, 2015; Brown et al., 2008; Hong et al., 2004), borrowing (Becker, 2006; Georgarakos et al., 2014), saving for retirement (Duflo and Saez, 2002; Haliassos et al., 2016) and housing choices (Patacchini and Venanzoni, 2014; Ioannides and Zabel, 2003) are affected to a large extent by the choices of peers in the social circle (Ioannides and Topa, 2010), at work (Hvide and Östberg, 2015; Duflo and Saez, 2002) and in the neighbourhood (Del Bello et al., 2015; Kling et al., 2007). Furthermore, empirical research on differences in financial behaviour between immigrants and natives suggests that immigrant behaviour tends to converge over time to that of natives on several dimensions (Haliassos et al., 2015). However, to the best of our knowledge, there is no study to date that investigates the impact of immigrant economic behaviour on financial choices of the native population. We contribute to this literature by studying the decision to participate in risky assets and by identifying the effect of immigrants' stock market participation behaviour on the investment behaviour of their native peers.

Focusing on the effect of foreigners' behaviour on that of natives represents not only an important topic *per se*, but also allows the identification of the peer effect by an using instrumental variable approach. In particular, we address the *reflection problem* (Manski, 1993) by exploiting the fact that immigrants and natives satisfy the *excluded peers* property (Bramoullé et al., 2009; De Giorgi et al., 2010).⁵ Specifically, we focus on natives and peers living in the same municipality and instrument municipality-specific stock market participation rates among foreigners by using the lagged stock market participation rates in their countries of origin weighted by the population composition shares of the municipality as an instrumental variable. This instrument is valid because one's stock market participation is strongly correlated with the average ownership in one's country of origin and because the behaviour of natives is not directly affected by the behaviour of those living abroad, except through the behaviour of foreign peers. Thus, this approach allows correcting for the simultaneity of individual behaviour because the stock market participation in the country of origin of foreigners is not influenced by that of native residents and, therefore, there cannot be any reverse causality. To further disentangle the endogenous peer effect from contextual and correlated effects (Manski, 1993) we explicitly control for individual investment preferences and for municipality-specific characteristics.

Our second contribution relates to the empirical research that studies the mechanisms underlying peer effects in financial behaviour. The two main transmission channels of peer effects identified in the literature are *social utility* and *social learning*. However, findings diverge on which of the two matters most. On the one hand, Bursztyn et al. (2014) in the experimental study show that peer effects are transmitted through both *social learning* and *social utility* channels, where *social learning* comprises all knowledge spillovers, from the awareness of the subject matter to opinion transmission, and where *social*

⁵ In fact, it is only possible to identify peer effects if peers satisfy this criterion, meaning that in our setting we can only study the effect of immigrants on natives and that we cannot rule out the *reflection problem* in any other case (e.g., peer effects from immigrants to immigrants, natives to natives, and natives to immigrants).

utility summarises Gali's (1994) notion of *keeping up with the Joneses* and accounts for preferences for conformity and payoff complementarities. On the other hand, Banerjee et al. (2013) show that, once it is properly conditioned on information transmission, individual behaviour no longer depends on group behaviour. Results by Haliassos et al. (2016) support the transfer of knowledge rather than imitation. In other words, they find no evidence supporting the *social utility* channel in the transmission of peer effects. We contribute to this debate by accounting for attributes that represent learning, such as individuals' financial literacy, as well as their own and their neighbours employment in the financial sector.

To study the effect of immigrants' stock market participation on that of natives we focus on the case of Luxembourg. The reason for why Luxembourg represents a unique setting for our identification strategy is twofold. First, about a half of Luxembourg residents are foreign-born. At municipality level, this share ranges from about 15% to as high as 65% (see Table 6 in the online appendix). Second, the immigrant population in Luxembourg is very heterogeneous and comprises groups with very low stockownership as well as those whose participation rates are twice as high as that of natives. Together, this results in a substantial degree of variation in natives' exposure to different investment attitudes, allowing the identification of the peer effect from immigrants to natives.

In the empirical analysis, we use several datasets. Our main source is the second wave of the Luxembourg Household Finance and Consumption Survey (LU-HFCS) from 2014. This is a representative survey of the resident population in Luxembourg and provides detailed information on individuals' economic and socio-demographic characteristics, on their country of birth, as well as on their current residence in Luxembourg at the detail of 4-digit zip codes. To construct the instrument, we use the data from the first wave of the Eurosystem HFCS, mainly referring to the year 2010, which provides harmonised information about stock market participation for most euro area countries. Finally, we complement individual-level data with municipality-specific information from the Luxembourg Population Census collected in 2011. In particular, we use information on the municipalities' population composition to weight the stock market participation rates in the Eurosystem HFCS dataset to construct the instrumental variable and rental prices to account for contextual effects.

Our results suggest that the financial decisions of the native population are influenced by the financial choices of foreigners in their community. In particular, we find that the peer effect of the stock market participation of foreigners on that of natives is 0.5, meaning that an increase in participation rate of foreigners by 10 percentage points is associated with an increase in the participation rate of natives by 5 percentage points. Controlling for financial learning channels, we find that at least part of this peer effect is due to *social learning*. The effect of the average participation of foreigners decreases by almost half after controlling for one's financial literacy, employment in the financial sector and the share of neighbours working in the financial sector, that is those neighbours who have financial knowledge. The latter, which seems to be driving the *social learning* effect, has an estimated coefficient of around 0.5, depending on the specification. This means that a 10 percentage point increase in the proportion of peers working in the financial sector would lead to a 5 percentage point increase in the probability of an individual to invest in stocks. In our context, foreigners might be contributing to this effect to a rather large extent, since 81% of

those working in the finance industry were born outside of Luxembourg.⁶ The positive effect of the proportion of residents employed in finance on natives' stock ownership rates cannot be interpreted as *social learning* only, as it might also include the pure promotion of certain financial products or be driven by the sorting of people working in finance to certain geographic areas, which we address to some extent by including municipality characteristics in the regression specification. Our findings are robust to a placebo test, relaxation of the linearity assumption, use of alternative instrumental variables and a variety of sample specifications.

To the best of our knowledge, this is the first study to analyse the response of the native population to the financial choices of foreigners. Although the results for Luxembourg might not be representative for other countries, they are likely to hold for certain cities or areas with a large immigrant population.⁷ Moreover, our research design provides a unique setting for the identification of peer effects by exploiting the *excluded peer group* property and employing the instrumental variable approach. Improved understanding about this question is necessary to design effective and sustainable financial inclusion policies in the presence of immigration induced on-going changes in the composition of the population in Europe. Our findings suggest that peer effects generate social multiplier in financial behaviour both by fostering financial literacy and, ultimately financial inclusion, through *social learning*, and by amplifying panics through *social utility*. The latter is due to the fact that *social learning* fails to explain all of the peer effect. Moreover, these peer effects operate effectively via individuals familiar with financial matters. Thus, greater participation in the formal financial system, and, in particular, in stock markets, could be achieved by increasing the number of financial experts in an individual's network, which in our case is defined by the municipality.

The paper proceeds as follows. Section 2 summarises the main findings on peer effects in investment decisions. Section 3 reviews the setup of the analysis. Sections 4 and 5 discuss in detail the methodology and the data. Section 6 presents main results and describes the robustness tests. Section 7 concludes.

⁶ Finance industry is comprised of credit institutions and professional financial services firms, insurance companies excluded. The proportion is reported as of the third quarter 2014 - the latest date available before the reporting changed. Source: Central Bank of Luxembourg tables 14.02 and 11.02 (1991-2014).

⁷ The results we find could be replicated in similar countries such as Singapore or Hong Kong or one could focus on certain cities with a large share of foreign-born residents, such as Lausanne in Switzerland (41.9%), Mannheim in Germany (38.7%), London in the U.K. (36.7%), and Brussels in Belgium (35%). In these hotspots for immigrants, financial education programs for immigrants might have strong social multiplier effects on both immigrants and natives.

2 Previous research

There is a vast literature on differences in financial market outcomes between immigrants and natives (e.g., Haliassos et al., 2016; Chen, 2013), and on the interdependence (Kelly and Gráda; 2000) and assimilation (e.g., Haliassos et al., 2015) of immigrants' financial behaviour. However, the reverse question, whether immigration affects natives' financial decisions, has received little attention.⁸ One exception is Brown et al. (2008), the study closest to ours, who examine the effect of stock market participation in one's neighbourhood on one's decision to own stocks. To identify the causal link between community and individual stock market participation, the authors focus on the behaviour of "native" residents in the United States, i.e. those whose states of birth and residence coincide, and instrument average community ownership by using information on average participation rates in states of birth of "non-native" neighbours. The results show that an individual is more likely to participate in the stock market when more people in her community are stock market investors and that this effect is stronger in communities in which individuals are more likely to seek advice from their neighbours.

Despite a lack of studies on the peer effects in investment decisions and portfolio allocation between immigrants and natives, there is a large body of research that analyses the role of peer effects in financial behaviour in a variety of other settings. Among the first authors to have looked empirically at the causal effect of peers' choices on individuals' financial outcomes are Duflo and Saez (2002) in retirement savings decisions. Similar to Duflo and Saez (2002), most papers studying peer effects in financial behaviour find a positive association between the decision of a group and of an individual (see Table 5 in the online appendix). However, there is no consensus on what drives those effects.

In particular, Bursztyn et al. (2014) disentangle two channels of social influence in financial decisions: *social learning* and *social utility*. Their experimental set up allows estimating the two mechanisms separately and to conclude that both matter. Differently, Banerjee et al. (2013) distinguish between a pure *information effect*, when a participation decision depends on whether the person is aware of the opportunity, and an *endorsement effect*, which captures all interactions beyond pure information transmission, meaning that the participation decision depends on participation among one's peers. By studying microfinance borrowing participation decisions, the authors show that only the information effect matters, whereas there is no statistical evidence of the *endorsement effect*.

Except for these two studies, the existing empirical literature on peer effects in financial behaviour either estimates the combined effect of social learning and social utility or focuses on one of the two. For example, several studies investigate the effects of social interactions on portfolio choices by looking at professional traders (Hong et al., 2005; Pool et al., 2015) or private investors (Ivkovic and Weisbenner, 2007; Kaustia and Knüpfer, 2012). These papers find that investors who live in the same city or neighbourhood (Hong et al., 2005; Ivkovic and Weisbenner, 2007; Kaustia and Knüpfer, 2012) are likely to trade the same stocks (Hong et al., 2005; Ivkovic and Weisbenner, 2007), to have a portfolio overlap (Pool et al., 2015), and to enter the stock market if their peers recently experienced positive returns (Kaustia and Knüpfer, 2012). While all these studies attribute their results to the *word-of-mouth* communication about stocks among investors, their conclusions about the quality of the shared information differ. Several

⁸ There are numerous studies that pose a question similar to ours in the context of education. Two examples are Gould et al. (2009) and Angrist and Lang (2004).

other papers highlight the importance of social interactions in investment decisions by arguing that sociability reduces fixed participation costs through cheaper information sharing (Georgarakos and Pasini, 2011; Hong et al., 2004; Ivkovic and Weisbenner, 2007).

A handful of papers separate *social utility* and *social learning* channels. Specifically, Li (2014) studies the importance of information sharing regarding financial decisions within family networks and finds that the probability of investing in stocks increases if children or parents recently entered the stock market. By showing that the results hold only for entry decisions and that there is no correlation in stock market exits, the author concludes that information sharing is driven by *social learning*. Cooper and Rege (2011), on the other hand, provide evidence consistent with Bursztyn et al.'s (2014) *social utility* hypothesis. To study what drives peer effects in choices under uncertainty, they conduct an experiment and conclude that the main driving force of peer effects in their setting is *social interaction*, mainly due to *social regret*. Haliassos et al. (2016) find that exposure to financially literate neighbours increases households' participation in stock markets, and that the effect of the transfer of relevant knowledge is more important than pure imitation.

Finally, our paper closely relates to the literature on peer effects in consumption (Agarwal et al., 2016; Boneva, 2014; Cai et al., 2009), indebtedness (Becker, 2006; Georgarakos et al., 2014), housing choice (Patacchini and Venanzoni, 2014; Ioannides and Zabel, 2003) and programme participation (Aizer and Currie, 2004).

Thus, there is a vast literature studying effects of peer choices on individual economic behaviour. However, most of these papers are only able to identify the overall effect of social interaction without determining what its drivers are. We contribute to the literature, by, first, robustly identifying peer effects in stock market participation and by separating *social learning* channel of its transmission; and, second, by answering the question whether these effects exist between immigrants and natives. Our results, in combination with recent findings on the nature of peer effects in financial behaviour and on differences between immigrants and natives, indicate that financial culture and investment attitudes can be transmitted through peer effects, which should be taken into consideration to design effective policies aimed at fostering financial inclusion.

3 Background and study set-up: Luxembourg and immigrants

Luxembourg offers a unique context to study the effects of immigration and of the exposure to different financial cultures on the portfolio choices of natives. There are several reasons for this. First, roughly half the Luxembourg population are foreign-born, with this fraction reaching more than 60% in certain areas of the country (see Table 6 in the online appendix). Most foreigners come to Luxembourg from neighbouring countries (Belgium, France and Germany) and from Southern Europe (Portugal and Italy). Immigrant from these countries account for between 53% and 92% of the foreign-born residents depending on the municipality. The rest of the immigrant population originates from other European countries and the rest of the world.

Despite a highly developed financial sector and high living standards, over years Luxembourg attracted both highly qualified and low-skilled immigrants. Heterogeneity among the foreign-born population is, amongst others, reflected in the stock market participation rates (Table 1). Interestingly, immigrants from

Portugal have one of the lowest stock market participation rates in Luxembourg which is even lower than the probability to be a stock holder among the Portuguese back in Portugal. This is in contrast to the Germans, Italians and Belgians in Luxembourg for whom the probability to be a stock market investor is almost twice as high as in their country of origin. This suggests differential selection into immigration across these countries. Namely, while Germans, Italians and Belgians in Luxembourg are more likely to be in jobs requiring high education, immigrants from Portugal are likely to occupy low-skilled jobs and to have lower educational attainment and lower income. The data confirm that significantly more immigrants have completed either high or low education whereas more natives have obtained middle education.

As regards to differences between native and overall immigrant population, they exist on several dimensions. In particular, the immigrants are on average younger than natives (Table 7 in the online appendix); less of them are widowed and retired, while there are no differences in divorce and marriage rates; more than half of foreign heads of households have a foreign partner comparing to only 12% among the natives. From the economic perspective (Table 8 in the online appendix), natives in Luxembourg have significantly higher homeownership rates but there are no differences in life insurance ownership or the probability to hold some debt. Further, Luxembourg natives' income and net wealth are, on average, higher than immigrants'. The former is driven by the fact that Luxembourgish tend to be employed in public sector (47% of Luxembourgish are employed in public jobs relative to 14% of immigrants), which, differently to many other countries, offers on average higher salaries than does the private sector. The latter is a direct consequence of higher homeownership rates among the natives and a remarkable increase of house prices over the last decade. This is also reflected by the fact that the natives have higher conditional mean levels of both main residence and liabilities, but there are no differences in financial wealth between the two groups. Lastly, immigrants on average are more financially literate, more risk loving, and more likely to work in the financial sector (12% of immigrants work in the financial sector compared to 5% of natives).

Finally, the composition of the immigrant population varies greatly across municipalities, as does their financial behaviour. Specifically, the overall share of foreigners ranges between 15% and 65% across municipalities, while the main immigrant groups account for 11- 55% of total population (see Table 6 in the online appendix). An interesting feature is that immigrants tend to cluster within municipalities by country of origin. For example, in some municipalities Portuguese make up 45% of the total population and 82% of the total foreign population. Similarly for the French and Belgians, whose shares in certain municipalities reaches 14% (27%) and 18% (64%) of the total (foreign) population, respectively. In the context of this paper, such a choice of place of residence creates a substantial variation in the exposure of natives to different foreign cultures, and in particular to investment attitudes and stock market participation behaviour. As can be seen from Table 2, the stock market ownership rates differ substantially at municipality level, with a higher variation among foreigners. This is not surprising given the difference in the composition of the population of municipalities and the fact that immigrants themselves are very diverse on this dimension. In particular, as shown in Table 1, while stock market

participation rates of the Portuguese is among the lowest, the participation rates of Germans and Belgians are twice as high as those of natives.⁹

To conclude, there are substantial differences in stock participation rates across municipalities that cannot be explained solely by socio-demographic characteristics. Moreover, natives in Luxembourg are exposed to diverse investment attitudes because immigrants, who have widely ranging stock-ownership rates, tend to cluster in different geographical areas. This variation makes it possible to study how the native population change their portfolio allocations as a result of portfolio choices of their foreign-born community peers.

4 Methodology and empirical strategy

4.1 Identifying and estimating the peer effects: instrumental variable approach

To identify the effect of stock market participation of foreigners on the investment decision of a native residing in the same municipality, we, first, specify our baseline estimating equation by a linear probability model including the variable meant to capture endogenous peer effects and a set of socio-demographic and economic characteristics:¹⁰

$$y_{icN} = \alpha^* + \beta_F^* \hat{E}(y|c, F) + Z'_{icN} \eta^* + u_{icN}, \quad (1)$$

where y_{icN} is an indicator taking value one if a native (N) household i residing in municipality c has investments in stocks or mutual funds. Z'_{icN} is a row vector of exogenous households' socio-demographic and economic characteristics and $\hat{E}(y|c, F)$, specified in equation 5, is the stock market participation rate among foreign peers of a household i living in municipality c .

$$\hat{E}(y|c, F) = \frac{\sum_{j \in P_{Fci}} y_{jcF}}{N_{cF}}, \quad (2)$$

where P_{Fci} is a set of foreign (F) neighbours of a native individual i living in a municipality c , y_{jcF} is the individual participation decision of immigrants residing in municipality c , and N_{cF} is the number of immigrants living in municipality c .

As has been shown in Section 4.1, a simple regression of a native's decision to invest in stocks on the stockownership rate among foreigners in her community would not produce a consistent estimation of the peer effect of interest, i.e. how natives change their stock market participation behaviour facing different investment attitudes of their foreign peers. Specifically, the estimate of the coefficient β_F^* meant to capture this effect would be biased in any of these three cases: there is a reverse causality, there are contextual effects, or there are correlated effects, which are altogether referred to as the *reflection problem* (Manski, 1993). For an excellent review to identify the peer effect of interest and to address the

⁹ The composition of the population in Luxembourg is comparable to such countries as United Arab Emirates, Qatar or Kuwait, where, however, most of the immigrants are employed in the construction sector or other low-skilled jobs and are isolated from the native population. Thus, it is difficult to imagine how native population might be in contact with immigrants in daily life. Among other suitable cases to study a question similar to ours would be Singapore or Hong Kong. One could also focus on certain cities with a large share of foreign-born residents, such as Lausanne in Switzerland (41.9%), Mannheim in Germany (38.7%), London in the U.K. (36.7%), and Brussels in Belgium (35%) (Burdett, 2015).

¹⁰ To address potential consequences of the linearity assumption, we report results of a probit model in the appendix, as in Nicoletti et al. (2014).

endogenous sorting and selection issues see Durlauf (2004), Topa and Zenou (2014) and Ioannides and Topa (2010). They survey the research on neighbourhoods' and social networks' effects and their role in shaping behaviour and economics outcomes.

In our context, the ideal experiment to rule out the possibility that correlation of investment behaviour between natives and immigrants is driven by unobserved correlated characteristics would be to allocate immigrants randomly to municipalities. However, in an absence of such an experiment we propose the twofold approach to clean the association between an individual's stock market participation and her group participation rate of the confounding factors. First, we solve the reverse causality problem and separate endogenous and exogenous effects by relying on an instrumental variable approach (e.g., Brown et al., 2008; Duflo and Saez, 2002; Ioannides and Zabel, 2003). Second, we take a step further and address the *contextual* and *correlated* effects by controlling explicitly for municipality-specific characteristics and individuals' risk preferences.

To solve the issue of reverse causality, we exploit the fact that the network of neighbours, consisting of natives and immigrants, and the network of foreigners, consisting of immigrants living in Luxembourg and those who stayed in their countries of origin, are partially overlapping. As shown in Bramoullé et al. (2009) and De Giorgi et al. (2010), identification of the peer effect and the separation of endogenous and exogenous effects are only possible if individuals do not interact in groups since it allows the use of instrumental variables. In the terminology of De Giorgi et al. (2010), such intransitivity of network allows instrumenting the peers' mean behaviour by using the mean of characteristics of peers' peers who do not interact directly with the person in question, or in other words of the *excluded peers*. Thus, intransitivity guarantees the existence of instrumental variables for the foreign peers' stock market participation rates.

In our application, we rely on the intuition of Guiso et al. (2004) that there may be long lasting effects of one's place of birth on one's financial outcomes. Following Brown et al. (2008), we construct an instrumental variable for the municipality-specific participation rates of foreigners by using information on lagged stockownership rates in the countries of birth of the immigrants. To derive this instrument we rely on the intransitivity of networks given by the assumption that Luxembourg natives do not interact directly with foreigners who did not immigrate to Luxembourg. This implies that, while ownership rates in the country of birth of immigrants are correlated with ownership rates of the immigrants residing in Luxembourg, there is no direct effect from those who stayed in their country of birth on the financial choices of the native population in Luxembourg if not indirectly through the foreign peers. This fact implies that the stock ownership rates in the countries of origin can be used as an instrumental variable for participation rates of immigrants in Luxembourg.

Formally speaking, the fact that average characteristics of immigrants' countries of origin can affect the natives' decisions only through the decision of their foreign neighbours means that we use as an instrument for immigrants' stock market participation the mean of the dependent variable y of those who stayed in the countries of origin, i.e. $\hat{E}(y|\text{country origin}, F) = \frac{\sum_{j \in P_{Fi}} y_{jF, \text{country origin}}}{N_{F, \text{country origin}}}$. To rule out simultaneous correlated responses across countries to the release of new information and to reduce the potential for picking up a spurious correlation, we use lagged values of the instrument. To construct a municipality - specific instrument, we weight participation rates in the countries of origin by the municipality-specific population composition, i.e. by the proportion of immigrants coming from a certain country.

To be valid, the chosen instrumental variable should satisfy two main conditions. First, it must be relevant, meaning that it should be correlated with the endogenous variable - stock market participation among the foreigners. Second, it must satisfy the exclusion restriction, i.e. it should not be correlated with unobserved variables explaining natives' stock market participation decisions - the dependent variable - and it must influence this decision only indirectly through the average participation decision of their foreign peers.

Since we use an instrumental variable at the level of the neighbourhood, there remain two potential threats to the identification, which have to do with the exogeneity of instrument. In particular, the instrument is exogenous only if, first, there are no omitted characteristics of those who live abroad that are correlated with the characteristics of the natives and explain the investment decision; and, second, if the population of immigrants' countries of origin do not interact directly with Luxembourg native residents.

While the latter does not seem to be of a considerable concern, the former might arise if immigrants and natives sort themselves into neighbourhoods based on unobservable correlated characteristics which also characterise those who stayed in their countries of origin. If this is the case and individuals living in the same neighbourhood share similar unobserved characteristics that are also correlated with the stock market participation decision, then these individuals will also have similar investment preferences, and thus correlated outcomes, even in the absence of the endogenous peer effect (Goldsmith-Pinkham and Imbens, 2013). Failing to control for such characteristics might therefore lead to an overestimation bias of the endogenous peer effect.

To address this concern we control for individual characteristics that might affect both investment preferences and the choice of the location of residence but are rarely observed in the data and thus remain "unobservable" in most of the empirical studies, as well as for a set of neighbourhood-specific covariates. In particular, to solve the issue of correlated effects, i.e. characteristics that are shared by natives and foreigners living in the same municipality, we include an indicator for individuals' preferences for risk (Bramoullé et al., 2009, Cooper and Rege, 2011)¹¹, as well as information on financial literacy and on whether an individual herself is employed in financial sector. As for the neighbourhood characteristics, we control for municipalities' average rental prices, which captures their economic condition and location within Luxembourg, and for the proportion of municipalities' residents working in the financial sector, which accounts for the population composition. Explicitly controlling for these characteristics allows partialling out the potential bias arising due to sorting of natives and immigrants with similar characteristics, which might affect their portfolio allocation decisions into same municipalities of residence. This approach has a further advantage that, by controlling explicitly for the individual- and neighbourhood-specific attributes, we are able to analyse the determinants of the investment decisions as well as the mechanisms of the peer effect transmission.

Formally speaking, to control for the confounding factors, that is contextual and correlated effects, we re-write equation 4 including neighbourhood and individuals' characteristics discussed above:

$$y_{icN} = \alpha + \beta_F \hat{E}(y|c, F) + Z'_{icN}\eta + \hat{E}(K|c)\gamma + x'_{icN}\delta + \epsilon_{icN}, \quad (3)$$

¹¹ Information on natives' risk attitudes is meant to address a concern raised in (Cooper and Rege, 2011) that if peers have similar unobserved taste for risk, possibly due to self-selection into peer groups, there would be observed positive behavioural correlation even in the absence of social interaction effects.

such that:

$$\hat{E}(K|c) = \frac{\sum_{j \in P_{ci}} K_{jc}}{N_c} \quad (4)$$

where K_{jc} is a set of neighbourhood specific characteristics (rental prices and proportion of people working in financial sector) and x'_{icN} is a vector of risk preferences, and financial literacy and an indicator of individual's employment in the financial sector. Since in this specification $E(\epsilon_i|c, Z, K, x)$ is more likely to be zero, estimation of equation 6 provides an unbiased estimate of an endogenous peer effect of interest β_F .¹²

4.2 Identifying mechanisms

Most of the literature agrees that correlation between individual decisions and the behaviour of the group, net out of contextual and correlated effects, may be driven by two forces: *social utility* and *social learning* (Bursztyn et al., 2014). Both of these channels help to explain why peers might play an important role in one's savings decisions. In particular, *social utility*, which has also been labelled as *social interaction effect* (Cooper and Rege, 2011), or, simply, *keeping up with the Joneses* (Gali, 1994), is responsible for social norms and beliefs about social norms transmission and operates through *social norms*, *social regret*, *preferences for conformity* and *payoff complementarities* (Cooper and Rege, 2011).

Social learning, on the other hand arises due to the fact that information supposed to guide financial decisions is costly and thus, individuals tend to rely on others' knowledge. According to Sorensen (2006), *social learning* is a particular form of endogenous peer effects, through which individuals might be both directly influenced by the information provided by peers and by knowledge of their decisions. Dahl et al. (2014) show that transmission of information, which includes knowledge about both the existence of the opportunity and possible returns, is one of the most important drivers of peer effects. Moreover, this channel also creates opportunities for social multiplier and "snowball" effects, thus, making *social learning* being especially relevant for policy-makers. As for its mechanisms, *social learning* might occur through *rational social learning*, when valuable information is transmitted, *imitation*, and *knowledge spillovers* (Cooper and Rege, 2011). Similar in the meaning but different in the terminology, Banerjee et al. (2013) distinguish between *endorsement channel* of peer effect transmission, which comprises both *social utility* and any opinion transmission, and the *pure learning channel*, which includes only awareness about the opportunity and, thus, real knowledge transmission. Independently of the classification, little has been

¹² We choose to control for municipality-specific characteristics, instead of those related only to foreigners, which is the peer, or reference, group of interest, because in our specification these characteristics are meant to capture contextual effects and factors which might induce sorting into specific areas, and thus that are common for both natives and foreigners. The choice of these controls is driven by both data availability and sample size. In principle, following Manski's (1993) discussion, one could include the group specific averages for all individual-level covariates estimated in the regression. However, our sample size of native residents is relatively small, thus not allowing estimation of such a specification precisely. To tackle this issue, we choose neighbourhood specific covariates such as to capture potential endogenous sorting and the contextual factors the best, namely municipality-specific rental prices and employment in financial sector. The data on rental prices is from the CENSUS administrative dataset and therefore is only available at the municipality level, without the distinction of rents paid by natives and foreigners. To remain consistent, in the baseline specification we define the proportion of residents working in financial sector, constructed from our survey, also at the municipality level. To address the concern that the variable capturing endogenous peer effect is defined among foreigners while contextual effects are constructed for the whole population of the neighbourhood, thus including both natives and foreigners, and to ensure the consistency of the definition of the reference group, we also perform the analysis where we specify reference group specific characteristics constructed from our survey data only for foreign population. Further, in the robustness analysis we also include controls for foreign peers' risk aversion and financial literacy to account for the possibility that omission of these factors might confound the estimation of the peer effect. The results of these analyses are reported in Table 23.

done to separate information transmission channels from the *social utility*. Despite multiple attempts to identify word-of-mouth communication by using different proxies of sociability, such analysis does not distinguish between *social utility* and *social learning* mechanisms. To fill this gap in the literature we attempt to disentangle the *social utility* and the *social learning* channels by partialling out everything that might be related to financial knowledge transmission. We cannot however disentangle the *social utility* channel per se and speculate that it might be characterized to some extent by the residual of the overall peer effect not captured by the social learning measures we control for. This way of measuring *social utility* is arguably imperfect since the included covariates might not capture all potential knowledge spillovers.¹³ To measure the importance of *social learning* channel, we, first, control for individual's financial literacy about stocks and other financial knowledge not related to the stock market. We further condition on one's employment in the financial sector, which is meant to proxy one's knowledge about financial markets and investment opportunities. Finally, we control for the proportion of one's neighbours working in financial sector, which captures not only municipalities' contextual effects, but also addresses possible knowledge spillovers from those familiar with the industry.

A word of caution is in place regarding the interpretation of our results. First, accounting for *social learning* mechanisms only allows us to make some judgements on the relative importance of knowledge spillovers, captured by our measures, and the remaining net effect of the stock market participation of foreign peers. However, this approach does not help say much about the peer effects due to *social learning per se*. This is because the coefficient of the variable which is the closest to capturing information transmission, namely the proportion of neighbours working in the financial sector, cannot be interpreted as a learning channel in a strict sense, but rather as a combination of both knowledge spillovers and sorting based on occupation, and, thus, possibly comprises both these effects.

Second, with our specification we cannot make conclusions about how financial knowledge affects one's portfolio choices, although it is arguably of interest *per se*. Indeed, while our set of individual controls is able to tell how financial knowledge is correlated with individual investment decisions and allows netting out the learning channel, these variables cannot be interpreted causally. This is because an individual's financial literacy might represent not only her own financial knowledge and what she learned from her peers, but also everything that was learned because of the investment decision, and thus suffers from the reverse causality.

Finally, the effects that we capture with the variables accounting for *social learning* might also to some extent reflect individuals' preferences for conformity. This is because one can feel the need to *keep up with the Joneses* not only in the dimension of actual investment choices, but also in one's financial awareness.

To summarise, our research design allows us to: first, identify the *endogenous peer effect* of foreigners' stock market participation decisions; and, second to take a step further by seeking to understand what are the drivers of this effect.

¹³ We also cannot distinguish social norms, social regret, preferences for conformity and payoff complementarities within the social utility channel using the available data.

5 Data, sample definition and descriptive evidence

5.1 Individual level data

We employ several dataset to perform the analysis in the paper. In particular, we use the second wave of Luxembourg Household Finance and Consumption Survey (LU-HFCS), collected in 2014 as a source of individual data on natives and to construct contemporaneous averages of foreigners' stock market participation at a municipality level. This data set contains information on 1,601 households, among which there are 875 households whose head was born in Luxembourg, whom we call *natives*, and 726 households whose head was born abroad, whom we refer to as *foreigners* or *immigrants*. For a detailed methodological report and first results see Girshina, Mathä, and Ziegelmeier (2017).

The LU-HFCS is a representative sample of the Luxembourg population and is the best available dataset for our analysis for several reasons. Firstly, it contains detailed balance sheet information along with a rich set of socio-demographic, economic, investment attitudes and financial knowledge variables. Secondly, it contains full details on the country of birth of the respondent, which is missing in the analogous datasets due to the anonymisation procedures. Finally, because information on the location of the residence is available at 4-digit zip code level, we can assign individuals into their municipalities of residence.

Our main dependent variable is an indicator for an individual's stock market participation. This variable takes value 1 if an individual holds stocks, directly or indirectly through mutual funds, and it is zero otherwise. Our main explanatory variable is stock market participation rate among foreigners, defined as a municipality-specific average of foreigners' stock market participation dummies weighted by population weights available in the sample.

Since all the information about household's wealth and investments is provided by the *financially knowledgeable person* (FKP), we use her person specific characteristics in the analysis. In particular, we include in the regression age, age squared, indicator for a male FKP, indicators for being single, widowed and divorced, and for having a partner born outside of Luxembourg. We also control for middle and high educational attainments, for self-employment, unemployment, retirement, and other occupation, and for individual's employment in financial sector. Next, we include an indicator for having risk-loving investment attitudes (*take substantial or above average risk expecting to earn substantial or above average returns*) and for answering correctly about differences in risk profiles of stocks and bonds, and the proportion of correct answers about other aspects of financial literacy (mortgage interest rates, inflation and diversification). As for household specific controls, we condition on the number of household members and a log transformation of a total gross household income.¹⁴

To construct the instrumental variable for the municipality-specific foreigners' stock market participation rates, we make use of the first wave of the Eurosystem Household Finance and Consumption Survey (HFCS), collected around the year 2010. This dataset has several advantages. First, it contains information on 14 other European countries,¹⁵ immigrants from which make up 78% of all foreigners and 34% of the

¹⁴ We add 1 to income if it is nil.

¹⁵ The other 14 European countries covered in the first wave of HFCS are Belgium, Germany, Greece, Spain, France, Italy, Cyprus, Malta, the Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland.

total population in Luxembourg. Second, this data was collected in a homogenous way across the European countries and between waves, and thus, allows using comparable variables which defined participation in the stock market. Finally, we use the lagged value of the instrument, which allows accounting for possible correlated shocks between an endogenous variable and an instrument. To construct the instrumental variable, we calculate stock market participation rates (directly and indirectly through mutual funds) of all the population in immigrants' country of origin¹⁶ and weight them by the proportion of the population from a corresponding country living in a municipality by using CENSUS 2011 data.¹⁷

In the main analysis we restrict the full sample of all households residing in Luxembourg to 875 native households, i.e. whose FKP is born in Luxembourg. We drop observations on households who reside in municipalities where no foreigners were surveyed (42 observations) and where foreigners surveyed are not from the European countries present in the first wave of the Eurosystem HFCS (26 observations). Finally, due to the multiply imputed nature of the dataset, 2 observations are dropped for households which do not appear in all implicates. This selection leads to a sample of 805 observations which we use to obtain the main results. In the robustness analysis, we further refine the sample selection and perform all the tests on a sample where there are at least 2, 3, 5 and 10 observations available for both natives and foreigners in a municipality. Due to the small sample size, however, the number of observations drops dramatically after such selections. Thus, we keep our sample as large as possible to estimate the main results.

5.2 Municipality level data

To analyse peer effects within neighbourhoods we exploit the variation in stockownership rates and in the population composition across municipalities.¹⁸ The reason for why we choose municipalities to define peer groups is twofold. First, the municipality is a geographic area small enough for peer effects to matter. The maximum surface of a municipality in Luxembourg is 113 square kilometres, while the average is 22.3 square kilometres (Table 2). This is small enough, since previous research suggests that peer effects decay after between 5-10 (Pool et al., 2015) and 50 miles' radius (Ivkovic and Weisbenner, 2007), which translates to areas between 78 and 7,854 square miles.¹⁹ Second, although we have data available at the 4-digit zip code level, only aggregation to municipalities allows having enough observations in a neighbourhood and administrative data on the composition of the population.

¹⁶ The rationale for using all the population in the country of origin is twofold. First, in presence of peer effects, financial culture of immigrants would affect financial culture of natives, and, thus, would affect those who emigrated from their country of origin to Luxembourg as well. Secondly, in several countries (France, the Netherlands and Spain) data on the country of origin was not collected, thus using all the population, and not only natives, allows using homogenous variables across countries. To address possible concerns, we also use an instrument constructed using only data on the native population in the countries of origin where available. Although the first stage changes, overall results remain the same.

¹⁷ We also use as weights for the instrumental "population weights" of LU-HFCS sample we used to construct our main explanatory variable and the results do not change.

¹⁸ We also do the analysis at a bigger - canton - level, where more observations per group are available. The results are robust to such an aggregation.

¹⁹ To put the size of Luxembourg into perspective, the total surface of the country is 2,586 km², which is divided into 116 municipalities (as of 2011) or 12 cantons. In comparison, the surface of New York city is 1,214 km², which has 5 boroughs - a typical unit of analysis of neighborhood peer effects in the US setting.

Thus, we analyse peer effects in stock ownership behaviour between immigrants and natives at a municipality level. In 2011 in Luxembourg there were 116 municipalities.²⁰ Our sample of individual data covers 107 of them. We supplement the individual survey data with the administrative data from the Population Census 2011 collected by National Institute of Statistics and Economics Studies of the Grand Duchy of Luxembourg (STATEC). This dataset contains information on the population of Luxembourg at a municipality-level by the country of birth, which we use to construct our instrumental variable by weighting stock-ownership rates in the immigrants' countries of origin by the corresponding shares in municipalities' population. We also use information from CENSUS to construct the municipality-specific controls, namely, dummies for the quintiles of the distribution of rental prices per square meter of the residence dwellings.

6 The effect of foreigners' stock market participation on the stock market participation of natives

6.1 Main empirical results: OLS and two-stage least squares

Our main results are presented in Table 4, which shows the estimates of the linear-in-means model of a native's stock market participation decision on the stockownership rates among her foreign peers. Our baseline specification includes the variable of interest, that is the stock market participation among the foreign neighbours, and a set of socio-demographic and economic controls, such as income, level of education and other relevant characteristics (columns 1 and 2 of the Table 4). The results show that there is a strong positive correlation between stockownership of natives and that of foreigners. In particular, the total effect of foreigners' stock market participation on natives' is 0.18 (0.53) in the OLS (2SLS) specification, which means that by increasing the ownership rate of foreigners by 10 percentage points, the probability of a native to invest in stocks increases by 1.8 (5.3) percentage points.

The coefficient in the 2SLS specification is higher than the coefficient of OLS. One reason for this might be the measurement error in the average foreign stock market participation due to the low number of foreign households in some municipalities. In this case it is likely that the OLS estimates suffer from an attenuation bias basing the coefficient towards zero. On the opposite, our instrumental variable using Census data is very precisely measured. Alternatively, the causal relationship between the instrument and the stock market participation of natives might be heterogeneous across the population (local average treatment effect). In our case the intensity of the exposure to the country of origin might vary with the years having lived in the country of origin or the intensity of the contact to the family and friends at home. Such heterogeneity of the results across the population might lead as well to higher point estimates of the 2SLS than that of the OLS regression as the instrument captures the effects of the strongest group (Oreopoulos, 2006). Table 3, presenting the results of the first stage for all specifications, shows that stockownership rates in the countries of origin of immigrants are strongly positively correlated with the stock market participation of immigrants in Luxembourg. In fact, by coming to Luxembourg, one is almost three times more likely to invest in the stock market than back in one's country of origin, while the ordinal property is preserved: immigrants from countries where stock market participation rates are higher are

²⁰ Currently there are 106 municipalities. However, we use the division which was in effect in 2011 due to our reliance on Census population composition shares to construct the instrumental variable.

more likely to have stock holdings in Luxembourg than immigrants from the countries where fewer people invest in stocks.²¹ This result is as expected and in line with previous findings. It justifies the choice of the instrumental variable. As regards to formal tests, the p-values of the F-statistic confirm the explanatory power of the instrument whereas the p-values of the endogeneity test suggest that the use of instrument is preferable over OLS because there is evidence of the endogeneity of the explanatory variable.²²

Next, we control for one's investment risk preferences and financial literacy (columns 3-4 of Table 4), the effect of foreigners' participation shrinks to 0.16 in the OLS and 0.52 in the 2SLS specification. This suggests that the correlation between a group's investment behaviour and individuals' choices can be partly attributed to sorting and correlated preferences - particularly those on risk attitudes. Unsurprisingly, the results indicate that the lower is the risk aversion (the more the individual is risk loving) the higher is her probability to invest in stocks. Specifically, risk loving individuals are 20 percentage points more likely to invest in stocks than those who prefer below average risk despite below average returns. As for financial literacy, interestingly, only financial knowledge about stocks, summarised by the variable *financial literacy related to stockownership*, seems to matter for the stock market participation decision: knowledge about the differences in risk profiles between bonds and stocks is associated with a 10 percentage point increase in the probability to invest in the stock market. Although this result is in line with findings that more financially knowledgeable people are more likely to invest in stocks (Lusardi and Mitchell, 2011a,b; van Rooij et al., 2011), in our application this correlation cannot be interpreted causally. This is because knowledge about stocks might be driven by learning through investment experience and thus, suffers from simultaneity. Moreover, on top of the own knowledge acquired prior to the investment decision, financial literacy might also contain knowledge transmitted by word-of-mouth and, hence, can be attributable to social learning. Although we cannot give causal interpretation to financial literacy controls in our setting, including them in the regression specification is necessary since they help to, first, isolate the *endogenous peer effect* by taking care of correlated preferences, and, second, capture *social learning* channel. Interestingly, once financial knowledge about differences in stocks and bonds is accounted for, neither employment of an individual in the financial sector nor other financial knowledge have explanatory power over natives' decision to invest in stocks. Overall, by including these controls the effect of average participation of foreigners decreases further but remains significant for both OLS and 2SLS.

Next, we control for the share of people working in the financial sector per municipality (columns 5-6 of Table 4). This control is meant to account for two factors: sorting and social learning. Sorting, because it is plausible that people working in the financial sector self-select themselves into certain areas, which might be closer to the financial centre of Luxembourg, or simply to be better located. On the other hand, part of the effect of this variable will account for the *social learning* since being surrounded by people employed in the industry, and, thus, made aware of opportunities, could increase the likelihood to learn about these

²¹ One concern about the validity of the instrument might be raised if the first stage is driven by, for example, income effects and not by the cultural persistence of financial behavior we are relying on. By looking at the Table 1, however, it can be seen that the order of stock market participation rates among the countries constituting main immigrant groups is preserved. This indicates that immigrants from high-participation countries tend to participate more than immigrants from low-participation countries. This fact addresses the concern.

²² In our baseline specification, we have one endogenous variable and one instrument, as well as the heteroscedasticity robust standard errors. Thus, to evaluate the relevance of the instrument and ensure that the estimates in the second stage are reliable, we are guided by the "rule of thumb" value of the F-statistics of 10 recommended by Stock et al. (2002).

opportunities and about specific financial products. Our estimates suggest that even after controlling for one's own employment in the financial sector, increasing the number of people working in finance by 10 percentage points increases the probability of investing in the stock market by around 5 percentage points. Moreover, by controlling for the proportion of peers who work in the financial sector, the effect of the stock market participation of foreign neighbours goes down by half to 0.1 and 0.3 in OLS and 2SLS regressions, respectively.²³ This suggests that the total effect of the stock market participation of foreigners is at least partly driven by knowledge spillovers from the neighbours familiar with the financial industry. Indeed, although the share of neighbours working in finance cannot be interpreted in a strict *social learning* sense, it most probably represents two effects: one part of it accounts for *social learning* and another is due to sorting.

Finally, we include controls for municipality-specific residential rental prices as a proxy of municipality wealth to account for possible municipality-specific effects and to address contextual effects and sorting on wealth or income (columns 7-8 of Table 4). Inclusion of this control slightly decreases the positive effect of the proportion of peers employed in the financial industry, but does not affect the overall results.

Our findings can be interpreted as follows. First, by employing instrumental variable approach we conclude that there exists a peer effect between foreigners' stock market participation behaviour and portfolio choices of natives. Second, by including a set of controls meant to capture contextual and correlated effects, we show that the peer effect we find is endogenous, and thus is of relevance for policy makers. Finally, we attempt to go further by disentangling mechanisms of what drives the endogenous peer effects. We do so by characterizing the *social learning* channel and we find that the covariates we include account for a sizeable portion, but not for the total of the estimated peer effect. This means that we perhaps fail to fully control for all possible drivers of *social learning* or that the remaining effect of the average participation of foreigners on individual decisions represents the *social utility* effect due to preferences for conformity or payoffs complementarities, or the combination of the two.

From the policy perspective, it means that, first, there is evidence of herding in financial behaviour, and second, that natives can quite plausibly change their financial attitudes in face of different financial cultures. Interestingly, the composition of the peer group plays an important role in explaining individual financial behaviour. In particular, the fact that the higher is the incidence of people in the neighbourhood working in finance, the higher is the probability of an individual to invest in stocks suggests that both *social learning* and sorting matters, and that people learn from those they think might be familiar with the subject matter.

Our estimates of the *endogenous peer effect* are in line with those obtained in the literature (Table 4). Our findings on the mechanisms of the peer effects transmission are in line with those of Bursztyn et al. (2014) who show that both *social utility* and *social learning* matter. Furthermore, Bursztyn et al. (2014) also show that social learning effects are the greatest when a peer who observes the behaviour of others is financially unsophisticated, and vice versa, when peers whose behaviour is observed by the others are financially sophisticated. Also Haliassos et al. (2016) find that exposure to financially literate neighbours

²³ The estimate of OLS in a full sample is not significant, whereas it is in the sample where there are at least two observations for both natives and foreigners in municipality. Although we present the results for the full sample in the main section, the results for the reduced sample might be more credible, because it excludes the possibility that the municipality averages are calculated based on one observation only.

increases households' participation in stock markets, and that the effect of the transfer of relevant knowledge is more important than pure imitation.

This result confirms our finding: significant positive effects of people working in the financial sector indicate that natives do learn from the behaviour of those they consider to be financially knowledgeable. This is also in line with the results of Banerjee et al. (2013), who show that peer effects are higher if people transmitting the knowledge are more important in a network sense, which in our case might be people who are part of the financial sector. Next, the sizable combined effect of variables meant to capture *social learning* in our analysis confirms that learning is arguably the main driver of peer effects in financial choices, with different authors showing the importance of the "*information diffusion*" (Cai and Szeidl, 2016) and "*awareness of the opportunity*" channels (Banerjee et al., 2013) in peer effects transmission over other channels.

6.2 Robustness checks

6.2.1 Placebo tests

The first robustness test we perform is to randomly assign individuals into different municipalities. If the effect we find, namely those of stock market participation among foreigners and fraction of the individuals working in the financial sector in a municipality of residence, are indeed peer effects and are not driven by spurious correlation or by a small sample, we expect to find no results if individuals are randomly assigned to a municipality of residence.²⁴ To make the evidence sharper and to analyse the interrelation between the main variables of interest, we limit the covariates included in the specification of this placebo regression to stock market participation of foreigners and the proportion of peers working in finance, and, as in the first four specifications, we also control for one's own employment in the financial sector. The results of the placebo tests are shown in the Table 9. In the first column we report the results of the OLS and 2SLS specifications with both municipality-level explanatory variables correctly assigned. As can be seen, the results of column 1 are comparable to those in Table 4 columns 1 and 2, which summarise the main results. Specifically, the probability of individuals to participate in stock market increases by 20 percentage points if twice as many foreigners invest in the stock market in a neighbourhood and by 60 percentage points if twice as many neighbours work in the financial sector. The second column shows the results when stock ownership of foreigners is assigned correctly whereas the fraction of individuals working in the financial sector is assigned randomly. As can be seen, the latter does not matter anymore, while the effect of the stock ownership increases and the indicator of people's employment in the financial sector becomes significant. This suggests that the effect of people who work in the financial sector is not spurious, and that it accounts for peer effects through the *social learning* channel. Next, we randomly assign both explanatory variables and find that they both become insignificant, while the effect of individual employment in the financial sector matters more. Finally, we randomly assign the stockownership of foreigners and correctly assign the fraction of neighbours working in the financial sector. Consistent with previous results, the only effect that matters is the fraction of people working in the financial sector, and its effect is larger than in the specification where we properly control for all the

²⁴ The reason we choose to randomly assign individuals into municipalities of residence is because at time the number of observations within a municipality is rather small, therefore we use the placebo regression in order to assure that our results are not driven by a small sample size.

channels that might represent peer effects. The main difference between the specifications in columns 1-4 and columns 5-8 is that, by omitting the control for individual working in the financial sector, the effect of the fraction of individuals working in the financial sector in a municipality matters more, as expected, when assigned correctly.

To make these placebo checks more informative, we repeat the randomisation exercise within six Luxembourg regions. This means that we randomly assign individuals in the municipality of residence within their region of residence. This design helps addressing the concern that there might be unobserved characteristics of the macro-area of the residence which might affect stock market participation decisions. The results shown in the Table 24 confirm that coefficient on the stock market participation of foreigners, when it is randomly assigned, is no longer significant. This means that behaviour of the foreigners with whom the natives share the region of residence but are expected to have negligible interactions does not affect their decisions. As for the randomly assigned proportion of peers working in the financial sector, its coefficient remains significant in the OLS specification, although it is lower than when it is correctly assigned, and it is no longer significant in the 2SLS specification. The fact that it remains significant but smaller in magnitude in the OLS specification might be indicative of the fact that there remains some interaction between individuals living in different municipalities but in the same region, since Luxembourg is a very small country, and that this interaction is less intensive as the effect has decayed. On the other hand, it could signal that there might be some sorting on occupation across regions.

This placebo exercise confirms that the effect of foreign neighbours' behaviour represents peer effects through the *social utility* channel, and that people working in the financial sector in one's municipality, represent both sorting and *social learning* channels. Thus, the estimated peer effects are not driven by spurious correlation.

6.2.2 Exploring additional instruments and models

To check the validity of the instrument further, we use additional available instruments. This approach allows verifying the exogeneity of the main instrument by testing the over-identifying restrictions. We consider several other instruments. First, we include as an additional instrument the total share of foreigners in a municipality of residence. Although overidentification test points towards the validity of the instrument, the F test on the joint predictive power of the instruments is relatively low. Thus, using these two instruments is not our preferred specification and we rely on the conclusions drawn from using only the main instrument, that is lagged stock market participation of the immigrants in their country of origin, as a unique exclusion restriction in a just-identified model. As for the endogeneity test, it indicates the presence of endogeneity of the instrumented variable. Overall, results do not change by using these instrumental variables (Table 11). Next, we include the detailed population composition of the municipality and the conclusions remain the same (Table 12). Finally, we relax the linearity assumption and repeat the analysis using probit model, which does not change our conclusions either (Table 10). Thus, our results are robust to different model specifications and to a variety of instrumental variables.

6.2.3 Exploring additional samples

To address the concern that municipality-specific averages are sometimes constructed using only few observations we repeat the analysis for different samples. In particular, we analyse samples where there

are at least 2, 3, 5 and 10 observations for both natives and foreigners available in a municipality (Table 13 to Table 22). Although the total size decreases very rapidly due to such restrictions, overall conclusions are robust to different sample selections.

6.2.4 Exploring other characteristics of the reference group

To analyse which reference group, foreigners or the overall municipality population, drives knowledge spillovers through financially literate peers, we restrict the reference group definition to only foreigners compared to the baseline using the overall municipality population. We then include in the analysis the proportion of individuals working in the financial sector among the foreigners only, as well as the proportion of risk loving and financial literate FKPs among the foreigners. We define financial literacy as an index constructed from a proportion of the correct answers to all four available financial literacy questions. Table 23 shows that none of the three included covariates affect the stock market participation decision of the natives, while the coefficient of the stock market participation goes up relative to the baseline estimates. This result suggests that financial competence as well as risk attitudes defined among the foreigners fail to capture the transmission of financial knowledge or investment behaviour. This means that, as has been already found in some studies (e.g. Duflo and Saez (2002)), individuals are more sensitive to the information spillovers within their own reference group, which in our case would be that of the native Luxembourg population.

7 Discussion and conclusions

The literature on peer effects in financial behaviour is well developed. We use the unique setting in Luxembourg to investigate – for the first time – the impact of the immigrant stock market participation behaviour on the stock market participation of the native population. There is no consensus in the literature on what are the main channels through which peer effects occur. Most of the scholars emphasise the role of *social learning* as a main transmission channel. Others, on the other hand, show that *social utility* also matters. We contribute to disentangle these two channels. We focus on the peer effects coming from immigrants for three reasons. First, immigrants in Luxembourg are very diverse in terms of financial behaviour with almost no Portuguese participating in stock markets and with Germans and Belgians having twice as high participation rates as Luxembourgish natives. Second, there is a substantial variation in municipality-level population composition. These two reasons combined create variation in the exposure of natives to a wide range of different financial attitudes which we exploit to identify peer effects in stock market participation behaviour. Finally, we focus on immigrants because it is the only group which satisfies the *excluded peer group* property, and thus, allows identification of peer effects by using an instrumental variable approach.

Thus, by exploiting the spatial variation in the financial behaviour of immigrants across Luxembourgish municipalities and by employing instrumental variable strategy, we are able to identify *peer effects*. By including controls for municipality-specific characteristics and by accounting for correlated preferences and sorting, we are able to separate *contextual* and *correlated* effects. Finally, we further control for potential drivers of financial knowledge transmission to capture *social learning* channel. The net of these factors peer effect could be interpreted as evidence of *social utility* channel. In particular, our results show that controlling for financial knowledge of an individual and of her peers cannot fully account for the total

peer effect, which means that there are either other drivers of information transmission or that *social utility* matters. We also show that social learning drives at least half of the peer effect. We cannot, however, interpret variables we include to proxy information sharing as purely learning channels, as they will partly account for sorting into municipalities on social and employment status.

Our findings are in line with those of Bursztyn et al. (2014), who show that not only the *social learning* matters in driving the peer effects, but also the *social utility*. Thus, in contrast to Banerjee et al. (2013), we conclude that there is something more in peer effects transmission than simple *awareness of the opportunity*. One fact that can possibly reconcile the two conclusions is that Banerjee et al. (2013) study the borrowing behaviour, which has been shown to be intrinsically different from the investment behaviour, which this study and Bursztyn et al. (2014) focus on, and which individuals are found to be less willing to both copy and share about.

8 References

- Agarwal, S., Qian, W., and Zou, X. (2016). Thy Neighbor's Misfortune: Peer Effect on Consumption. *Working paper available at SSRN*.
- Aizer, A. and Currie, J. (2004). Networks or neighborhoods? Correlations in the use of publicly-funded maternity care in California. *Journal of Public Economics*, 88(12):2573--2585.
- Angrist, J. D. and Lang, K. (2004). Does school integration generate peer effects? Evidence from Boston's Metco Program. *The American Economic Review*, 94(5):1613--1634.
- Banerjee, A. V., Chandrasekhar, A., Duflo, E., and M.O.Jackson (2013). The diffusion of microfinance. *Science*, 341(6144):1236498.
- Becker, G. S. (2006). Peer comparisons and consumer debt. *University of Chicago Law School*, 73(231):231--248.
- Beshears, J., Choi, J., Laibson, D., B.C.Madrian, and K.L.Milkman (2015). The effect of providing peer information on retirement savings decisions. *The Journal of Finance*, 70(3):1161--1201.
- Boneva, T. (2014). Neighbourhood effects in consumption: Evidence from disaggregated consumption data. Working paper.
- Bramoullé, Y., Djebbari, H., and Fortin, B. (2009). Identification of peer effects through social networks. *Journal of Econometrics*, 150(1):41--55.
- Brooks, S. and Gelman, A. (1998). General methods for monitoring convergence of iterative simulations. *Journal of Computational and Graphical Statistics*, 63(3):1509--1531.
- Brown, J. R., Ivkovic, Z., Smith, P. A., and Weisbenner, S. (2008). Neighbors matter: Causal community effects and stock market participation. *The Journal of Finance*, 63(3):1509--1531.
- Burdett, R. (2015). Innovation in Europe's Cities. A report by LSE Cities on Bloomberg Philanthropies' 2014 Mayors Challenge.
- Bursztyn, L., Ederer, F., Ferman, B., and Yuchtman, N. (2014). Understanding mechanisms underlying peer effects: evidence from a field experiment on financial decisions. *Econometrica*, 82(4):1273-- 1301.

- Cai, H., Chen, Y., and Fang, H. (2009). Observational learning: Evidence from a randomized natural field experiment. *American Economic Review*, 99(3):864--882.
- Cai, J. and Szeidl, A. (2016). Interfirm relationships and business performance. Working paper.
- Chen, M. (2013). The effect of language on economic behavior: Evidence from savings rates, health behaviors, and retirement assets. *American Economic Review*, 103(2):690--731.
- Cooper, D. and Rege, M. (2011). Misery loves company: social regret and social interaction effect in choices under risk and uncertainty. *Games and Economic Behavior*, 73(1):91--110.
- Dahl, G. B., Løken, K. V., and Mogstad, M. (2014). Peer effects in program participation. *American Economic Review*, 104(7):2049--2074.
- De Giorgi, G., Pellizzari, M., and Redaelli, S. (2010). Identification of social interactions through partially overlapping peer groups. *American Economic Journal: Applied Economics*, 2(2):241--275.
- Del Bello, C. L., Patacchini, E., and Zenou, Y. (2015). Neighborhood effects in education. Working paper.
- Duflo, E. and Saez, E. (2002). Participation and investment decisions in a retirement plan: The influence of colleagues' choices. *Journal of Public Economics*, 85(1):121--148.
- Durlauf, S. (2004). Neighborhood effects. In *Handbook of Regional and Urban Economics*, volume 4, pages 2173--2242. Amsterdam: North-Holland.
- Gali, J. (1994). Keeping up with the Joneses: Consumption externalities, portfolio choice, and asset prices. *Journal of Money, Credit and Banking*, 26(1):1--8.
- Gelman, A., Carlin, J., Stern, H., and Rubin, D. (2014). *Bayesian Data Analysis*, volume 2. Boca Raton, FL: Chapman and Hall, second edition.
- Gelman, A. and Rubin, D. (1992). Inference from iterative simulation using multiple sequences. *Statistical Science*, 7(4):457--472.
- Georgarakos, D., Haliassos, M., and Pasini, G. (2014). Household debt and social interactions. *Review of Financial Studies*, 27(5):1404--1433.
- Georgarakos, D. and Pasini, G. (2011). Trust, sociability and stock market participation. *Review of Finance*, 15(4):693--725.
- Girshina, A., Mathä, T., and Ziegelmeyer, M. (2017). The Luxembourg Household Finance Consumption Survey: Results from the 2nd wave. Mimeo.
- Goldsmith-Pinkham, P. and Imbens, G. W. (2013). Social Networks and the Identification of Peer Effects. *Journal of Business & Economic Statistics*, 31(3):253--264.
- Gould, E. D., Lavy, V., and Paserman, M. D. (2009). Does immigration affect the long-term educational outcomes of natives? Quasi-experimental evidence. *The Economic Journal*, 119:1243--1269.
- Guiso, L., Sapienza, P., and Zingales, L. (2004). The role of social capital in financial development. *American Economic Review*, 94(3):526--556.
- Guiso, L., Sapienza, P., and Zingales, L. (2008). Trusting the stock market. *The Journal of Finance*, 63(6):2557--2600.
- Haliassos, M., Jansson, T., and Karabulut, Y. (2015). Incompatible European Partners? Cultural Predispositions and Household Financial Behavior. Working paper.
- Haliassos, M., Jansson, T., and Karabulut, Y. (2016). Financial Literacy Externalities. Working paper.

- Hong, H., Kubik, J. D., and Stein, J. C. (2004). Social interaction and stock-market participation. *The Journal of Finance*, 59(1):137--163.
- Hong, H., Kubik, J. D., and Stein, J. C. (2005). Thy neighbour's portfolio: Word-of-mouth effects in the holdings and trades of money managers. *The Journal of Finance*, 60(6):2801--2824.
- Hvide, H. K., and Östberg, P. (2015). Social interaction at work. *Journal of Financial Economics*, 117: 628 -- 652
- Ioannides, Y. M. and Topa, G. (2010). Neighborhood effects: Accomplishments and looking beyond them. *Journal of Regional Science*, 50(1):343--362.
- Ioannides, Y. M. and Zabel, J. E. (2003). Neighborhood effects and housing demand. *Journal of Applied Econometrics*, 18(5):563--584.
- Ivkovic, Z. and Weisbenner, S. (2007). Information diffusion effects in individual investors' common stock purchases: Covet thy neighbors' investment choices. *Review of Financial Studies*, 20(4):1327--1357.
- Kaustia, M. and Knüpfer, S. (2012). Peer performance and stock market entry. *Journal of Financial Economics*, 104(2):321--338.
- Kelly, M. and Gráda, C. O . (2000). Market contagion: Evidence from the panics of 1854 and 1857. *The American Economic Review*, 90(5):1110--1124.
- Kling, J., Liebman, J., and Katz, L. (2007). Experimental analysis of neighborhood effects. *Econometrica*, 75:83--119.
- Li, G. (2014). Information sharing and stock market participation: Evidence from extended families. *The Review of Economics and Statistics*, 96(1):151--160. Finance and Economics Discussion Series 2009-47, Board of Governors of the Federal Reserve System.
- Lusardi, A. and Mitchell, O. S. (2011a). Financial Literacy and Retirement Planning in the United States. *Journal of Pension Economics and Finance*, 10(4):509--525.
- Lusardi, A. and Mitchell, O. S. (2011b). Financial literacy around the world: An overview. *Journal of Pension Economics and Finance*, 10(4):497--508.
- Manski, C. F. (1993). Identification of endogenous social effects: The reflection problem. *The Review of Economic Studies*, 60(3):531--542.
- Nicoletti C., Savalnes K., E. Tominey (2017), The family peer effect on mothers' labour supply. *The American Economic Review: Applied Economics (forthcoming)*.
- Oreopoulos, P. (2006). Estimating average and local average treatment effects of education when compulsory schooling laws really matter. *The American Economic Review*, 96(1), 152-175.
- Patacchini, E. and Venanzoni, G. (2014). Peer effects in the demand for housing quality. *Journal of Urban Economics*, 83:6--17.
- Pool, V. K., Stoffman, N., and Yonker, S. E. (2015). The people in your neighborhood: social interactions and mutual fund portfolios. *The Journal of Finance*, 70(6):2679--2732.
- Sorensen, A. (2006). Social learning and health plan choice. *RAND Journal of Economics*, 37(4):929-- 945.
- Stock, J. H., Wright, J. H., and Yogo, M. (2002). A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments. *Journal of Business and Economic Statistics*, 20(4):518 -- 529.

Topa, G. and Zenou, Y. (2014). Neighbourhood and Network Effects. In Duranton, G., Henderson, V., and Strange, W., editors, *Handbook of Regional and Urban Economics*, volume 5.

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

9 Tables and figures

Table 1: Composition of Luxembourgish population and stock ownership rates by the country of origin

Groups	Country of origin	Population in Luxembourg, %	Risky assets ownership rates in Luxembourg in 2014, %	Lagged risky assets ownership rates in the country of origin in 2010 (instrument), %	
				All population	Only natives ^a
Natives	Luxembourg	56.96	20.84	24.34	27.60
Main immigrant groups	Portugal	16.08	0.48	6.34	6.13
	France	6.14	22.74	21.23	21.23
	Italy	3.52	21.49	9.24	9.96
	Belgium	3.30	42.84	25.80	27.25
	Germany	2.35	39.20	21.39	23.30
Immigrants from other European countries available in the Eurosystem HFCS dataset	Netherlands	0.76	12.97	22.48	22.48
	Spain	0.71	37.11	13.30	13.30
	Greece	0.30	0.00	3.57	3.68
	Finland	0.21	97.06	38.54	39.20
	Austria	0.15	91.41	12.94	13.73
	Slovakia	0.12	0.00	3.26	3.17
	Slovenia	0.08	0.00	19.69	20.07
	Malta	0.04	na	20.01	19.39
	Cyprus	0.01	na	35.06	37.69

Note: The table reports the composition of the population in Luxembourg by nationality based on Census 2011 and stock ownership rates in Luxembourg in 2014 based on second wave of the LU-HFCS. In addition, it contains lagged risky asset ownership rates in the country of origin based on the first wave of the Eurosystem HFCS. Data is weighted and multiply imputed.

^a In France, Spain and the Netherlands, data on ownership rates is computed only for the total population because an indicator on the country of origin/nationality is not collected/available.

Table 2: Summary statistics of municipalities' characteristics

	Mean	Median	Mean standard deviation
Foreigners, % (based on LU-HFCS sample)	34.7	35.9	23.4
Foreigners, % (based on CENSUS)	33.5	32.6	9.8
Stock market participation all population, %	20.2	14.3	21.2
<i>Stock market participation of natives, %</i>	22.5	13.3	14.3
<i>Stock market participation of foreigners, %</i>	16.4	2.3	23.1
Financially literate, %	72.9	75.9	13.8
Risk loving, %	4.3	0.0	12.4
High education attained, %	30.9	28.4	24.9
Unemployed, %	2.0	0.0	6.0
Working in financial sector, %	5.3	0.1	8.7
Age	50.1	51.2	8.6
Homeownership, %	77.1	78.9	22.3
Income, Euro	89 137.9	86 010.3	34 068.4
Main residence value (conditional mean), Euro	510 120.7	491 185.8	216 953.5
Net wealth, Euro	783 839.5	708 524.1	543 525.6
Municipality population (based on CENSUS)	4 669	2148	9 904
Municipality square km	22.3	20.3	13.4
Municipality number observations (based on LU-HFCS sample)	15	8	27

Note: The table reports descriptive statistics for socio-demographic and economic characteristics at municipality level. To compute them two datasets are used: the second wave collected in 2014 of LU-HFCS and CENSUS data collected in 2011. The statistics are reported only for municipalities present in LU-HFCS sample. All the statistics are computed at municipality level. Mean and median is not weighted by municipalities' population and, therefore, is not representative of the country. Total population of Luxembourg as of 2011 based on Census is 512 353 people. Our data covers municipalities with 499 553 residents in total, thus 98% of the population. In total, we have observation in 107 municipalities out of 116 municipalities based on the municipality definition as of 2011.

Table 3 First stage results for the full sample

	OLS			
	(1)	(2)	(3)	(4)
Average stock market participation of foreigners in their countries of origin	2.97*** (0.75)	2.95*** (0.75)	2.73*** (0.90)	3.41*** (1.09)
<i>P-value</i>	0.000	0.000	0.003	0.002
F-statistic of residuals from the first stage	4.36	4.74	1.86	1.76
<i>P-Value Endogeneity test</i>	0.040	0.032	0.177	0.188
Financial knowledge and preferences controls		Yes	Yes	Yes
% of individuals working in financial sector in municipality			Yes	Yes
Other municipality -specific controls				Yes
Observations	805	805	805	805

Note: The table reports first stage regressions for the sample of natives from the LU-HFCS second wave (2014) such that there is at least one foreigner available in a municipality and an instrument is available for this foreign household, meaning his/her country of birth is among European countries available in the first wave of the Eurosystem HFCS dataset. Data is weighted and multiply imputed. The dependent variable is the average participation rate in stocks or mutual funds of foreigners in a municipality. Instrumental variable (regressor) is the average participation of foreigners in their countries of origin from the first wave (2010) of HFCS data. Socio-demographic controls (not displayed) include an indicator for male; indicators for the level of education; log transformation of income; indicator for risk-loving financial attitude; working in the financial sector; financial literacy related and not related to stockownership; age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation; and an indicator for a foreign partner. Municipality-specific controls are % of individuals working in financial sector in a municipality and dummies for 5 groups of average rental prices in Euro/square meter. Standard errors in parenthesis are clustered by municipality for 83 clusters. Heteroscedasticity robust Hausman test is in form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: OLS and 2SLS results for the full sample

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Stockownership of foreigners	0.18** (0.08)	0.53*** (0.19)	0.16* (0.08)	0.52*** (0.19)	0.09 (0.08)	0.34* (0.20)	0.10 (0.08)	0.31* (0.19)
Male	0.08*** (0.03)	0.08*** (0.03)	0.06** (0.03)	0.06** (0.03)	0.07*** (0.03)	0.07*** (0.03)	0.07*** (0.03)	0.07*** (0.03)
Middle education	0.09** (0.04)	0.09** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)
High education	0.17*** (0.05)	0.14*** (0.05)	0.14*** (0.05)	0.11** (0.05)	0.13*** (0.04)	0.12*** (0.04)	0.13*** (0.04)	0.12*** (0.04)
Log income	0.09*** (0.03)	0.09*** (0.03)	0.09*** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.08*** (0.03)
Risk loving			0.23** (0.10)	0.19** (0.09)	0.22** (0.10)	0.20** (0.09)	0.22** (0.09)	0.20** (0.09)
Working in financial sector			0.11 (0.09)	0.12 (0.09)	0.08 (0.09)	0.09 (0.09)	0.08 (0.09)	0.09 (0.09)
Financial literacy not related to stockownership			-0.05 (0.07)	-0.07 (0.07)	-0.08 (0.07)	-0.09 (0.07)	-0.08 (0.07)	-0.08 (0.07)
Financial literacy related to stockownership			0.10*** (0.03)	0.09*** (0.03)	0.09*** (0.03)	0.09*** (0.03)	0.09*** (0.03)	0.09*** (0.03)
% of individuals working in financial sector in municipality					0.60*** (0.18)	0.45** (0.23)	0.56** (0.21)	0.42* (0.25)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-specific controls							Yes	Yes
F-statistic of instrument in the first stage		15.59		15.47		9.25		9.73
<i>P-value</i>		0.000		0.000		0.003		0.002
Number of Observations	805	805	805	805	805	805	805	805
Mean Stockownership	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave (2014) such that there is at least one foreigner available in a municipality and an instrument is available for this foreign household – meaning his/her country of birth is among European countries available in the first wave of the Eurosystem HFCS dataset. Data is weighted and multiply imputed. The dependent variable is an indicator for whether a household holds stocks or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation; and an indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental prices in Euro/square meter. The instrumental variable is the average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS. Standard errors in parenthesis are clustered by municipality for 83 clusters. *** p<0.01, ** p<0.05, * p<0.1.

10 Online appendix

10.1 Additional Tables

Table 5: Previous papers on community effects on individual financial decision-making

Authors	Outcome	Explanatory variable of interest	Method	Controls	Data	Effect
Beshears et al. (2015)	- Participation in savings plan - Contributions in savings plan	Information about participation of the peers	OLS	Socio-demographic controls	Data collected from a randomized trial	Participation: -0.040**; -1.760*** to 1.083* Contributions: -0.221**; -10.663** to 5.558* 0.418*** ^a
Brown et al. (2008)	Equity ownership (stocks and equity mutual funds)	Average participation in a native's municipality, excluding own observation	2SLS IV: average ownership in the birth states of "non-native" neighbours	Household fixed effects (capturing also community fixed effects), state-year fixed effects, time-varying community-level controls (income, age etc.), community-specific time-trends, trends in community median home value and firms' covariates	US panel of tax returns	
Bursztyn et al. (2014)	Investment decision to purchase an asset	Investment decision to purchase an asset of a peer investor: the willingness to purchase and actual ownership	Randomized field experiment	Broker fixed effects and socio-demographic controls	Data collected from a randomized trial	"Social learning": 0.285** — 0.328** "Social utility": 0.220** — 0.242** 0.168** — 0.411***
Duflo and Saez (2002)	Participation in a supplemental pension plan	Average participation in a reference group, excluding own observation	2SLS IV: average salary and tenure structure in the peer group	Individual socio-demographic and income controls	US University administrative data	
Georgarakos and Pasini (2011)	Participation in stocks	Fraction of trusting individuals in a region and an indicator for engagement in social activities	Probit and test for endogeneity; IV: quality of the political institutions in the past and frequency of contacts with grandchildren	Country fixed-effects and individual socio-demographic characteristics	Survey of Health, Ageing and Retirement in Europe	Trust: 0.0206** — 0.0211** Sociability: 0.0311*** — 0.0358***
Hong et al. (2004)	Stocks and mutual funds ownership	Sociability indicator	OLS	Risk tolerance, education, age, urban indicator, other socio-demographic controls, dummies for wealth quintiles	Health and Retirement Study	0.0215** — 0.0411***

Table continues on the next page...

Table continued from previous page

Hong et al. (2005)	Share of portfolio allocated to a certain stock	Average share across all funds in the city allocated to this stock, excluding own fund	OLS	Model estimated in first differences	CDA Spectrum	0.1310***
Ivkovic and Weisbenner (2007)	Proportion of stocks bought (sold) in a certain industry in a certain quarter	Proportion of stocks bought (sold) in a certain industry in a certain quarter by all neighbouring households within 50 miles	OLS	Industry-quarter dummies	Private dataset on individual investor's monthly positions and trades	0.207***—0.365***
Li (2009)	Entrance in the stock market in a time interval	Entry in the stock market of parents and children in the past	Logit	Socio-demographic and economic controls; time dummies	Panel Study of Income Dynamics	0.298***—0.475***
Pool et al. (2015)	Portfolio overlap in holdings	Neighbours indicator	OLS	Controls for portfolio characteristics; county-specific control for religiosity and zip-level median home prices	Morningstar, Thomson Financial CDA/Spectrum Mutual Fund Database	0.88***—2.24**

*** p<0.01, ** p<0.05, * p<0.1

^a The coefficient presented in this table is rescaled to ensure comparability with other studies.

Table 6: Luxembourg population: natives, immigrants and main groups of foreigners by country of birth, %

Municipality	Native Born	Foreign Born	Germany	France	Belgium	Portugal	Italy	Other
Bascharage	72	28	1	4	3	10	4	6
Beaufort	57	43	3	3	2	25	1	9
Bech	76	24	3	4	3	5	2	7
Beckerich	73	27	2	2	11	8	1	3
Berdorf	60	40	3	4	2	12	0	19
Bertrange	52	48	3	8	5	8	7	17
Bettembourg	63	37	1	6	2	18	3	7
Bettendorf	58	42	1	1	1	34	1	3
Betzdorf	68	32	4	4	3	8	2	12
Bissen	66	34	1	3	3	18	2	7
Biwer	74	26	4	3	1	7	1	10
Boulaide	77	23	1	2	10	5	1	5
Bourscheid	75	25	3	2	4	5	0	12
Bous	75	25	2	5	1	9	1	7
Clemency	77	23	1	3	7	7	2	4
Clervaux	66	34	2	3	6	14	0	7
Colmar-Berg	61	39	2	2	3	22	2	9
Consdorf	71	29	3	3	2	14	1	5
Consthum	85	15	1	0	2	9	1	3
Contern	67	33	3	5	3	6	2	13
Dalheim	70	30	3	5	2	10	3	7
Diekirch	62	38	2	2	1	25	2	6
Differdange	48	52	1	3	1	33	5	9
Dippach	67	33	2	5	3	12	4	7
Dudelange	63	37	1	4	1	21	4	6
Echternach	55	45	5	3	1	29	1	6
Ell	72	28	1	1	18	3	1	3
Ermsdorf	69	31	3	1	2	19	1	4
Erpeldange	74	26	2	2	2	13	2	5
Esch-Alzette	48	52	1	4	1	32	4	10
Esch-Sure	56	44	2	3	12	11	0	15
Eschweiler	73	27	2	2	7	7	0	8
Ettelbruck	57	43	2	2	2	24	3	10
Feulen	72	28	1	2	2	15	3	5
Fischbach	72	28	3	2	3	12	1	7
Flaxweiler	75	25	3	2	2	8	1	9
Frisange	70	30	2	7	3	9	4	7
Garnich	74	26	2	4	6	5	2	7
Goesdorf	85	15	2	2	4	4	0	4
Grevenmacher	60	40	8	3	1	17	1	9
Grosbous	79	21	1	2	4	8	2	3
Hefingen	68	32	1	2	3	13	2	11
Heinerscheid	81	19	1	1	4	9	0	4

Table continues on the next page

Table continued from previous page

Municipality	Native Born	Foreign Born	Germany	France	Belgium	Portugal	Italy	Other
Hesperange	51	49	3	11	4	11	6	15
Hobscheid	67	33	1	5	13	9	1	4
Hoscheid	79	21	2	1	3	8	1	6
Hosingen	79	21	2	1	3	9	1	6
Junglinster	67	33	4	5	3	7	1	12
Kayl	67	33	1	2	1	19	3	7
Kehlen	65	35	2	6	7	6	3	12
Kiischpelt	76	24	2	2	4	6	0	10
Koerich	70	30	3	5	6	8	2	7
Kopstal	55	45	4	10	6	7	2	15
Lac Haute Sure	78	22	1	3	9	4	0	4
Larochette	38	62	1	3	3	45	2	7
Lenningen	69	31	3	3	4	9	2	11
Leudelange	67	33	2	9	4	8	3	7
Lintgen	60	40	2	3	2	24	1	9
Lorentzweiler	63	37	3	5	3	15	2	10
Luxembourg	35	65	4	14	4	14	6	23
Mamer	55	45	3	8	7	8	5	15
Manternach	76	24	5	2	2	6	1	8
Medernach	54	46	2	3	1	34	0	6
Mersch	62	38	2	3	2	21	2	9
Mertert	67	33	8	2	1	13	1	9
Mertzig	73	27	2	2	2	16	2	4
Mompach	73	27	6	5	1	8	0	7
Mondercange	76	24	1	5	1	7	5	4
Mondorf	59	41	3	9	2	18	2	6
Munshausen	76	24	3	1	6	6	1	8
Niederanven	54	46	6	5	4	6	3	20
Nommern	76	24	2	2	3	10	1	6
Preizerdaul	81	19	2	1	3	8	1	4
Putscheid	77	23	2	1	3	13	1	4
Petange	56	44	0	4	3	26	4	7
Reckange	80	20	2	4	2	5	2	5
Redange	75	25	1	3	7	6	1	7
Reisdorf	63	37	3	2	2	21	1	8
Remich	60	40	4	6	2	18	1	9
Roeser	65	35	2	7	2	13	5	7
Rosport	79	21	5	2	1	7	0	6
Rumelange	60	40	1	4	1	20	3	11
Sandweiler	53	47	3	7	3	11	4	19
Sanem	70	30	1	3	1	14	5	6
Schengen	69	31	4	4	2	14	1	5
Schieren	63	37	1	1	1	25	1	7
Schif lange	63	37	1	3	1	18	3	11
Schuttrange	51	49	5	7	4	7	3	22

Table continues on the next page

Table continued from previous page

Municipality	Native Born	Foreign Born	Germany	France	Belgium	Portugal	Italy	Other
Septfontaines	66	34	3	4	9	7	2	9
Stadtbredimus	68	32	3	3	2	14	1	9
Steinfort	64	36	1	5	10	10	4	6
Steinsel	62	38	3	6	3	9	4	13
Strassen	45	55	4	11	5	9	6	20
Tandel	77	23	2	1	1	15	1	4
Troisvierges	59	41	1	2	9	23	0	7
Tuntange	69	31	3	5	4	4	1	14
Useldange	77	23	0	2	3	9	1	8
Vianden	58	42	2	2	1	29	1	6
Waldbillig	75	25	2	3	2	8	0	8
Waldbredimus	73	27	3	2	2	6	1	12
Walferdange	52	48	3	7	4	12	4	17
Weiler-la-Tour	72	28	2	7	3	5	3	9
Weiswampach	65	35	2	1	11	14	1	6
Wiltz	54	46	1	3	6	20	1	15
Wincrange	79	21	1	2	7	6	1	4
Winseler	69	31	1	2	18	5	1	4
Wormeldange	62	38	4	3	2	20	1	9

Source: Authors' own computations based on Census 2011. Municipalities are only those present in the LU-HFCS sample.

Table 7: Summary statistics of socio-demographic characteristics of natives and foreigners

	Native born	Foreign born	Difference Natives vs. Foreigners	P-value Difference
Demographic characteristics				
Male, %	55.33 (2.02)	58.12 (2.32)	-2.80 (3.08)	0.363
Age	52.74 (0.73)	47.30 (0.70)	5.44*** (1.02)	0.000
Household characteristics				
Never married, %	28.42 (1.92)	25.58 (2.13)	2.84 (2.86)	0.321
Widowed, %	12.23 (1.48)	5.88 (1.18)	6.35*** (1.90)	0.001
Divorced, %	12.49 (1.32)	15.21 (1.70)	-2.71 (2.16)	0.208
Foreign partner, %	12.24 (1.24)	52.49 (2.35)	-40.25*** (2.66)	0.000
Household size	2.22 (0.05)	2.65 (0.07)	-0.43*** (0.09)	0.000
Educational attainment, %				
High education (ISCED=5,6)	27.99 (1.75)	39.66 (2.30)	-11.67*** (2.89)	0.000
Middle education (ISCED=3,4)	45.14 (2.03)	26.69 (2.10)	18.45*** (2.93)	0.000
Occupation, %				
Self-employed	5.22 (0.71)	3.52 (0.64)	1.70* (0.95)	0.074
Unemployed	2.32 (0.63)	4.66 (0.98)	-2.34** (1.16)	0.044
Retired	32.84 (1.92)	17.70 (1.84)	15.14*** (2.66)	0.000
Work in financial sector	5.10 (0.86)	11.59 (1.52)	-6.49*** (1.76)	0.000
Work in public sector	46.62 (2.82)	14.26 (2.03)	32.36*** (3.49)	0.000
Financial literacy and investment attitude, %				
Financial literacy	73.69 (1.01)	76.51 (1.16)	-2.82* (1.50)	0.060
Risk loving	2.71 (0.62)	8.39 (1.40)	-5.68*** (1.54)	0.000
Country of birth out of total sample, %	54.7	45.3		
Number of observations	875	726		

Note: The table reports descriptive statistics for socio-demographic characteristics of foreigners and natives residing in Luxembourg. To compute them, the second wave of LU-HFCS (2014) is used. Data is collected for 1601 households. Data is weighted and multiply imputed. All individual socio-demographic characteristics are defined as those of the financially knowledgeable person (FKP) of the household. Financial literacy is defined as an average number of correctly answered questions on a set of four financial literacy questions. Risk loving is an indicator taking value one if the FKP prefers to take high or above average risk to get high or above average returns (in contrast to average or low risk). Robust standard errors are in parenthesis. Natives' and foreigners' averages are not tested against zero. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Summary statistics of households' economic characteristics

	Native born	Foreign born	Difference Natives vs. Foreigners	P-value Difference
Ownership rates, %				
Homeownership	79.50 (1.74)	51.79 (2.34)	27.71*** (2.92)	0.000
Stock market participation	20.84 (1.54)	17.00 (1.67)	3.84* (2.27)	0.092
Life insurance	33.09 (1.86)	30.48 (2.13)	2.61 (2.84)	0.359
Collateralized debt	33.93 (1.87)	36.87 (2.20)	-2.95 (2.89)	0.307
Non-collateralized debt	34.59 (1.91)	32.91 (2.17)	1.68 (2.90)	0.563
Income and wealth, Euro				
Income	92,066.72 (2,643.97)	80,726.96 (3,554.31)	11,339.76*** (4,392.75)	0.010
Net wealth	919,752.00 (80,948.75)	567,196.31 (64,084.01)	352,555.75*** (102,939.16)	0.001
Financial wealth (conditional mean)	140,144.77 (12,093.00)	133,663.58 (37,356.03)	6,481.19 (39,226.58)	0.869
Main residence value (conditional mean)	674,498.31 (16,025.46)	593,543.00 (20,634.05)	80,955.30*** (26,329.00)	0.002
Total liabilities (conditional mean)	195,116.39 (12,827.92)	157,230.86 (10,962.03)	37,885.53** (16,881.27)	0.025
Number of observations	875	726		

Note: The table reports descriptive statistics for economic characteristics of foreigners and natives residing in Luxembourg. To compute them, the second wave of LU-HFCS (2014) is used. Data is collected for 1601 households. Data is weighted and multiply imputed. Stock market participation is an indicator taking value 1 if individual owns stocks directly or indirectly through mutual funds. Life insurance and (non-)collateralized debt ownership rates are constructed accordingly. Robust standard errors are in parenthesis. Natives' and foreigners' averages are not tested against zero. ***p<0.01, ** p<0.05, * p<0.1

Table 9: Placebo treatment for the full sample

<i>Stockownership of foreigners assigned:</i>	Correctly	Correctly	Randomly	Randomly	Correctly	Correctly	Randomly	Randomly
<i>% of individuals in financial sector assigned:</i>	Correctly	Randomly	Randomly	Correctly	Correctly	Randomly	Randomly	Correctly
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Controlling for individual working in financial sector</i>				<i>Not controlling for individual working in financial sector</i>			
	OLS							
Stockownership of foreigners	0.20***	0.27***	0.09	-0.04	0.20***	0.28***	0.11	-0.05
	(0.07)	(0.08)	(0.23)	(0.08)	(0.07)	(0.09)	(0.23)	(0.08)
% of individuals working in financial sector in municipality	0.62***	0.01	-0.05	0.75***	0.69***	0.02	-0.06	0.81***
	(0.19)	(0.21)	(0.08)	(0.17)	(0.18)	(0.21)	(0.08)	(0.17)
Working in financial sector	0.13	0.17**	0.18**	0.13				
	(0.09)	(0.08)	(0.09)	(0.09)				
	2SLS							
Stockownership of foreigners	0.40**	0.59***	0.12	-0.10	0.38**	0.60***	0.14	-0.10
	(0.19)	(0.19)	(0.32)	(0.22)	(0.19)	(0.20)	(0.31)	(0.21)
% of individuals working in financial sector in municipality	0.49**	-0.04	-0.10	0.75***	0.57**	-0.03	-0.11	0.81***
	(0.24)	(0.19)	(0.29)	(0.17)	(0.23)	(0.19)	(0.28)	(0.17)
Working in financial sector	0.14	0.16**	0.17**	0.13				
	(0.08)	(0.08)	(0.09)	(0.09)				
	First Stage							
Average stock market participation of foreigners in their countries of origin	2.71***	2.97***	2.71***	2.97***	2.71***	2.97***	2.41***	2.82***
	(0.91)	(0.76)	(0.91)	(0.76)	(0.91)	(0.76)	(0.39)	(0.28)
F-statistic of instrument in the first stage	8.929	15.49	39.49	98.56	8,908	15.61	39.32	98.16
<i>P-value</i>	0.004	0.000	0.000	0.000	0.004	0.000	0.000	0.000
Observations	805	805	805	805	805	805	805	805
Mean stockownership	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213

Note: The table reports first stage regressions for the sample of natives from the LU-HFCS second wave (2014) such that there is at least one foreigner available in a municipality and an instrument is available for this foreigner – meaning his/her country of birth is among European countries available in the first wave of the Eurosystem HFCS dataset. Data is weighted and multiply imputed. The dependent variable is average participation rate in stocks or mutual funds of foreigners in a municipality. The instrumental variable (regressor) is the average participation of foreigners in their countries of origin from the first wave (2010) of HFCS data. Standard errors in parenthesis are clustered by municipality for 83 clusters.

*** p<0.01, ** p<0.05, * p<0.1.

Table 10: Probit results for the full sample

	Probit (1)	ProbitIV (2)	Probit (3)	ProbitIV (4)	Probit (5)	ProbitIV (6)	Probit (7)	ProbitIV (8)
Stockownership of foreigners	0.13* (0.07)	0.39** (0.15)	0.12* (0.07)	0.38** (0.15)	0.08 (0.07)	0.23 (0.19)	0.08 (0.07)	0.22 (0.17)
Male	0.08*** (0.03)	0.08*** (0.03)	0.07** (0.03)	0.06** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)
Middle education	0.10** (0.04)	0.10** (0.04)	0.09** (0.04)	0.08** (0.04)	0.09** (0.04)	0.09** (0.04)	0.09** (0.04)	0.08** (0.04)
High education	0.14*** (0.05)	0.12*** (0.05)	0.12** (0.05)	0.10** (0.05)	0.11** (0.05)	0.10** (0.05)	0.11** (0.05)	0.10** (0.05)
Log income	0.15*** (0.03)	0.14*** (0.02)	0.13*** (0.03)	0.12*** (0.02)	0.13*** (0.03)	0.12*** (0.02)	0.13*** (0.03)	0.12*** (0.02)
Risk loving			0.13** (0.06)	0.10 (0.07)	0.13** (0.06)	0.12* (0.07)	0.12** (0.06)	0.11 (0.07)
Working in financial sector			0.09 (0.06)	0.09* (0.05)	0.06 (0.06)	0.07 (0.06)	0.06 (0.06)	0.07 (0.06)
Financial literacy not related to stockownership			-0.05 (0.07)	-0.07 (0.07)	-0.08 (0.07)	-0.08 (0.07)	-0.07 (0.07)	-0.07 (0.07)
Financial literacy related to stockownership			0.08*** (0.03)	0.08** (0.03)	0.08*** (0.03)	0.07** (0.03)	0.08*** (0.03)	0.07** (0.03)
% of individuals working in financial sector in municipality					0.50*** (0.15)	0.41* (0.21)	0.46*** (0.17)	0.37* (0.21)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality -specific controls							Yes	Yes
F-statistic of instrument in the first stage		15.59		15.47		9.25		9.73
<i>P-value</i>		0.000		0.000		0.003		0.002
Number of observations	805	805	805	805	805	805	805	805
Mean stockownership	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave (2014) such that there is at least one foreigner available in a municipality and an instrument is available for this foreigner – meaning his/her country of birth is among European countries available in the first wave of Eurosystem HFCS dataset. Data is weighted and multiply imputed. The dependent variable is an indicator for whether household holds stocks or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of the average rental price Euro/square meter. The instrumental variable is the average participation of foreigners in their countries of origin from the first wave (2010) of HFCS data. Standard errors in parenthesis are clustered by municipality for 83 clusters. Probit IV standard errors are robust to heteroschedasticity. Probit estimates are weighted average marginal affects. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: 2SLS results with additional instruments for the full sample: average participation in countries of origin and total % of foreigners

	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
Stockownership of foreigners	0.53*** (0.19)	0.52*** (0.19)	0.35* (0.20)	0.32* (0.18)
Male	0.08*** (0.03)	0.06** (0.03)	0.07*** (0.03)	0.07** (0.03)
Middle education	0.09** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)
High education	0.14*** (0.05)	0.12** (0.05)	0.12*** (0.04)	0.12** (0.05)
Log income	0.09*** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)
Risk loving		0.19** (0.09)	0.20** (0.09)	0.20* (0.10)
Working in financial sector		0.12 (0.09)	0.09 (0.09)	0.09 (0.08)
Financial literacy not related to stockownership		-0.07 (0.07)	-0.09 (0.07)	-0.08 (0.07)
Financial literacy related to stockownership		0.09*** (0.03)	0.09*** (0.03)	0.09*** (0.03)
% of individuals working in financial sector in municipality			0.45**	0.42*
Socio-demographic controls	Yes	Yes	Yes	Yes
Municipality-specific controls				Yes
Mean stockownership	0.213	0.213	0.213	0.213
First Stage				
Average stock market participation of foreigners in their countries of origin	2.97*** (0.75)	2.95*** (0.74)	2.65*** (0.90)	3.38*** (1.14)
% Foreigners	0.01 (0.15)	-0.01 (0.15)	-0.07 (0.16)	-0.04 (0.27)
F-statistic of instrument in the first stage	8.024	8.004	4.713	4.938
<i>P-value</i>	0.001	0.001	0.012	0.009
F-statistic of residuals from the first stage	4.41	4.69	1.91	1.83
<i>P-Value Endogeneity test</i>	0.039	0.033	0.170	0.180
<i>P-value Overidentification test (Sargan)</i>	0.183	0.405	0.711	0.204
Number of observations	805	805	805	805

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave (2014) such that at least one foreigner from a country available in HFCS dataset is available in a municipality. Data is weighted and multiply imputed. The dependent variable is an indicator for whether household holds stocks or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and an indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. The instrumental variable is the average participation of foreigners in their countries of origin from the first wave of Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 83 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 12: 2SLS results with additional instruments for the full sample: average participation in countries of origin and % of foreigners detailed

	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
Stockownership of foreigners	0.42*** (0.16)	0.40** (0.16)	0.18 (0.17)	0.16 (0.14)
Male	0.08*** (0.03)	0.06** (0.03)	0.07*** (0.03)	0.07** (0.03)
Middle Education	0.09** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)
High Education	0.15*** (0.05)	0.12** (0.05)	0.13*** (0.04)	0.12*** (0.05)
Log Income	0.09*** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.09*** (0.02)
Risk loving		0.20** (0.09)	0.22** (0.09)	0.21** (0.10)
Working in Financial Sector		0.12 (0.09)	0.08 (0.09)	0.08 (0.08)
Financial literacy not related to stockownership		-0.06 (0.07)	-0.08 (0.07)	-0.08 (0.07)
Financial literacy related to stockownership		0.09*** (0.03)	0.09*** (0.03)	0.09*** (0.03)
% of individuals working in financial sector in municipality			0.55*** (0.21)	0.52** (0.23)
Socio-demographic controls	Yes	Yes	Yes	Yes
Municipality-specific controls				Yes
Mean Stockownership	0.213	0.213	0.213	0.213
First Stage				
Average stock market participation of foreigners in their countries of origin	6.20** (2.94)	6.20** (2.94)	6.29** (3.09)	6.22* (3.39)
% Germans	-0.07 (1.91)	-0.09 (1.90)	-0.07 (1.87)	-0.43 (1.87)
% Italians	2.33 (1.59)	2.27 (1.58)	2.36 (1.56)	1.18 (2.69)
% Portuguese	0.21 (0.42)	0.21 (0.41)	0.21 (0.42)	0.32 (0.50)
% French	-0.64 (1.43)	-0.65 (1.43)	-0.62 (1.45)	2.20 (1.82)
% Belgians	-3.61* (1.91)	-3.60* (1.92)	-3.65* (2.00)	-3.72* (2.05)
% Others	-0.16 (0.80)	-0.16 (0.80)	-0.15 (0.80)	0.20 (0.74)
F-statistic of instrument in the first stage	6.505	6.539	3.881	5.761
F-statistic of residuals from the first stage	<i>P-value</i> 0.000	<i>P-value</i> 0.000	<i>P-value</i> 0.000	<i>P-value</i> 0.000
	3.00	2.96	0.31	0.25
	<i>P-Value Endogeneity test</i> 0.090	<i>P-Value Endogeneity test</i> 0.090	<i>P-Value Endogeneity test</i> 0.577	<i>P-Value Endogeneity test</i> 0.617
	<i>P-value Overidentification test (Sargan)</i> 0.000	<i>P-value Overidentification test (Sargan)</i> 0.000	<i>P-value Overidentification test (Sargan)</i> 0.002	<i>P-value Overidentification test (Sargan)</i> 0.008
Number of Observations	805	805	805	805

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave 2014 such that at least one foreigner from countries available in the first wave of Eurosystem HFCS dataset is available in a municipality. Data is weighted and multiply imputed. The dependent variable is an indicator for whether household holds stock or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and an indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of the average rental price Euro/square meter. The instrumental variable is the average participation of foreigners in their countries of origin from the first wave (2010) of HFCS data. Standard errors in parenthesis are clustered by municipality for 83 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 13: First stage for the reduced sample (at least two observations)

	OLS			
	(1)	(2)	(3)	(4)
Average stock market participation of foreigners in their countries of origin	2.94*** (0.80)	2.92*** (0.80)	2.77*** (1.01)	3.55*** (1.27)
F-statistic of instrument in the first stage	13.45	13.36	7.57	7.82
<i>P-value</i>	0.000	0.001	0.008	0.007
F-statistic of residuals from the first stage	4.06	4.56	1.30	1.65
<i>P-Value Endogeneity test</i>	0.048	0.037	0.258	0.204
Socio-demographic controls	Yes	Yes	Yes	Yes
Financial knowledge and preferences controls		Yes	Yes	Yes
% of individuals working in financial sector in municipality			Yes	Yes
Other municipality-specific controls				Yes
Observations	764	764	764	764

Note: The table reports first stage regressions for the sample of natives from the LU-HFCS second wave (2014) such that at least two observations for natives and at least two observations for foreigners and at least one foreigner is from a country available in HFCS dataset are available in a municipality. Data is weighted and multiply imputed. The dependent variable is average participation rate in stocks or mutual funds of foreigners in a municipality. The instrumental variable (regressor) is the average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Socio-demographic controls (not displayed) include indicator for male, indicators for a level of education, log transformation of income, indicator for risk-loving financial attitude, working in financial sector, financial literacy related and not related to stockownership, age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and an indicator for a foreign partner. Municipality-specific controls are % of individuals working in the financial sector in a municipality and dummies for 5 groups of the average rental price Euro/square meter. Standard errors in parenthesis are clustered by municipality for 65 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 14: OLS and 2SLS results for the reduced sample (at least two observations)

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Stockownership of foreigners	0.24** (0.09)	0.58*** (0.20)	0.21** (0.09)	0.58*** (0.21)	0.15* (0.08)	0.36* (0.21)	0.15* (0.09)	0.36* (0.19)
Male	0.08*** (0.03)	0.08*** (0.03)	0.06** (0.03)	0.07** (0.03)	0.07*** (0.03)	0.07*** (0.03)	0.07*** (0.03)	0.07** (0.03)
Middle education	0.09** (0.04)	0.09** (0.04)	0.08** (0.04)	0.08** (0.04)	0.09** (0.03)	0.08** (0.03)	0.08** (0.03)	0.08** (0.04)
High education	0.19*** (0.05)	0.17*** (0.05)	0.15*** (0.05)	0.14*** (0.05)	0.15*** (0.04)	0.14*** (0.04)	0.15*** (0.04)	0.14*** (0.05)
Log income	0.09*** (0.03)	0.09*** (0.03)	0.09*** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)
Risk loving			0.23** (0.09)	0.19** (0.09)	0.22** (0.09)	0.20** (0.09)	0.22** (0.09)	0.20* (0.10)
Working in financial sector			0.09 (0.09)	0.09 (0.08)	0.05 (0.09)	0.06 (0.09)	0.05 (0.09)	0.06 (0.08)
Financial literacy not related to stockownership			-0.02 (0.07)	-0.03 (0.07)	-0.05 (0.07)	-0.05 (0.07)	-0.05 (0.07)	-0.04 (0.07)
Financial literacy related to stockownership			0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.04)	0.10*** (0.03)
% of individuals working in financial sector in municipality					0.66*** (0.18)	0.53** (0.23)	0.62*** (0.22)	0.48* (0.26)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-specific controls							Yes	Yes
F-statistic of instrument in the first stage		13.45		13.36		7.570		7.816
<i>P-value</i>		0.000		0.001		0.008		0.007
Number of Observations	764	764	764	764	764	764	764	764
Mean Stockownership	0.211	0.211	0.211	0.211	0.211	0.211	0.211	0.211

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave (2014) such that at least two observations for natives and at least two observations for foreigners and at least one foreigner is from a country available in the first wave Eurosystem HFCS dataset are available in a municipality. Data is weighted and multiply imputed. The dependent variable is an indicator for whether household holds stocks or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and an indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of the average rental price Euro/square meter. The instrumental variable is the average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 65 clusters. *** p<0.01, ** p<0.05, * p<0.1

Table 15: Placebo treatment for the reduced sample (at least two observations)

<i>Stockownership of foreigners assigned:</i>	Correctly	Correctly	Randomly	Randomly	Correctly	Correctly	Randomly	Randomly
<i>% of individuals in financial sector assigned:</i>	Correctly	Randomly	Randomly	Correctly	Correctly	Randomly	Randomly	Correctly
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Controlling for individual working in financial sector</i>				<i>Not controlling for individual working in financial sector</i>			
	OLS							
Stockownership of foreigners	0.26***	0.34***	-0.04	-0.02	0.26***	0.34***	-0.04	-0.03
	(0.08)	(0.10)	(0.08)	(0.08)	(0.08)	(0.10)	(0.08)	(0.08)
% of individuals working in financial sector in municipality	0.69***	0.01	0.09	0.85***	0.75***	0.02	0.10	0.90***
	(0.19)	(0.21)	(0.23)	(0.17)	(0.18)	(0.21)	(0.23)	(0.16)
Working in financial sector	0.12	0.16*	0.16*	0.11				
	(0.09)	(0.08)	(0.09)	(0.09)				
	2SLS							
Stockownership of foreigners	0.42**	0.66***	-0.07	-0.08	0.40**	0.68***	-0.08	-0.08
	(0.19)	(0.21)	(0.29)	(0.22)	(0.18)	(0.21)	(0.28)	(0.21)
% of individuals working in financial sector in municipality	0.59**	-0.05	0.11	0.84***	0.66***	-0.04	0.13	0.90***
	(0.23)	(0.19)	(0.32)	(0.17)	(0.22)	(0.19)	(0.31)	(0.16)
Working in financial sector	0.12	0.15*	0.16*	0.11				
	(0.08)	(0.08)	(0.09)	(0.09)				
	First Stage							
Average stock market participation of foreigners in their countries of origin	2.75***	2.94***	2.53***	2.93***	2.75***	2.94***	2.53***	2.93***
	(1.02)	(0.80)	(0.41)	(0.30)	(1.02)	(0.80)	(0.41)	(0.30)
F-statistic of instrument in the first stage	7.262	13.35	38.64	97.92	7.245	13.45	38.47	97.59
<i>P-value</i>	0.009	0.001	0.000	0.000	0.009	0.000	0.000	0.000
Observations	764	764	764	764	764	764	764	764
Mean stockownership	0.211	0.211	0.211	0.211	0.211	0.211	0.211	0.211

Note: The table reports first stage regressions for the sample of natives from the LU-HFCS second wave (2014) such that at least two observations for natives and foreigners and at least one foreigner is from a country available in the first wave of Eurosystem HFCS dataset are available in a municipality. Data is weighted and multiply imputed. The dependent variable is the average participation rate in stocks or mutual funds of foreigners in a municipality. The instrumental variable (regressor) is average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 65 clusters. *** p<0.01, ** p<0.05, * p<0.1.

Table 16: Probit results for the reduced sample (at least two observations)

	Probit (1)	ProbitIV (2)	Probit (3)	ProbitIV (4)	Probit (5)	ProbitIV (6)	Probit (7)	ProbitIV (8)
Stockownership of foreigners	0.19** (0.08)	0.43*** (0.15)	0.17** (0.08)	0.42*** (0.15)	0.12* (0.07)	0.21 (0.21)	0.12 (0.08)	0.23 (0.17)
Male	0.09*** (0.03)	0.08*** (0.03)	0.07*** (0.03)	0.07** (0.03)	0.08*** (0.02)	0.08*** (0.03)	0.09*** (0.02)	0.08*** (0.03)
Middle education	0.11*** (0.04)	0.10** (0.04)	0.10** (0.04)	0.09** (0.04)	0.10** (0.04)	0.10** (0.04)	0.10** (0.04)	0.09** (0.04)
High education	0.17*** (0.05)	0.15*** (0.05)	0.14*** (0.05)	0.12*** (0.05)	0.13*** (0.05)	0.13*** (0.05)	0.13*** (0.05)	0.13*** (0.05)
Log income	0.15*** (0.03)	0.14*** (0.02)	0.13*** (0.03)	0.12*** (0.02)	0.12*** (0.03)	0.12*** (0.02)	0.13*** (0.03)	0.12*** (0.02)
Risk loving			0.13** (0.06)	0.10 (0.07)	0.13** (0.06)	0.12* (0.07)	0.12** (0.06)	0.11* (0.07)
Working in financial sector			0.06 (0.06)	0.06 (0.05)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)	0.04 (0.06)
Financial literacy not related to stockownership			-0.02 (0.07)	-0.03 (0.07)	-0.06 (0.07)	-0.06 (0.07)	-0.05 (0.07)	-0.05 (0.07)
Financial literacy related to stockownership			0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)
% of individuals working in financial sector in municipality					0.57*** (0.16)	0.52** (0.22)	0.54*** (0.18)	0.46** (0.23)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-specific controls							Yes	Yes
F-statistic of instrument in the first stage		13.45		13.36		7.570		7.816
<i>P-value</i>		0.000		0.001		0.008		0.007
Number of observations	764	764	764	764	764	764	764	764
Mean stockownership	0.211	0.211	0.211	0.211	0.211	0.211	0.211	0.211

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave (2014) such that there is at least two observations for natives and at least two observations for foreigners and at least one foreigner is from a country available in the first wave of the Eurosystem HFCS dataset are available in a municipality. Data is weighted and multiply imputed. The dependent variable is an indicator for whether household holds stocks or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. The instrumental variable is the average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 65 clusters. Standard errors of Probit IV are robust to heteroschedasticity. Probit estimates are weighted average marginal affects. Probit estimates are weighted average marginal affects. *** p<0.01, ** p<0.05, * p<0.1.

Table 17: 2SLS results with additional instruments for the reduced sample (at least two observations):
average participation in countries of origin and total % of foreigners

	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
Stockownership of foreigners	0.54*** (0.19)	0.54*** (0.19)	0.34* (0.19)	0.36** (0.18)
Male	0.08*** (0.03)	0.06** (0.03)	0.07*** (0.03)	0.07** (0.03)
Middle education	0.09** (0.04)	0.08** (0.04)	0.08*** (0.03)	0.08** (0.04)
High education	0.17*** (0.05)	0.14*** (0.05)	0.14*** (0.04)	0.14*** (0.05)
Log income	0.09*** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)
Risk loving		0.19** (0.09)	0.21** (0.09)	0.20* (0.10)
Working in financial sector		0.09 (0.08)	0.06 (0.09)	0.06 (0.08)
Financial literacy not related to stockownership		-0.03 (0.07)	-0.05 (0.07)	-0.04 (0.07)
Financial literacy related to stockownership		0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.03)
% of individuals working in financial sector in municipality			0.54** (0.22)	0.48* (0.26)
Socio-demographic controls	Yes	Yes	Yes	Yes
Municipality -specific controls				Yes
Mean stockownership	0.211	0.211	0.211	0.211
First Stage				
Average stock market participation of foreigners in their countries of origin	2.92*** (0.78)	2.90*** (0.78)	2.59** (0.99)	3.40** (1.32)
% Foreigners	-0.08 (0.16)	-0.10 (0.16)	-0.16 (0.16)	-0.14 (0.30)
F-statistic of instrument in the first stage	7.175	7.137	4.053	4.240
<i>P-value</i>	0.002	0.002	0.022	0.019
F-statistic of residuals from the first stage	3.39	3.84	1.17	1.79
<i>P-Value Endogeneity test</i>	0.070	0.054	0.282	0.1856
<i>P-value Overidentification test (Sargan)</i>	0.056	0.141	0.787	0.681
Number of observations	764	764	764	764

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave (2014) such that at least two observations for natives and foreigners are available in a municipality and a foreigner is from a country available in the Eurosystem HFCS dataset. Data is weighted and multiply imputed. The dependent variable is an indicator for whether household holds stocks or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. The instrumental variable is the average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 65 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage not significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 18: 2SLS results with additional instruments for the reduced sample (at least two observations): average participation in countries of origin and % of foreigners detailed

	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
Stockownership of foreigners	0.35** (0.14)	0.33** (0.14)	0.11 (0.15)	0.12 (0.13)
Male	0.08*** (0.03)	0.06** (0.03)	0.07*** (0.03)	0.07** (0.03)
Middle Education	0.09*** (0.04)	0.08** (0.04)	0.09*** (0.03)	0.08** (0.04)
High Education	0.18*** (0.05)	0.15*** (0.05)	0.15*** (0.04)	0.15*** (0.05)
Log Income	0.09*** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.09*** (0.02)
Risk loving		0.22** (0.09)	0.23** (0.09)	0.22** (0.10)
Working in Financial Sector		0.09 (0.09)	0.05 (0.09)	0.05 (0.08)
Financial literacy not related to stockownership		-0.02 (0.07)	-0.05 (0.07)	-0.05 (0.07)
Financial literacy related to stockownership		0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.03)
% of individuals working in financial sector in municipality			0.68*** (0.19)	0.64*** (0.24)
Socio-demographic controls	Yes	Yes	Yes	Yes
Municipality -specific controls				Yes
Mean Stockownership	0.211	0.211	0.211	0.211
First Stage				
Average stock market participation of foreigners in their countries of origin	6.63** (3.14)	6.70** (3.14)	6.95** (3.29)	7.63* (3.93)
% Germans	-1.18 (2.09)	-1.19 (2.08)	-1.16 (2.07)	-1.58 (2.01)
% Italians	1.23 (1.71)	1.19 (1.70)	1.40 (1.67)	0.54 (2.64)
% Portuguese	0.07 (0.45)	0.09 (0.44)	0.08 (0.45)	0.36 (0.59)
% French	-0.81 (1.48)	-0.83 (1.48)	-0.82 (1.52)	2.17 (1.87)
% Belgians	-4.86** (1.93)	-4.91** (1.93)	-5.06** (2.01)	-5.46** (2.15)
% Others	0.24 (0.95)	0.24 (0.95)	0.33 (0.96)	0.82 (0.81)
F-statistic of instrument in the first stage	6.378	6.430	3.840	7.082
P-value	0.000	0.000	0.000	0.000
F-statistic of residuals from the first stage	3.39	3.84	1.17	1.79
P-Value Endogeneity test	0.388	0.350	0.768	0.811
P-value Overidentification test (Sargan)	0.000	0.000	0.001	0.005
Number of Observations	764	764	764	764

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave 2014 such that at least two observations for natives and foreigners and at least one foreigner is from a country available in the first wave of the Eurosystem HFCS dataset are available in a municipality. Data is weighted and multiply imputed. Dependent variable is an indicator for whether household holds stock or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. Instrumental variable is average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 65 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 19: OLS and 2SLS results for the reduced sample (at least three observations)

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Stockownership of foreigners	0.25*** (0.09)	0.58*** (0.19)	0.23** (0.09)	0.58*** (0.19)	0.15* (0.08)	0.36* (0.19)	0.16* (0.09)	0.36* (0.19)
Male	0.08*** (0.03)	0.08*** (0.03)	0.07** (0.03)	0.07** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08*** (0.03)	0.08** (0.03)
Middle Education	0.09** (0.04)	0.09** (0.04)	0.08* (0.04)	0.08* (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)
High Education	0.17*** (0.05)	0.16*** (0.05)	0.14*** (0.05)	0.13** (0.05)	0.14*** (0.05)	0.13*** (0.05)	0.14*** (0.05)	0.13*** (0.05)
Log Income	0.13*** (0.03)	0.12*** (0.03)	0.12*** (0.03)	0.11*** (0.03)	0.12*** (0.03)	0.11*** (0.03)	0.12*** (0.03)	0.11*** (0.02)
Risk loving			0.24** (0.10)	0.21** (0.09)	0.24** (0.10)	0.22** (0.09)	0.24** (0.09)	0.22** (0.10)
Working in Financial Sector			0.08 (0.09)	0.08 (0.09)	0.05 (0.10)	0.06 (0.09)	0.05 (0.10)	0.06 (0.09)
Financial literacy not related to stockownership			-0.01 (0.07)	-0.02 (0.07)	-0.03 (0.07)	-0.04 (0.07)	-0.03 (0.07)	-0.03 (0.07)
Financial literacy related to stockownership			0.10*** (0.03)	0.10*** (0.03)	0.09*** (0.03)	0.09*** (0.03)	0.10*** (0.03)	0.10*** (0.03)
% of individuals working in financial sector in municipality					0.64*** (0.19)	0.50** (0.23)	0.60*** (0.22)	0.45* (0.27)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality -specific controls							Yes	Yes
Mean Stockownership	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223
First Stage								
Average stock market participation of foreigners in their countries of origin		3.10*** (0.87)		3.09*** (0.87)		2.93** (1.11)		3.72*** (1.39)
F-statistic of instrument in the first stage		12.64		12.63		6.992		7.178
	<i>P-value</i>	0.001		0.001		0.011		0.010
F-statistic of residuals from the first stage		4.43		5.28		1.80		1.92
	<i>P-Value Endogeneity test</i>	0.040		0.025		0.186		0.171
Number of Observations	709	709	709	709	709	709	709	709

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave 2014 such that at least three observations for natives and at least three observations for foreigners are available in a municipality. Data is weighted and multiply imputed. Dependent variable is an indicator for whether household holds stock or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. Instrumental variable is average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 55 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 20: OLS and 2SLS results for the reduced sample (at least five observations)

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Stockownership of foreigners	0.34*** (0.11)	0.77*** (0.22)	0.31** (0.11)	0.75*** (0.23)	0.17 (0.12)	0.45* (0.26)	0.21 (0.16)	0.50* (0.30)
Male	0.08** (0.03)	0.09*** (0.03)	0.07** (0.03)	0.08** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.09*** (0.03)	0.09** (0.04)
Middle Education	0.10** (0.04)	0.10** (0.04)	0.09* (0.04)	0.09* (0.04)	0.09** (0.04)	0.09** (0.04)	0.09** (0.04)	0.08* (0.04)
High Education	0.16** (0.06)	0.15** (0.06)	0.12** (0.06)	0.12** (0.06)	0.12** (0.06)	0.12** (0.05)	0.12** (0.05)	0.12** (0.05)
Log Income	0.13*** (0.03)	0.12*** (0.03)	0.12*** (0.03)	0.11*** (0.03)	0.12*** (0.03)	0.11*** (0.03)	0.12*** (0.03)	0.11*** (0.03)
Risk loving			0.20** (0.10)	0.16* (0.09)	0.21** (0.10)	0.18** (0.09)	0.20** (0.10)	0.17 (0.11)
Working in Financial Sector			0.09 (0.11)	0.08 (0.10)	0.06 (0.11)	0.06 (0.10)	0.06 (0.11)	0.06 (0.10)
Financial literacy not related to stockownership			0.03 (0.07)	0.01 (0.07)	0.00 (0.07)	-0.00 (0.07)	0.00 (0.07)	0.00 (0.08)
Financial literacy related to stockownership			0.08** (0.04)	0.09** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)	0.08** (0.04)
% of individuals working in financial sector in municipality					0.67*** (0.21)	0.49* (0.29)	0.62** (0.28)	0.38 (0.37)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality -specific controls							Yes	Yes
Mean Stockownership	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225
First Stage								
Average stock market participation of foreigners in their countries of origin		2.77*** (0.78)		2.73*** (0.76)		2.53** (1.06)		2.64** (0.98)
F-statistic of instrument in the first stage		12.53		12.88		5.669		7.329
F-statistic of residuals from the first stage		<i>P-value</i> 0.001		0.001		0.023		0.011
		4.27		4.69		1.40		1.43
		<i>P-Value Endogeneity test</i> 0.470		0.038		0.246		0.241
Number of Observations	566	566	566	566	566	566	566	566

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave 2014 such that at least five observations for natives and at least five observations for foreigners are available in a municipality. Data is weighted and multiply imputed. Dependent variable is an indicator for whether household holds stock or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. Instrumental variable is average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 33 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 21: OLS and 2SLS results for the reduced sample (at least ten observations available in a municipality for natives and at least five for foreigners)

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Stockownership of foreigners	0.50*** (0.11)	0.97*** (0.28)	0.49*** (0.11)	0.99*** (0.30)	0.27* (0.15)	0.62 (0.38)	0.37** (0.15)	0.72* (0.39)
Male	0.11*** (0.03)	0.12*** (0.03)	0.10** (0.04)	0.11*** (0.03)	0.12*** (0.03)	0.12*** (0.03)	0.12*** (0.03)	0.13*** (0.04)
Middle Education	0.10* (0.05)	0.10* (0.05)	0.09* (0.05)	0.09* (0.05)	0.10** (0.04)	0.10** (0.04)	0.09* (0.04)	0.08* (0.04)
High Education	0.17** (0.07)	0.16** (0.07)	0.14* (0.07)	0.13* (0.07)	0.14** (0.06)	0.14** (0.06)	0.12* (0.06)	0.11* (0.06)
Log Income	0.12*** (0.04)	0.12*** (0.04)	0.12*** (0.04)	0.11*** (0.03)	0.11*** (0.04)	0.11*** (0.03)	0.12*** (0.04)	0.11*** (0.03)
Risk loving			0.22** (0.09)	0.19** (0.08)	0.23** (0.09)	0.21** (0.09)	0.21** (0.09)	0.19* (0.11)
Working in Financial Sector			-0.02 (0.11)	-0.03 (0.10)	-0.05 (0.12)	-0.05 (0.11)	-0.06 (0.12)	-0.05 (0.09)
Financial literacy not related to stockownership			0.01 (0.07)	-0.02 (0.07)	-0.01 (0.07)	-0.02 (0.07)	-0.00 (0.07)	-0.00 (0.08)
Financial literacy related to stockownership			0.09** (0.04)	0.10*** (0.04)	0.09** (0.04)	0.10*** (0.04)	0.10** (0.04)	0.10** (0.04)
% of individuals working in financial sector in municipality					0.73** (0.26)	0.49 (0.43)	0.51 (0.35)	0.22 (0.45)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality -specific controls							Yes	Yes
Mean Stockownership	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208
First Stage								
Average stock market participation of foreigners in their countries of origin		2.25** (0.79)		2.23*** (0.77)		1.70* (0.91)		1.96* (0.96)
F-statistic of instrument in the first stage		8.069		8.457		3.493		4.222
	<i>P-value</i>	0.011		0.009		0.078		0.055
F-statistic of residuals from the first stage		3.33		3.68		0.99		1.63
	<i>P-Value Endogeneity test</i>	0.085		0.071		0.333		0.218
Number of Observations	458	458	458	458	458	458	458	458

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave 2014 such that at least ten observations for natives and at least five observations for foreigners are available in a municipality. Data is weighted and multiply imputed. Dependent variable is an indicator for whether household holds stock or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. Instrumental variable is average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 19 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 22: OLS and 2SLS results for the reduced sample (at least ten observations available in a municipality)

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Stockownership of foreigners	0.41*** (0.12)	0.82*** (0.23)	0.41*** (0.13)	0.82*** (0.23)	0.14 (0.15)	0.32 (0.27)	0.17 (0.12)	0.57 (0.40)
Male	0.11** (0.04)	0.12*** (0.04)	0.10** (0.04)	0.12*** (0.04)	0.12*** (0.03)	0.12*** (0.03)	0.12*** (0.03)	0.13*** (0.05)
Middle Education	0.08 (0.07)	0.07 (0.07)	0.07 (0.07)	0.06 (0.07)	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.07 (0.05)
High Education	0.18* (0.09)	0.17* (0.09)	0.14 (0.09)	0.12 (0.09)	0.14* (0.07)	0.14** (0.07)	0.14* (0.07)	0.12* (0.07)
Log Income	0.15*** (0.05)	0.14*** (0.04)	0.14*** (0.04)	0.13*** (0.04)	0.13*** (0.04)	0.13*** (0.04)	0.14*** (0.04)	0.13*** (0.03)
Risk loving			0.14 (0.12)	0.12 (0.10)	0.13 (0.12)	0.13 (0.10)	0.13 (0.11)	0.11 (0.12)
Working in Financial Sector			0.02 (0.12)	0.01 (0.11)	-0.01 (0.13)	-0.01 (0.12)	-0.02 (0.13)	-0.01 (0.09)
Financial literacy not related to stockownership			0.05 (0.08)	0.01 (0.07)	0.02 (0.07)	0.01 (0.07)	0.02 (0.07)	0.02 (0.09)
Financial literacy related to stockownership			0.11** (0.04)	0.12*** (0.04)	0.11** (0.04)	0.12*** (0.04)	0.12** (0.04)	0.12** (0.05)
% of individuals working in financial sector in municipality					0.81*** (0.23)	0.69** (0.31)	0.75** (0.26)	0.37 (0.51)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-specific controls							Yes	Yes
Mean Stockownership	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226
First Stage								
Average stock market participation of foreigners in their countries of origin		2.98*** (0.80)		2.95*** (0.74)		2.66* (1.32)		3.02* (1.62)
F-statistic of instrument in the first stage		13.92		15.73		4.065		3.473
	<i>P-value</i>	0.002		0.002		0.065		0.085
F-statistic of residuals from the first stage		3.64		3.95		0.75		5.49
	<i>P-Value Endogeneity test</i>	0.079		0.068		0.403		0.036
Number of Observations	351	351	351	351	351	351	351	351

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave 2014 such that at least ten observations for natives and at least ten observations for foreigners are available in a municipality. Data is weighted and multiply imputed. Dependent variable is an indicator for whether household holds stock or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. Instrumental variable is average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 14 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 23: OLS and 2SLS results for the main sample and covariates specified for foreigners as a reference group

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)
Stockownership of foreigners	0.12 (0.10)	0.49** (0.25)	0.10 (0.11)	0.54* (0.30)
Male	0.07** (0.03)	0.06** (0.03)	0.07*** (0.03)	0.06** (0.03)
Middle Education	0.08** (0.04)	0.07* (0.04)	0.08** (0.04)	0.07* (0.04)
High Education	0.13*** (0.05)	0.11** (0.05)	0.13*** (0.05)	0.11** (0.05)
Log Income	0.09*** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.08*** (0.03)
Risk loving	0.21** (0.10)	0.18** (0.09)	0.22** (0.10)	0.18* (0.09)
Working in Financial Sector	0.11 (0.09)	0.12 (0.09)	0.11 (0.09)	0.12 (0.09)
Financial literacy not related to stockownership	-0.06 (0.07)	-0.06 (0.07)	-0.06 (0.07)	-0.05 (0.07)
Financial literacy related to stockownership	0.09*** (0.03)	0.09*** (0.03)	0.09** (0.03)	0.09*** (0.03)
% of foreigners working in financial sector in municipality	0.16 (0.17)	-0.07 (0.22)	0.15 (0.17)	-0.03 (0.22)
% risk loving individuals among foreigners			-0.11 (0.19)	-0.17 (0.18)
% financially literate individuals among foreigners			0.12 (0.16)	-0.16 (0.25)
Socio-demographic controls	Yes	Yes	Yes	Yes
Municipality-specific controls	Yes	Yes	Yes	Yes
Mean Stockownership	0.213	0.213	0.213	0.213
First Stage				
Average stock market participation of foreigners in their countries of origin		3.02*** (0.96)		2.52*** (0.79)
F-statistic of instrument in the first stage		9.890		10.17
F-statistic of residuals from the first stage	<i>P-value</i>	0.002		0.002
		3.25		2.70
	<i>P-Value Endogeneity test</i>	0.075		0.104
Number of Observations	805	805	805	805

Note: The table reports participation regressions for the main sample of natives from the LU-HFCS second wave 2014. Data is weighted and multiply imputed. Dependent variable is an indicator for whether household holds stock or mutual funds. Other socio-demographic controls (not displayed) include age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner. Municipality-specific controls are dummies for 5 groups of average rental price Euro/square meter. Instrumental variable is average participation of foreigners in their countries of origin from the first wave of the Eurosystem HFCS data. Reference group specific covariates include proportion of individuals working in financial sector among foreigners and proportion of risk loving and financially literate individuals among foreigners. Standard errors in parenthesis are clustered by municipality for 83 clusters. Heteroscedasticity robust Hausman test is in a form of auxiliary regression: coefficient on the residuals from the first stage significantly different from zero points to the endogeneity of the instrumented variable. *** p<0.01, ** p<0.05, * p<0.1.

Table 24: Placebo treatment for the full sample: randomization within regions

<i>Stockownership of foreigners assigned:</i>	Correctly	Correctly	Randomly	Randomly	Correctly	Correctly	Randomly	Randomly
<i>% of individuals in financial sector assigned:</i>	Correctly	Randomly	Randomly	Correctly	Correctly	Randomly	Randomly	Correctly
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Controlling for individual working in financial sector</i>				<i>Not controlling for individual working in financial sector</i>			
	OLS							
Stockownership of foreigners	0.20***	0.23***	0.07	0.03	0.20***	0.24***	0.07	0.02
	(0.07)	(0.08)	(0.08)	(0.08)	(0.07)	(0.09)	(0.08)	(0.08)
% of individuals working in financial sector in municipality	0.62***	0.30	0.41**	0.72***	0.69***	0.29	0.41**	0.79***
	(0.19)	(0.19)	(0.19)	(0.18)	(0.18)	(0.19)	(0.18)	(0.18)
Working in financial sector	0.13	0.17**	0.18**	0.13				
	(0.09)	(0.08)	(0.09)	(0.09)				
	2SLS							
Stockownership of foreigners	0.40**	0.57***	0.33	0.22	0.38**	0.59***	0.34	0.20
	(0.19)	(0.21)	(0.21)	(0.20)	(0.19)	(0.21)	(0.21)	(0.20)
% of individuals working in financial sector in municipality	0.49**	0.06	0.24	0.60***	0.57**	0.05	0.23	0.69***
	(0.24)	(0.22)	(0.23)	(0.21)	(0.23)	(0.22)	(0.23)	(0.20)
Working in financial sector	0.14	0.16**	0.18*	0.14				
	(0.08)	(0.08)	(0.09)	(0.09)				
	First Stage							
Average stock market participation of foreigners in their countries of origin	2.71***	2.62***	2.68***	2.69***	2.71***	2.63***	2.68***	2.71***
	(0.91)	(0.71)	(0.42)	(0.33)	(0.91)	(0.71)	(0.42)	(0.33)
F-statistic of instrument in the first stage	8.929	13.58	40.08	68.12	8.908	13.70	40.04	68.45
<i>P-value</i>	0.004	0.000	0.000	0.000	0.004	0.000	0.000	0.000
Observations	805	805	805	805	805	805	805	805
Mean stockownership	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213

Note: The table reports first stage regressions for the sample of natives from the LU-HFCS second wave 2014 such that there is at least one observation for foreigner available in a municipality and instrument is available for this foreigner – meaning his/her country of birth is among European countries available in the first wave of the Eurosystem HFCS dataset. Data is weighted and multiply imputed. Dependent variable is average participation rate in stock or mutual funds of foreigners in a municipality. Instrumental variable (regressor) is average participation of foreigners in their countries of origin from the first wave (2010) of HFCS data. Standard errors in parenthesis are clustered by municipality for 83 clusters . *** p<0.01, ** p<0.05, * p<0.1.

10.2 Analysis including social trust

It is well known from the literature that social interactions and trust are important determinants of stock market participation (see, for example, Hong et al. (2004), Guiso et al. (2008), and Guiso et al. (2004)). According to this literature, in the locations with higher levels of trust and social interaction there should be expected higher stock market participation rates through both peer effects and trust to the political institutions. Thus, *ceteris paribus*, in the municipalities with higher social interaction and trust, the peer effects can be expected to be stronger. One way to test this hypothesis would be to repeat the analysis for the subsamples of natives living in municipalities with high and low levels of trust and interaction. However, given the small size of our sample, such an analysis would most likely fail to deliver precise estimates, and thus credible results, due to the lack of statistical power.

Another way to proceed is to include directly municipality-specific indices of social trust and interaction in the estimated model. This specification would also allow addressing the omitted variable bias concern which might arise when these important determinants of stock market participation are not controlled for. However, in the Eurosystem HFCS information on social trust and interactions was not collected. Therefore, we use data from the European Social Survey (ESS) and the municipality -specific population composition CENSUS weights to construct municipality-specific trust indices. In particular, we use three questions from the ESS, namely whether people can be trusted, and whether such political institutions as parliament and legal system can be trust worthy. We construct the municipality-specific indices in a way similar to how we construct the instrumental variable. That is, we, first, construct country-specific averages using all the available ESS rounds, and then we weight these indices by the population shares at the municipality level.

As can be seen from Table 25 and Table 26 stock market participation and social trust indices at a country and municipality-level are indeed strongly correlated. Moreover, all the three chosen indices are correlated among themselves. It is not surprising therefore, that when using these variables in the regression analysis (Table 27 and Table 28) our main explanatory variable, namely stock market participation of foreigners, does not have predictive power over the natives' stock ownership decision anymore. Moreover, due to such high level of collinearity, the chosen instrument is no longer relevant and the first stage fails to hold.

It is worthwhile noting, however, that the proportion of financially educated peers, defined as neighbours working in the financial sector, is still an important predictor of individual stock market participation decisions.

Thus, this analysis allows us to conclude, that social interactions and trust are indeed important components of stock market participation decision. One possible way of using this information could be to use these indices as additional instrumental variables. This analysis is left for the future research.

Table 25: Composition of Luxembourgish population, stock ownership rates and trust indices by the country of origin

Groups	Country of origin	Population in Luxembourg, %	Risky assets ownership rates in Luxembourg in 2014, %	Lagged risky assets ownership rates in the country of origin in 2010 (instrument), %			Trust in:	
				All population	Only natives ^a	People	Country's parliament	Legal system
<i>Natives</i>	Luxembourg	56.96	20.84	24.34	27.60	5.11	5.71	6.14
<i>Main immigrant groups</i>	Portugal	16.08	0.48	6.34	6.13	3.81	3.42	3.80
	France	6.14	22.74	21.23	21.23	4.44	4.30	4.91
	Italy	3.52	21.49	9.24	9.96	4.52	4.24	5.04
	Belgium	3.30	42.84	25.80	27.25	4.98	4.79	4.81
<i>Immigrants from other European countries available in the Eurosystem HFCS dataset</i>	Germany	2.35	39.20	21.39	23.30	4.74	4.34	5.58
	Netherlands	0.76	12.97	22.48	22.48	5.84	5.19	5.70
	Spain	0.71	37.11	13.30	13.30	5.00	4.60	4.39
	Greece	0.30	0.00	3.57	3.68	3.87	3.74	5.07
	Finland	0.21	97.06	38.54	39.20	6.51	5.85	6.96
	Austria	0.15	91.41	12.94	13.73	5.09	4.90	5.97
	Slovakia	0.12	0.00	3.26	3.17	4.05	3.59	3.79
	Slovenia	0.08	0.00	19.69	20.07	4.15	3.80	3.83
	Malta	0.04	na	20.01	19.39	na	na	na
	Cyprus	0.01	na	35.06	37.69	4.08	4.79	5.69

Note: The table reports the composition of the population in Luxembourg by nationality based on the Census 2011 and stock ownership rates in Luxembourg in 2014 based on second wave of the LU-HFCS. In addition, it contains lagged risky asset ownership rates in the country of origin based on the first wave of the Eurosystem HFCS. Data is weighted and multiply imputed. The data on social trust indices is from the European Social Survey all available rounds for each country. Each index ranges from 0 to 10 where 0 is the minimum level trust and 10 is the maximum. The observations whose answers are recorded as "Don't know" are dropped.

^a In France, Spain and the Netherlands, data on ownership rates is computed only for the native population because an indicator on the country of origin/nationality is not collected/available.

Table 26: Pairwise correlation coefficients between foreigners' stock market participation and trust indices at municipality level

Municipality stockownership of foreigners		People trust index	Parliament trust index	Legal system trust index
Municipality specific trust indices defined among foreigners				
Municipality stockownership of foreigners	1.000			
People trust index	0.456	1.000		
Parliament trust index	0.465	0.993	1.000	
Legal system trust index	0.522	0.955	0.956	1.000
Municipality specific trust indices defined for all population				
Municipality stockownership of foreigners	1.000			
People trust index	0.345	1.000		
Parliament trust index	0.262	0.972	1.000	
Legal system trust index	0.310	0.983	0.993	1.000

Note: The table reports the pairwise correlation coefficients between stock market participation among foreigners and trust indices at municipality level. Stock ownership rates are based on second wave of the LU-HFCS. The data on social trust indices is from the European Social Survey all available rounds for each country.

Table 27: OLS and 2SLS results including trust indices

	Trust index of municipality defined among:			
	Foreigners		All population	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)
Stockownership of foreigners	0.04 (0.10)	3.45 (16.18)	0.04 (0.09)	-0.98* (0.53)
Risk loving	0.21** (0.09)	0.10 (0.80)	0.21** (0.09)	0.26** (0.11)
Working in financial sector	0.09 (0.09)	0.14 (0.35)	0.09 (0.09)	0.07 (0.09)
Financial literacy not related to stockownership	-0.05 (0.07)	-0.13 (0.40)	-0.05 (0.07)	-0.04 (0.07)
Financial literacy related to stockownership	0.09*** (0.03)	0.08 (0.13)	0.10*** (0.03)	0.11*** (0.04)
% of individuals working in financial sector in municipality	0.42* (0.24)	0.51 (3.41)	0.48** (0.24)	0.40 (0.28)
People trust index in municipality	-1.04 (0.99)	3.94 (34.04)	0.85 (0.92)	3.42** (1.61)
Parliament trust index in municipality	1.28* (0.77)	-1.37 (20.57)	1.20 (0.95)	-2.12 (1.99)
Legal system trust index in municipality	-0.19 (0.29)	-3.28 (16.62)	-1.45* (0.79)	0.70 (1.45)
Socio-demographic controls	Yes	Yes	Yes	Yes
Municipality-specific controls	Yes	Yes	Yes	Yes
Mean stockownership	0.213	0.213	0.213	0.213
First Stage				
Average stock market participation of foreigners in their countries of origin		0.15 (6.15)		4.81 (3.04)
F-statistic of instrument in the first stage		0.001		2.508
<i>P-value</i>		0.981		0.117
Correlation coefficients between stock market participation among foreigners and:				
People trust index in municipality		0.46		0.34
Parlament trust index in municipality		0.46		0.26
Legal system trust index in municipality		0.52		0.31
Number of observations	805	805	805	805

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave (2014) such that at least one foreigner from a country available in HFCS dataset is available in a municipality. Data is weighted and multiply imputed. The dependent variable is an indicator for whether household holds stocks or mutual funds. Socio-demographic controls include indicator for a male FKP, age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner, log transformation of income. Municipality-specific controls include dummies for 5 groups of average rental price Euro/square meter. The data on social trust indices is from the European Social Survey all available rounds for each country. The instrumental variable is average participation of foreigners in their countries of origin from the first wave of Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 83 clusters. *** p<0.01, ** p<0.05, * p<0.1.

Table 28: OLS and 2SLS results including trust indices: by index

	Trust index of municipality defined among:											
	Foreigners						All population					
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)	OLS (9)	2SLS (10)	OLS (11)	2SLS (12)
Stockownership of foreigners	0.03 (0.09)	-1.05 (2.74)	0.02 (0.09)	7.96 (47.69)	0.04 (0.10)	-1.08 (2.18)	0.01 (0.09)	-0.22 (0.40)	0.02 (0.09)	-0.01 (0.31)	0.03 (0.09)	0.05 (0.34)
Risk loving	0.22** (0.09)	0.28 (0.20)	0.22** (0.09)	-0.20 (2.57)	0.22** (0.09)	0.28 (0.18)	0.21** (0.09)	0.22** (0.11)	0.21** (0.09)	0.21** (0.10)	0.21** (0.09)	0.21** (0.10)
Working in financial sector	0.09 (0.09)	0.06 (0.11)	0.09 (0.09)	0.27 (1.22)	0.09 (0.09)	0.06 (0.10)	0.09 (0.09)	0.09 (0.08)	0.09 (0.09)	0.09 (0.08)	0.09 (0.09)	0.09 (0.08)
Financial literacy not related to stockownership	-0.07 (0.07)	-0.04 (0.11)	-0.07 (0.07)	-0.36 (1.72)	-0.07 (0.07)	-0.06 (0.08)	-0.07 (0.07)	-0.06 (0.07)	-0.07 (0.07)	-0.07 (0.07)	-0.07 (0.07)	-0.07 (0.07)
Financial literacy related to stockownership	0.09*** (0.03)	0.10** (0.04)	0.09*** (0.03)	0.04 (0.37)	0.09*** (0.03)	0.10** (0.04)	0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.03)	0.10*** (0.03)
% of individuals working in financial sector in municipality	0.42* (0.22)	0.55 (0.46)	0.40* (0.22)	-0.86 (6.41)	0.43* (0.23)	0.32 (0.47)	0.42** (0.21)	0.49* (0.25)	0.47** (0.21)	0.48* (0.25)	0.46** (0.21)	0.45* (0.25)
People trust index in municipality	0.16 (0.10)	0.70 (1.36)					0.40*** (0.15)	0.57* (0.34)				
Parlament trust index in municipality			0.16* (0.09)	-3.31 (21.42)					0.23** (0.09)	0.24 (0.16)		
Legal system trust index in municipality					0.10 (0.09)	0.64 (1.07)					0.21** (0.09)	0.20 (0.17)
Socio-demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality-specific controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean stockownership	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213
First Stage												
Average stock market participation of foreigners in their countries of origin		2.68 (5.14)		0.77 (7.11)		-1.30 (2.31)		2.71* (1.47)		2.95** (1.30)		2.71** (1.26)
F-statistic of instrument in the first stage		0.271		0.0118		0.318		3.389		5.177		4.601
<i>P-value</i>		0.604		0.914		0.574		0.069		0.026		0.035
Number of observations	805	805	805	805	805	805	805	805	805	805	805	805

Note: The table reports participation regressions for the sample of natives from the LU-HFCS second wave (2014) such that at least one foreigner from a country available in HFCS dataset is available in a municipality. Data is weighted and multiply imputed. The dependent variable is an indicator for whether household holds stocks or mutual funds. Socio-demographic controls include indicator for a male FKP, age, age squared; household size; marital status: single, widowed, divorced; occupational status: self-employed, unemployed, retired, or other occupation and indicator for a foreign partner, log transformation of income. Municipality-specific controls include dummies for 5 groups of the average rental price Euro/square meter. The data on social trust indices is from the European Social Survey all available rounds for each country. Instrumental variable is average participation of foreigners in their countries of origin from the first wave of Eurosystem HFCS data. Standard errors in parenthesis are clustered by municipality for 83 clusters. *** p<0.01, ** p<0.05, * p<0.1.