

# International Comparative Household Finance\*

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## Abstract

This paper reviews the literature on international comparative household finance. The paper presents summary statistics on household balance sheets for 13 developed countries, and uses these statistics to discuss common features and contrasts across countries. The paper then discusses retirement savings, investments in risky assets, unsecured debt, and mortgages.

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# 1 Introduction

Household finance studies the ways in which households use financial instruments to attain their objectives. The field has grown rapidly in recent years, with considerable emphasis on mistakes—household financial behavior that deviates from the prescriptions of standard finance theory in ways that are hard to rationalize—and on the characteristics of households and of the financial systems in which they operate that either exacerbate or mitigate such mistakes.

This type of research requires high-quality microeconomic data on household financial decisions, and the growth of the field has been driven in part by the increasing availability of such data. Traditional household surveys have been augmented by administrative data from governments, financial institutions, and most recently technology companies that aggregate financial information for households. As elsewhere in applied microeconomics, there is also great interest in identification through discontinuities, natural experiments, and sometimes randomized controlled trials.

A particularly vibrant subfield of household finance studies international data. Individual studies often concentrate on single countries, but taken together the body of research enables a systematic comparison of household finance practices around the world. We review this subfield of international comparative household finance, defining it broadly to include a related body of work that studies regional variation within countries, most obviously variation across US states.

There are several good reasons to study household finance in the international context. First, at the level of basic facts it is important to understand which microeconomic facts hold true broadly across the world and which appear specific to the US or to countries with similar characteristics.<sup>1</sup> Second, in many cases better data are available internationally than in the US. Notably, Scandinavian governments collect data on the wealth portfolios of their citizens (a prerequisite to the taxation of wealth), and are far more willing than the US government to merge different types of administrative data on households and to make the combined datasets available to academic researchers. As another example, electronic registries of equity ownership are available in countries as different as Finland and India, and have been used for academic research on household behavior in equity markets.

Third, institutional differences across countries allow more precise measurement of certain effects of interest. For example, the mortgage system in Denmark allows refinancing to lower the interest rate even by borrowers with negative home equity and impaired credit records. Thus, if one observes sluggish refinancing in Denmark one can

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<sup>1</sup>Guiso et al. (2002) is a notable early contribution in this spirit. There is an analogy here to the recent concern that academic psychology has relied too heavily on experiments with US college students. The acronym WEIRD (white, educated, from industrialized, rich democracies) has been used to describe these experimental subjects who may indeed be unusual in a global context (Henrich et al. 2010).

be confident that it is not the result of refinancing constraints that have bedeviled US research on this subject (Andersen et al. 2015). Similarly, unique features of the UK and Singapore housing markets allow Giglio et al. (2015) to estimate discount rates for real estate over extremely long horizons. Fourth, and related to the above point, different countries' and states' financial systems have different regulatory discontinuities, and abrupt legal changes that occur at different times. Each of these may provide a new natural experiment to provide identification.<sup>2</sup>

Fifth, even in the absence of natural experiments, different countries have different histories of macroeconomic shocks. Research on household responses to these shocks can progress more rapidly when the data available are a multi-country panel rather than a single-country time series. As an example, Badarinza et al. (2015) use international data to shed light on the determinants of fixed- versus adjustable-rate mortgage choice.

Sixth, some important aspects of household finance are inherently global. When investing in risky asset markets, households have the opportunity to diversify internationally but many appear reluctant to do so, a phenomenon known as the "home bias" puzzle. Home bias has often been studied using consolidated national balance sheets (see Cooper et al. 2013 for a survey), but recent work in this area drills down to the household level (Bekaert et al. 2015). Even domestic assets such as housing can be affected by external shocks such as flows of capital and people across state and national borders (Saiz & Wachter 2011, Badarinza & Ramadorai 2015).

Finally, and most ambitiously, institutional and cultural differences across countries, regions, and states can be used to identify the effects of institutions and culture on household financial decisions. Of course, there is the usual caveat that such geographical differences must be exogenous to financial behavior today, and must be uncorrelated with other unmeasured determinants of household financial behavior. A well known example of this style of research is the claim of Guiso et al. (2008) that trust, a cultural attribute with deep historical roots, determines households' willingness to use the formal financial system. The importance of culture is reinforced by evidence that households moving across borders retain the investment habits of their country of origin and are slow to adjust to the investment norms of their new home country (Haliassos et al. 2015).

The international comparative household finance literature has matured to the point at which certain broad observations can be made. At the microeconomic level across households, the predominant impression is of commonality across countries. In all countries households with higher education, income, and wealth tend to participate more actively in formal financial markets and conform more closely to the predictions

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<sup>2</sup>For example, Bajo et al. (2014) study a reform of the mortgage system in Italy that unexpectedly removed barriers to refinancing. Campbell et al. (2015) study discrete regulatory changes in India and trace out their effects on risky mortgage lending in that country. Anagol et al. (2015) study Indian IPOs in which there are randomized allocations of shares to particular applicants, and identify a range of treatment effects of randomly experienced gains and losses on investment decision-making.

of standard finance theories. The effect of age is also broadly similar across countries, with beneficial effects of increasing financial experience in early adulthood ultimately overwhelmed by the deleterious effects of declining cognitive capacity (Agarwal et al. 2009a).

At the macroeconomic level of financial system structure, however, there are persistent and somewhat mysterious differences across countries. A notable example is the division between countries where fixed-rate mortgages are dominant, notably the US, Germany, and Denmark, and countries where adjustable-rate mortgages predominate, including the UK and most southern European countries. An important question is whether these differences result from deeper cross-country differences in economic structure or the preferences of the population, or whether they are essentially arbitrary outcomes influenced by history and inertia in financial structure. If the latter is the case, it suggests the possibility of identifying global “best practices” and importing them into countries that have inherited inferior household finance systems.

The remainder of this review is organized as follows. Section 2 presents a systematic comparison of household balance sheets across 13 developed countries, based on household surveys conducted in each of these countries. This comparison reveals many similarities and some notable cross-country differences that should be kept in mind when interpreting the literature. After this the paper considers in turn the assets and liabilities on the balance sheet. Section 3 explores cross-country evidence on retirement savings systems, and section 4 considers households’ investments in risky non-retirement assets. Section 5 studies short-term unsecured household debt, and section 6 studies mortgages. Section 7 concludes. A companion website, [www.household-finance.net](http://www.household-finance.net), hosts a repository of international metadata and research, with the goal of reducing barriers to entry for new researchers.

## 2 International evidence on household balance sheets

Accurate measurement of household balance sheets is a notoriously difficult challenge. Administrative data may exist on particular assets and liabilities, but are hard to merge to obtain a complete picture of the balance sheet. Household surveys provide a top-down view, but there is increasing concern about non-response rates either to the survey or to important individual questions (Meyer et al. 2015), and about inaccurate responses influenced by imperfect recall and a tendency to overestimate asset values. It is particularly difficult to get informative responses from wealthy households, and some surveys oversample this group (Kennickell 2008). Recent efforts to improve data quality compare and combine administrative and survey micro-data, and reconcile these household-level data sources with national accounts data (Bricker et al. 2015, Cynamon & Fazzari 2015, Koijen et al. 2014).

Cross-country balance sheet comparisons are even more difficult because of cross-

country variation in financial systems, regulations, survey design, and survey response rates. A relatively new trend is the development of household surveys that are implemented simultaneously in many countries with questions that are designed to elicit comparable responses.<sup>3</sup> We use one such survey, the Eurosystem Household Finance and Consumption Survey (HFCS), together with a set of national surveys that are broadly comparable to the Survey of Consumer Finances (SCF) in the US.<sup>4</sup> Together, these surveys allow us to compare household balance sheets in 13 developed countries.

Ideally, we would want to compare data collected in the same year. This is not feasible, given the varying release schedules of the different surveys. Our data therefore span the years 2008 (Spain), 2009 (Greece, Netherlands and Finland), 2010 (Australia, Germany, France, Italy, Slovenia, Slovakia and the US), and 2012 (UK and Canada). Fortunately, while average household asset and liability values vary over time, the features of the data that we are interested in—the cross-country patterns in participation rates and the relative magnitudes of various types of assets and liabilities—are all quite stable over time.

Asset holdings and liabilities are measured using current market values.<sup>5</sup> All surveys use regression-based imputation methods to correct for non-response, missing or unreliable values, but only the SCF and the HFCS release multiple replicates. The overall quality of the data is ensured by validation by respective institutions and inspection of primary documentation by interviewers, and in one instance (the Canadian SFS) through the additional inclusion of personal tax files and administrative pension plan data.

### *Participation rates*

Table 1 reports participation rates in particular assets (Panel A) and liabilities (Panel B).<sup>6</sup> In all countries but one, over 90% of households report holding financial

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<sup>3</sup>An important recent example is the World Bank’s Global Financial Inclusion project (Demirgüç-Kunt & Klapper 2013). Using survey data from 148 countries around the world, they show that 50 percent of adults worldwide are “banked,” that is, have an account at a formal financial institution, but also that account penetration varies across countries by level of economic development and across income groups within countries. They suggest that “unbanked” households face barriers to account use such as cost, distance, and documentation requirements.

<sup>4</sup>Like the SCF, the Canadian Survey of Financial Security (SFS), the UK Wealth and Assets Survey (WAS), and the Eurosystem Household Finance and Consumption Survey (HFCS) capture the balance sheets of representative cross-sections of households. The Australian Household, Income and Labour Dynamics survey (HILDA) is designed as a longitudinal panel, in which the same individuals are tracked through time.

<sup>5</sup>The UK WAS survey is unique in considering expected future growth rates of income and social security benefits. However, for cross-country comparability we also use current market values to evaluate balance sheet positions in the WAS. Differences arise in the calculation of future pensions, but they are negligible for our purposes.

<sup>6</sup>We define the participation rate as the fraction of households who report that they hold an asset, even if they also say that their holding is zero. This is a choice that makes little difference in most countries but does have an impact in Italy, where around 10% of households report having a deposit account with zero balance.

assets in some form. The exception is Greece, where only 74% of households report holding any type of financial asset. While this may accurately reflect relatively low participation in financial markets, it may also reflect distrust of official surveys in Greece, a country notorious for tax evasion (Artavanis et al. 2015). This illustrates the difficulties that cultural differences can cause for cross-country comparative survey research.

Table 1 unsurprisingly shows the highest financial asset participation rate for bank deposits and transaction accounts. However, the academic literature in household finance has devoted relatively little attention to simple banking transactions, despite their prevalence and the possibility of household mistakes in managing payments mechanisms. Examples of work in this area include Schuh & Stavins (2010) on the relative convenience, costs, and usage of different payment instruments across consumers; Agarwal & Qian (2014) on the effects of unanticipated income shocks in Singapore on household spending behavior through bank checking accounts as well as debit and credit cards; and Bakker et al. (2014) on the large fees incurred by households on account of bank overdrafts.

In most countries, the second highest financial asset participation rate is for retirement assets. This participation rate does vary considerably across countries, with high levels in Australia, the UK, and Canada, and quite low levels in Slovenia, Slovakia, and especially Greece. Retirement asset accumulation depends of course on the balance of defined-benefit and defined-contribution elements in the retirement system, which varies across countries as we discuss in the next section.

Outside retirement accounts, there is considerable variation across countries in the participation rates for directly held stocks and mutual funds. Despite the well known costs and risks of self-directed active equity investment, and evidence surveyed by Ramadorai (2010) that individual investors tend to underperform institutions, in several countries (Australia, Spain, France, the UK, and the US) the participation rate is substantially lower in mutual funds than in directly held stocks. This is a striking fact even though the mutual fund participation rate excludes mutual funds held in retirement accounts.

The bottom row of panel A shows that participation rates for equity investments are quite low even when one includes indirect holdings of equities in mutual funds and retirement accounts. With this broadest definition, the participation rate is just below one half in the US, about one third in Finland, and only about one quarter in Germany, Spain, and France. Unsurprisingly and consistent with research in the US (Campbell 2006), the participation rate increases with wealth, as we illustrate by comparing the participation rate in directly held stock investments for households with above median and below median levels of wealth. Nevertheless the participation rate remains far below one in both parts of the wealth distribution.

The participation rate in fixed-income products is overall relatively low, albeit with

substantial variation across countries. Italy and the UK both have relatively high fixed-income participation rates, which in Italy consists largely of holdings of public debt. While some households may use their own government's debt as an offset to the taxes they will have to pay to service that debt, in the spirit of the Ricardian equivalence hypothesis, this is by no means universal behavior.

Turning to non-financial assets, vehicles and valuables are most commonly held. Perhaps more importantly, the homeownership rate (measured as the fraction of households owning their main residence, rather than the more common definition in the real estate literature of the fraction of housing units that are owner-occupied) is above 50% everywhere except Germany, a country in which renting is famously more common.

In almost all countries about 10% of households own private businesses. These tend to be the wealthiest households so private businesses are a much more important component of the aggregate household balance sheet than this fraction would indicate.

On the liabilities side, panel B of Table 1 shows substantial cross-country heterogeneity. Three quarters of households are indebted in the US, and this fraction is only slightly lower in Canada, Australia, the UK, and the Netherlands. However, this is very different from Italy, where only one in four households has any debt, or even France, Spain, and Germany, where about half of all households are indebted. Given that all countries in our sample are developed industrialized nations with mature market economies and most of them members of the same currency area, this degree of cross-country variation may seem surprising. Different explanations have been proposed in the literature, referring to the taxation of mortgage payments, the regional history of financial regulation, competitiveness of the banking sector, efficiency of the legal system, financial literacy of households, and cultural differences in the social acceptance of indebtedness (Guiso et al. 2006, Bover et al. 2013).

Countries also differ with respect to the preferred methods of short-term financing. In Anglo-Saxon countries credit card debt is widespread, ranging from about one quarter in Canada and the UK to almost 40% in the US. In Germany, Italy, and the Netherlands, overdraft facilities and credit lines are relatively more popular. A substantial fraction of households hold vehicle, student loans and other debt in all countries, though the participation rates vary considerably, between one eighth in Greece and Slovakia to over one half in Finland.

Panel B of Table 1 also shows that only one in ten Italians and one in five Germans have a mortgage. For the US, the corresponding share is equal to one half. This heterogeneity is particularly surprising, since the homeownership rate in Italy is close to the one in the US.

#### *The composition of assets and liabilities*

Table 1 shows participation rates, but gives no information about the magnitudes of assets and liabilities. Table 2 summarizes the size of the various components of

household balance sheets, converted to 2010 US dollars at market exchange rates.

The first two rows of panel A report the total assets of average and median households in each country. Large differences between mean and median assets, notably in the US and Germany, reflect an unequal and right-skewed wealth distribution. Concentrating on the assets of median households, we see the highest values in Australia, Canada, and the UK, and surprising patterns in Europe where the values are relatively high in southern European countries such as Spain and Italy, also high in the Netherlands, but strikingly low in Germany. Even Greece has a higher median household asset value than Germany, despite the large income discrepancy between these two countries.

In the lower part of Panel A, we compute the respective share of each asset category, relative to total gross assets. We do this by equally weighting, rather than wealth-weighting, household-level portfolio shares. This conforms to an important principle of household finance. Aggregating all assets to a single composite portfolio using wealth-weights will more accurately represent the portfolio of the wealthy than the portfolio of a typical household. It is the latter that we are interested in for questions of household finance.

The asset shares help us to interpret the cross-country variation in total asset holdings. In Anglo-Saxon countries (Australia, Canada, the UK, and to a lesser degree the US), and in the Netherlands, retirement assets have a relatively high share. In these countries, the relatively high levels of median gross assets are attributable to the importance of defined contribution retirement plans as we discuss in the next section. In southern Europe, notably in Greece, Spain, and Italy, housing is much more important and financial participation rates are relatively low. The puzzling observation that median households in these countries have greater assets than the median German household is largely attributable to the higher rate of homeownership in southern Europe.

Other interesting facts emerge from this table. Deposits and transaction accounts are surprisingly important across the sample, and especially so in Europe. In the extreme case of Germany, the mean asset share in such accounts is 30%. While it may be optimal for households with a very small buffer-stock of savings to keep their assets liquid, such a high liquidity ratio seems unlikely to be optimal for the average household. On the household demand side, it may well be the case that the high liquidity ratio reflects low financial literacy, extreme risk aversion, or an irrational preference for liquidity. On the supply side, some countries may impose regulatory hurdles on financial institutions which limit the provision of more advantageous products. It is also possible that profit-maximizing financial institutions consciously direct households towards profitable products that pay low interest (see Gurun et al. 2013 for evidence of directed advertising efforts of banks in the US, and Fecht et al. 2013 for evidence on German banks taking actions which are detrimental to retail investors).

Confirming the evidence of Table 1, mutual funds, bonds, and publicly traded stocks

account for only a tiny fraction of household portfolios, despite historical evidence for an equity premium, and theoretical exhortations for households to invest in risky assets yielding a positive risk premium. We discuss this well known puzzle in the section on household risky asset holdings.

Nonfinancial assets are relatively important in all countries, but particularly so in southern Europe as discussed above. The dominant single asset in all countries is the household's primary residence. Vehicles and other consumer durables are especially important in the UK, the US, and Canada, and generally represent the second-largest non-financial asset category, except in Greece, Spain, and Finland, where vacation homes and tourism-related residential properties are widespread.

Nonfinancial assets are often financed with debt, and panel B of Table 2 reports this side of the balance sheet. Median liabilities (for households with nonzero liabilities) are greatest in the Anglo-Saxon countries and particularly the Netherlands, and are generally lower in southern Europe. Combining this fact with the asset holdings in panel A of Table 2, and the liability participation rates shown earlier in Table 1, it follows that median southern European households have higher net wealth than US or northern European households as shown at the bottom of panel B of Table 2. This fact, initially surprising given lower incomes in southern Europe, is in part a reflection of financial underdevelopment in southern Europe, which leads households to save for housing rather than funding it through mortgage borrowing.

The contrast between northern and southern European balance sheets raises interesting questions about the relation between private household wealth, shown here, and broader concepts of national wealth and welfare. Public housing and other assets used to provide public services enter national balance sheets but not private balance sheets, and these public assets are likely greater in northern Europe. It is also likely that bequest motives are stronger in countries with weak provision of public services and limited availability of credit to fund educational and housing investments by young adults. Finally, it should be kept in mind that a high level of house prices, as in the UK, raises measured household wealth but corresponds to more expensive housing services rather than a higher standard of living.

The patterns in household balance sheets we have documented in this section justify the attention the literature pays to the topics we review in the remainder of this paper, namely, retirement savings, other risky investments, unsecured household debt, and mortgages.

### **3 Retirement savings**

The most basic distinction in retirement systems is that between defined benefit (DB) and defined contribution (DC) pensions. DB systems provide a pre-specified income stream and the assets that support these promised payments are owned by the pension

provider, not by the pension recipient.<sup>7</sup> If these assets lose their ability to support the promised payments, in principle the pension provider is liable and the pension recipient is protected, although in practice DB pensions can be reduced in extreme circumstances. DC systems allow households to accumulate assets, through their own contributions and those of their employers, which in turn support consumption in retirement. These systems demand more of individual households but also allow greater flexibility to accommodate job changes, periods of part-time work, early retirement, and differences across households in desired investment strategies.

Figure 1 illustrates the cross-country variation in retirement systems. The figure shows the fraction of households with DC plans on the left axis, and the average dollar value of the DC account on the right axis. The figure shows that following a shift away from DB plans in the last 25 years, DC pensions dominate the market in Australia, the UK, and the US, but are far less prevalent in Europe. The incidence of DC plans has risen in reaction to increased workforce mobility, demographic changes, pension underfunding, and regulatory reform linked with market-based accounting in these countries, especially in the UK and in the US, where the size of the average DC pot is considerably higher than in any of the other countries.

At the opposite end of the spectrum, DC plans have not made significant inroads into many European countries, where government- and employer-sponsored DB pensions are far more prevalent. There is considerable heterogeneity across DB pension plans in Europe, and they are often indistinguishable from public social security schemes (Boersch-Supan 2008). Especially in Italy, Spain, and Eastern Europe, traditional public systems carry the entire burden of retirement financing, and DC plans have only very modest participation rates. In Germany, France, and the Netherlands, public pensions coexist with large DC schemes, which are mostly private and voluntary. As household surveys provide very imprecise measures of public pensions and DB plans, we focus in Figure 1 on the prevalence of DC plans, leaving DB pensions as a residual.<sup>8</sup>

Retirement saving is a difficult but extremely important challenge for households, as actions must be taken far in advance of outcomes, small changes in actions can have large effects on outcomes because savings are compounded over long horizons, and retired households have few margins for adjustment if retirement wealth proves inadequate. Researchers are exploiting micro-level data on individual retirement accounts and variation in retirement savings systems around the world to study this important topic.

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<sup>7</sup>Within DB systems, there is also the distinction between funded systems as in the UK and the Netherlands, and pay-as-you-go systems as in France and Germany.

<sup>8</sup>Figure 1 excludes Canada where the underlying survey does not make a clean distinction between pure DC plans and plans with DB features.

### *Retirement asset accumulation*

A large body of research has demonstrated that retirement asset accumulation is a minefield in which household choices are particularly subject to error. Benartzi & Thaler (2007) survey household decision making in this area and show that households make errors of two types. On the one hand, many households make poor active decisions. Notably they adopt “naive diversification” strategies that depend on the menu, i.e., the choice of retirement savings options. Households seem to spread assets across available funds on the menu, regardless of these funds’ asset allocation, an approach that often implies a suboptimal allocation between bonds and stocks. Households also engage in trend-following strategies in which their equity allocation moves with recent market returns, and they overinvest in the stock of companies in which they are employed, especially following high returns on these stocks (Benartzi 2001).

On the other hand, households appear sluggish in their decision making, in the sense that they are generally slow to join advantageous plans, and make infrequent changes to their retirement savings rates and asset allocations. As we discuss below, practical “nudge” approaches built on academic work in this area have attempted to use this household inertia to cure the tendency to make poor active choices.

Work using a variety of international datasets has confirmed these findings on inertia as well as poor active decision making. In Sweden, over 90% of DC plan participants choose the default plan, and only a tiny percentage of participants make any changes to their portfolio (Cronqvist & Thaler 2004). In Denmark, only 15% of households are “active savers” and optimally adjust their portfolios to respond to retirement-related tax incentives (Chetty et al. 2013). This behavior is not without consequence: Choi et al. (2011) find quantitatively important effects of low participation and contribution rates and suboptimal asset allocation.

Worryingly, these problems appear to be concentrated among those least able to bear the consequences of suboptimal decisions. For example, Disney et al. (2001) exploit structural changes induced by pension reform in the UK to show that household responses differed strongly across social strata, with greater participation by high-income earners. They estimate that half of UK households do not make sufficient contributions towards pension accounts. They also find that exactly those parts of the population that do not have any retirement savings and that hold few financial assets are the ones that are more likely to opt out both of the state component of the pension scheme and of plans provided by employers. Similar conclusions have been reached in Canada, Italy, and Germany. Chetty et al. (2013) find that, in Denmark, “active savers” are wealthier and more financially sophisticated, while passive individuals are least prepared for retirement.

The greater incidence of investment mistakes among poorer and lower-income households may be explained in part by the lower financial literacy of these households.

Hastings et al. (2013) show that household financial literacy is correlated with wealth and income, both within and across countries, although there is considerable residual variation in financial literacy. The literature on financial literacy has progressed slowly, plagued by measurement and identification problems. Nevertheless, international evidence documenting a positive impact of financial literacy has emerged. Bucher-Koenen & Lusardi (2011) exploit the shock of German reunification and use regional variation across German federal states to obtain exogenous variation in the financial knowledge of peers. They find a positive impact of financial knowledge on retirement planning. Lusardi & Mitchell (2011) conclude that the impact of financial literacy on planning is also positive in the US, but they recognize that financial literacy can be hard to improve given that many households are unfamiliar with the basic economic concepts needed to make adequate saving and investment decisions.

Recently developed solutions to poor decision making employ household inertia in an innovative way. Households tend to choose the path of least resistance (Madrian & Shea 2001, Choi et al. 2002), engaging in passive decision-making and accepting the status quo. Paradoxically, this provides the path to a potential solution, since wealth accumulation in DC retirement systems depends on numerous product-level and institutional design features. Among those that matter are the financial incentives households have to participate and contribute (for example matching contributions from employers); the ease of participation (for example opt-in versus opt-out systems); the presence of defaults for asset allocation (in the US, for example, defaults used to be riskless money market funds but since the Pension Protection Act of 2006 have largely become target-date mutual funds with a mix of equity and fixed-income assets); rules concerning early withdrawals (which are often permitted in the US but much less so in other countries as shown by Beshears et al. 2015); and requirements for annuitization or withdrawal of assets upon retirement.

To be more specific, households respond to system design features that are economically neutral, or almost so, which nonetheless reduce the decision-making burden of taking a certain course of action. The household finance literature has increasingly taken the view that such “nudges” can be used to promote advantageous retirement savings strategies. Evidence has emerged showing that sensible default options, automatic enrollment, automatic contribution rate increases, fund matching, and dynamic asset allocations are beneficial to households (see, for example, Madrian & Shea 2001, as well as Hedesstrom et al. 2004 for Sweden, and Lippi 2014 for Italy).

It is tempting to conclude that similar approaches will work elsewhere in household finance, but it is important to keep in mind that the retirement savings context is special because employees seem to trust employers to design retirement systems in a benevolent fashion (although Bubb et al. 2015 question whether this trust is well placed). In other contexts, households may lack an institutional counterparty that they regard as benevolent. For example, there is less evidence that nudges work as well

in developing countries. In Mexico, government nudges were ineffective for households at the lower end of the wealth distribution, and investors did not respond optimally to the available information, even when significant efforts were made to make the relevant features salient, for example by building a synthetic fee index (Duarte & Hastings 2012).

### *Retirement asset decumulation*

How well do households utilize their accumulated savings, once they reach retirement age? A simple life-cycle model would suggest that older people should run down their financial assets as they age. However, economists both in the US and around the world have been puzzled by the observation that assets are only slowly decumulated and that the acceptance rate of annuity-type products is very low (Benartzi et al. 2011).

One plausible explanation for this behavior is a concern about health-care costs, which leads households to retain assets in case they need to pay for long-term care. Ameriks et al. (2011) survey US Vanguard clients and report that this concern is salient to them. Cross-country evidence also lends support to this mechanism. Using micro-level data from the U.S. Health and Retirement Study (HRS), the English Longitudinal Study of Ageing (ELSA), and the Survey of Health, Ageing and Retirement in Europe (SHARE), Nakajima & Telyukova (2013) find that the rate of dissaving in retirement, especially of financial assets, is correlated with the public provision of healthcare. Household exposure to out-of-pocket medical spending risk accounts for much of the cross-country variation in post-retirement asset decumulation, with households dissaving more rapidly in Scandinavian and other countries with high-quality public healthcare.

The role of housing in retirement is also important. In southern and central-eastern Europe, the homeownership rate is high and the rate of dissaving is low. In northern Europe, real estate wealth is less important and retirees spend down their wealth more rapidly. This raises the question of why homeowners do not extract home equity as they age. It is possible that housing is used for bequests, which older people may particularly wish to leave to their young adult children given the relatively weak public provision of services and the difficulty of borrowing in many southern European countries; but it may also be that home equity extraction is difficult in southern Europe, where financial products such as home equity loans and reverse mortgages are uncommon. Even in the absence of such financial instruments, retirees could decumulate housing wealth by downsizing, but such behavior also seems unusual in southern Europe. Angelini et al. (2014) show using SHARE data that northern Europeans change residence five to seven times on average, while southern and eastern Europeans typically move less than three times. In the extreme, the average elderly households in Greece, Poland or the Czech Republic experience only one change of residence during their adult lifetime, and no further adjustments in their holdings of residential property during retirement.

In summary, in the US, the literature has predominantly focused on the complex

choices facing households with DC retirement plans. In Europe, where DB pension schemes are more important, the literature has focused more on explaining the participation in DC plans in those countries that offer them, and the contrasting patterns of retirement asset decumulation in northern and southern Europe.

## 4 Risky investments

An important theme of the literature on risky asset holdings is that households with higher income, greater financial wealth, and better education tend to invest more in risky assets and also invest more efficiently, i.e., in a more diversified fashion, and paying lower fees. For both these reasons, such households tend to earn higher average returns. Piketty (2014) has expressed concern that this dispersion in returns increases the inequality of the wealth distribution, a particularly powerful effect in countries with DC retirement systems and a high ratio of household wealth to income.

The field of household finance has paid considerable attention to risky household investments. This is because household decisions in this area deviate considerably from the predictions of theory. Theory is very clear on the desirability of participation, showing that any rational household should hold at least some risky assets in a market with a positive equity premium. The large historical equity premium has led both financial planners and academic economists to recommend substantial equity allocations for households accumulating financial assets (Campbell & Viceira 2002, Campbell 2006).

The deviation of observed household behavior from this strong theoretical exhortation is also clear. As Tables 1 and 2 show, many households do not participate in risky asset markets, and when they do participate, they tend to hold relatively small fractions of their portfolios in risky form. This is true even when one takes account of indirect risky asset holdings through DC retirement accounts.

While non-participation by low-wealth households can easily be rationalized by small fixed costs of risky investment, it is far harder to explain for wealthy households. Notable recent attempts to address this issue include Briggs et al. (2015). Using a unique sample of Swedish lottery winners, these authors show that close to 40% of Swedes with lottery winnings of over US\$ 300,000 do not begin participating in equity markets following such a large exogenous wealth shock. Using a calibrated life-cycle portfolio model, they suggest that large fractions of the population need to have unduly pessimistic expectations about the equity premium to rationalize this behavior.

Even among participants, risky shares vary cross-sectionally at given levels of wealth, and the inefficient construction of many household portfolios has been shown to offset or even negate the benefit of stock market participation. For example, many households in Sweden hold portfolios with a high proportion of uncompensated idiosyncratic risk (Calvet et al. 2007), and in India, Campbell et al. (2014) show that there is significant evidence of a large fraction of household portfolios exhibiting negatively compensated

style tilts – for example, holding growth stocks in a market with a value premium, or by adopting a short-term contrarian investment strategy in a market with momentum where outperforming stocks continue to outperform for a period of time.

We now discuss what the literature has discovered about the determinants of both non-participation and inefficient portfolio construction. These determinants fall into several broad categories: wealth, genetic factors, cognitive ability, financial literacy, trust, the effects of past experience and reinforcement learning, inertia, and information frictions.

### *Determinants of risktaking*

The cross-sectional variation in risktaking suggests that risk aversion varies across households. An important question in household finance is the extent to which this variation is endogenous to wealth. It is quite plausible that risk aversion declines with wealth, for example if the utility of bequests or luxury goods is less curved than the utility of basic necessities (Carroll 2002, Wachter and Yogo 2010). Calvet & Sodini (2014) use high-quality Swedish administrative data and find that risk aversion appears to decline in wealth even when one compares identical twins who have the same genetic determinants of risk aversion.

Turning to exogenous determinants of risktaking, an intriguing strand of the literature focuses precisely on these genetic determinants. By comparing the similarity in financial behavior across pairs of identical and fraternal Swedish twins, Barnea et al. (2010) find that genetic factors account for about a third of the cross-sectional variation in stock market participation and asset allocation. The family environment appears to have an effect only on younger investors. One channel by which genetic factors may influence risktaking is through genetic variance in cognitive ability. Grinblatt et al. (2011) use data from Finland, where IQ scores are available for all Finnish males in a 20-year age range because they are obtained upon induction into Finland’s mandatory military service. They show that scores on IQ tests predict stock market participation, as well as trading behavior and performance.

Numerous studies measure financial literacy and show that it correlates with risk-taking. Van Rooij et al. (2011) survey households in the Netherlands and find that low-literacy households are less likely to participate in the stock market. Christiansen et al. (2008) show, using Danish data, that economists are far more likely to participate in the stock market than other comparable investors suggesting that specific financial education may also be an important determinant. A difficulty in interpreting these studies is that financial literacy is endogenous; wealthier people, and people with greater risk tolerance and hence greater interest in risky asset markets, may choose to become financially literate.

Guiso et al. (2008) emphasize that trust in formal financial institutions and systems is a prerequisite for equity investing, and present evidence that countries and regions

with low levels of trust also tend to have low levels of stock market participation. Overall, international studies confirm that less trusting individuals are less likely to buy stocks and, conditional on buying stocks, buy less. Trust, which is difficult to measure, may be correlated with other observable attributes. For example, religious households consider themselves more trusting, and are more likely to save, and left-wing voters and politicians are less likely to invest in stocks, controlling for income, wealth, education, and other relevant factors, a finding that may be explained by greater faith in the market among right-wing voters (see Kaustia & Torstila 2011).

A growing literature studies the relation between past experiences and risktaking. One strand of this literature relates personal economic experiences to long run risk-taking in financial markets, finding that investors living through periods of low stock returns, inflation, and unemployment suffer declines in stock market participation and allocations to risky assets even decades after the experience. Malmendier & Nagel (2011) find, using data from the US, that stock returns experienced during an investor's lifetime predict participation and risktaking, and suggest that the mechanism is a tendency for households to overweight events they have experienced directly when they forecast asset returns. The international literature has also documented similar links between experiences early in life and subsequent portfolio decisions, showing that stock market downturns in particular have significant and economically substantial effects on households' willingness to take financial risks.

On the other hand, time-series variation in risktaking may also partially result from inertia. If a household rarely reviews its portfolio risk, and allows this to drift passively with market returns, the household's risky share will tend to increase with stock prices. Calvet et al. (2009) use Swedish administrative data and find evidence for partial but not complete inertia. The effect is strongest for a 50% initial risky share, and disappears at 0% or 100% initial risky shares.

Finally, information frictions may be an important part of the story. Hong et al. (2004), for example, use data from the Health and Retirement Study in the US, and find that social households, who interact with their neighbors, or attend church, are more likely to invest in the stock market. Kaustia & Knäuper (2012) show that in Finland, recent stock returns that local peers experience affect an individual's stock market entry decision, although the result is not symmetric in the sense that negative returns don't seem to affect exit from the market. They attribute this result to households not discussing negative experiences with others as often as they do positive outcomes.

#### *Underdiversification, income hedging, and local bias*

Household portfolio returns are influenced not only by the overall level of risk taken, but also by the efficiency of diversification. An underdiversified portfolio has higher risk for any average return, because it takes uncompensated idiosyncratic risk. Hence its average return per unit risk, or Sharpe ratio, is lower. Calvet et al. (2007) study non-

retirement portfolios in Sweden, a country where mutual funds play an important role, and find that the median Swedish household obtains a Sharpe ratio about 85% that of a world equity index (invested without currency hedging), but the corresponding number for a household at the fifth percentile of efficiency is only 40%. These numbers translate into average return losses on risky investments, relative to the efficient benchmark, of 87 basis points for the median household and over 7% for a household at the fifth percentile of efficiency. The return losses are only about one-third as large on complete household portfolios, because the share of risky assets is on average only about one-third.

The results of Calvet et al. are based on unusually comprehensive wealth data, but some of their findings appear consistent with data from other countries. For example, Calvet et al. calculate the fraction of the total variance of each household's risky portfolio that is due to idiosyncratic risk, and find this to be about 55% for the median Swedish household. Comparable ratios are reported within portfolios of directly held stocks studied by Grinblatt & Keloharju (2000) in Finland, Von Gaudecker (2015) in the Netherlands, and Campbell et al. (2014) in India. In India, directly held stocks constitute the principal investment in risky assets for a majority of households.

One justification for underdiversification could be to hedge the risks of labor income that households receive, or other risks such as future health risk. Since wages and stock returns generally move together at the industry level, income hedging would require households to invest in industries other than the one they work for. In fact, households typically “anti-hedge” by overinvesting in their own industry and even their own employer as shown by Benartzi (2001), Massa & Simonov (2006) and others.

Alternatively, underdiversification might be justified if households have superior information about “local” stocks in the industry they work for or the region where they live. Such information could lead households to actively overweight or underweight local stocks, and could create an unconditional average tilt towards local stocks if information reduces the risk of holding these stocks or if households face short-sales constraints. Theoretically, even a small initial local informational advantage may be magnified into significant home bias, as investors rationally choose to expand their knowledge in the domain in which their information advantage initially lies. In this vein, Massa & Simonov (2006) attribute the observed anti-hedging behavior of Swedish households to superior information they may have about the industries in which they are employed, and Bernile et al. (2015) suggest that US investors earn greater returns on stocks with greater local economic exposure. However, Doskeland & Hvide (2011), using Norwegian data, find no evidence for superior performance of anti-hedging investments.

Perceptions of familiarity rather than true informational asymmetry may also play a role here. For example, Grinblatt & Keloharju (2001) find that Finnish households are more likely to hold and trade stocks of firms located nearby, firms where the CEO is from a similar cultural background to themselves, and firms that communicate in their native tongues. They also find that these effects are more pronounced for not-for-profit,

government, and household investors than for profit-making corporations.

Both the degree of underdiversification and the reasons for it may vary with the household's level of financial sophistication. Von Gaudecker (2015) finds that Dutch households with lower financial literacy are less well diversified unless they seek advice from professional advisers or personal contacts. Guiso & Viviano (2015) also relate diversification to financial literacy using administrative data from Italy. Korniotis & Kumar (2013), using data from 11 European countries and the US, show that households with demographic characteristics suggestive of sophistication tend to outperform if they hold concentrated portfolios, but the opposite is true for households that are likely to be unsophisticated.

Finally, there is some evidence for life-cycle effects on portfolio construction. For example, Betermier et al. (2015) examine the value tilt of Swedish investors, finding a tendency for this tilt to increase over the life cycle. The life-cycle effect on value investing could be consistent with models in which growth stocks hedge intertemporal fluctuations in expected stock returns or technological progress that erodes the value of human capital, thereby appealing to younger investors with longer horizons and greater human capital; however, it could also be consistent with a behavioral bias of young investors towards future-oriented growth stocks, or with households learning about the value premium as they spend more time participating in the stock market.

#### *Trading behavior*

Households can squander some of the benefits of stock market participation if their short-term decision making is sub-optimal. This behavior was originally highlighted in the work of Barber & Odean (2000) on the high turnover of US households' portfolios unaccompanied by increases in expected returns, suggesting that households incur unnecessarily high transactions costs. Moreover, as Grinblatt & Keloharju (2001) show, households tend to exhibit a strong disposition effect, i.e., the tendency to hold one's losing investments while selling winners, a losing strategy in a market with positive momentum, and a sub-optimal one in countries in which losses can shield capital gains from taxes.

The literature has highlighted similar causes for biases in short-term decision making as it has for longer-term risktaking behavior. For example, Cronqvist & Siegel (2014), using twins data from Sweden, show that genetic factors have strong explanatory power for behavioral biases in equity markets, including underdiversification and the disposition effect. Intriguingly, Chen et al. (2006) show that capuchin monkeys appear to exhibit loss aversion, suggesting that such behavior has deep evolutionary roots. IQ also appears to affect short-term equity trading behavior. Grinblatt et al. (2012) find that, in Finland, high-IQ investors are less subject to the disposition effect, more aggressive about tax-loss trading, and more likely to supply liquidity when stocks experience a one-month high. High-IQ investors also exhibit superior market timing,

stock-picking skill, and trade execution.

Learning and feedback also seem to play a role in short-term financial decision-making. Several papers, including Korniotis & Kumar (2011) and Campbell et al. (2014), show that style tilts, trading intensity, and the disposition effect are related to time in the market, feedback from investment performance, and investors' demographic characteristics suggesting the role of experience and sophistication. Feng & Seasholes (2005), tracking the behavior of Chinese investors through time, show that sophistication and trading experience eliminate the reluctance to realize losses, but only moderately reduce the propensity to realize gains.

The international household finance literature has studied the effects of trading performance on trading intensity using datasets from different countries, converging on the view that good performance predicts trading intensity. This suggests a model in which investors learn from their performance about their trading skill, and they cease trading if they conclude that they lack skill (see, for example, Linnainmaa 2011, who uses data from Finland). However, others propose that the effects of performance on trading may stem from more naive reinforcement learning. For example, Anagol et al. (2015) use lotteries in oversubscribed IPOs in India to show that lottery-winning investors, who receive exogenous gains (from which no inferences about investor skill can be made) on account of being randomly allotted IPO shares, are more inclined to apply for future IPOs, increase the fraction of their portfolios held in the same sector as the IPO stock, increase the overall number of stocks that they hold, and churn their portfolios far more frequently. Anagol et al. detect these effects on investment behavior even among investors with substantial portfolio holdings, for whom the exogenous gains are small enough fractions of the portfolio to rule out explanations based on wealth effects or portfolio rebalancing.

#### *Delegated investing, fees, and complexity*

Households can control suboptimal investment behaviors in several ways. One possibility is for households to hold mutual funds as a way to gain equity exposure without trading stocks directly. Another possibility is for households to seek professional advice on their investment decisions (Von Gaudecker 2015). In both of these cases, however, there may be important trade-offs between households' tendencies to engage in these behaviors, the level of fees charged by advisers and mutual funds, the incentives of advisers to offer objective advice, and the possibility that mutual fund managers or advisers may themselves be susceptible to these behaviors.

Fees are perhaps the most obvious example of costs imposed on households through delegation to mutual funds. Khorana et al. (2009) show that mutual fund fees vary considerably around the world, and that the quality of a country's governance environment is negatively correlated with the level of fees charged to customers. Anagol & Kim (2012) estimate, using a natural experiment in India in which regulatory actions

differentiated the fees that could be charged by closed- and open-ended mutual funds, that investors lost and fund firms gained approximately \$350 million US as a result of the shrouded fees that could be charged by closed-end funds. On the demand side, Grinblatt et al. (2015) show that high-IQ investors in Finland avoid mutual funds with high fees.

Visible fees are not the only way in which institutional asset managers are able to extract rents from retail investors. Structured products are a common household investment vehicle in Europe. Célérier & Vallée (2014) conduct a textual analysis of the term sheets of 55,000 retail structured products issued in 17 European countries during the 2000s. They find that the complexity of these products increased significantly over the decade, that relatively more complex products have higher markups, and that the headline rate offered by a product is an increasing function of its complexity. These results cast serious doubt on the suitability of such investments for unsophisticated investors.

Financial advice is another area in which households face significant challenges. Forster et al. (2014), using comprehensive data from Canada, show that financial advisers offer “one-size-fits-all” advice that appears better explained by adviser attributes than household characteristics. This advice appears to cost roughly 2.7% per year, significantly more than the cost of a life-cycle fund. While financial advisers may help their clients by giving them the courage to invest in risky assets, as suggested by Gennaioli et al. (2015), these results raise the question of whether a lower-cost solution can be made available.

## 5 Unsecured credit

The main forms of unsecured credit in most countries are credit cards, overdrafts, and high-cost short-term credit commonly known as payday loans. The literature has analyzed the nature of borrowers and their repayment behavior, the structure of markets and products, the pricing of credit in these markets, and the behavior of households following bankruptcy.

### *Credit cards and overdraft accounts*

Credit cards and overdraft accounts are convenient and ubiquitous, but often criticized for confusing marketing and misleading back-end fees.

In the UK, “teaser rates” on credit cards are omnipresent. These often take the form of “zero interest rate deals,” provided to households as an incentive to switch credit card providers, for a limited period during which APRs on cards are eliminated. Once the initial teaser period elapses, households can hit a “payment wall” which can result in significant financial vulnerabilities, as banks re-adjust rates to more normal APRs. May et al. (2004) use survey data from the UK and find significant exposure

of households to such deals, and estimate significant costs to households who do not switch following the teaser period. Recently in the UK, the Royal Bank of Scotland unilaterally announced that it is eliminating such deals from its set of consumer offers, claiming that their internal research found evidence that the fees paid by consumers on these deals were close to extortionate.

Gabaix & Laibson (2006) provide a useful theoretical framework which has often been used to study the consumer credit market. They suggest that a “shrouded equilibrium” is one in which sophisticated consumers benefit at the expense of unsophisticated consumers in an environment in which producers offer complex multi-attribute products. The sophisticated “unbundle” the products, eschewing the expensive options, and the price that they eventually pay is lower since unsophisticated consumers cross-subsidize them by consuming these unnecessary frills. Producers do not have an incentive to deviate by offering simpler products, since such offers simply educate more consumers, causing these new sophisticates to move to the complex product.

In the US, the CARD Act of 2009 regulated the practices of personal credit card issuers in a way that appears to have been successful at reducing their ability to earn unusually high fees. Agarwal et al. (2015) use small-business credit cards as a control group (since they were not regulated by the CARD Act) and find that explicit fees did not go up even though the collection of back-end fees was regulated. This suggests that credit card issuers have some market power and took a hit to their profits following the regulation - which does not match the implications of a simple competitive version of the shrouded equilibrium model, although it is consistent with a more complex imperfect-competition framework.

An active area of research has explored the determinants of households’ repayment behavior. In the US, Gross & Souleles (2002) pioneered the use of large loan-level datasets to study credit card payment flows. They estimate duration models of default on credit card balances, and use variation in default costs (which can be both pecuniary costs such as legal fees, as well as nonpecuniary costs such as social stigma) to explain changes in borrowers’ willingness to default.

Features of the market can also influence repayment behavior. Campbell et al. (2012) use data from a payment solutions company and exploit variation across US counties to study bank account closures resulting from excessive overdraft activity. They find that involuntary closures relate to the competitiveness of the banking sector, with more closures in counties with more competitive banking markets and more multi-market banks. As with many other studies in household finance, they also find that high involuntary closures are associated with low levels of education and wealth.

In this area of household finance as in others, reinforcement learning appears to be an important theme. Agarwal et al. (2013a) find that households learn how best to reduce fees on their credit card bills, and estimate that this knowledge depreciates by roughly 10% per month, i.e., they find evidence that households learn and subsequently

forget. Similar patterns hold for borrowers who use overdraft accounts. Bakker et al. (2014) use supervisory transaction-level data from the US to study the life cycle of overdraft usage. They conclude that borrowers become inattentive after the first year, ignoring increases of fees.

Finally, the form of the institution providing consumer credit may be important. Cheaper credit normally requires an ongoing relationship with a financial institution. Mistrust may be one force that inhibits the formation of such a relationship. Mutual and nonprofit institutions, such as mutual insurance companies, credit unions, and traditional UK building societies, may help to address this problem (Bubb & Kaufman 2013), with the caveat that mutuals can easily be captured by their management since depositors do not provide effective oversight. Wheelock & Wilson (2011), using US data, document a rapid increase in the share of credit unions as a share of US depository institution assets, and present evidence that they exhibit increasing returns to scale—suggesting that this may be an important growth sector in the future.

#### *Payday loans, pawn loans, and payroll loans*

Payday loans—extremely short-term credit products often bearing high annual percentage rates (APRs)—can be an attractive alternative means of borrowing, particularly for households who lack access to credit cards and overdrafts. However, this particular form of credit has been controversial. Critics claim that these loans are potentially exploitative because borrowers may repeatedly renew their loans and enter a debt trap, whereas defenders point out that consumers without a savings buffer-stock can use these markets to avoid worse outcomes such as eviction for non-payment of rent, or loss of work when a car breaks down (Agarwal et al. 2009b, Stegman 2007, Campbell et al. 2011). The literature on payday loans and other small-ticket short-duration credit also has links with the microcredit literature in developing countries (for a survey, see Banerjee et al. 2015).

International research has been particularly fertile in this area. For example, Berry & Duncan (2007) use data from the Canadian Survey of Financial Security to show that having access to payday loans allows people to meet financial emergencies more easily, while at the same time payday borrowers are more likely to become insolvent. Some papers, e.g. Carrell & Zinman (2014), exploit variation in payday loan regulations across US states to identify the effects of access to payday loans on financial outcomes. They draw upon exogenous variation in the assignment of military personnel to domestic bases, as well as the fact that US states have effective regulatory authority over such loans, while federally regulated institutions are discouraged from issuing payday loans. They find that access to payday loans leads to a significant decline in job performance and a higher likelihood of financial distress.

More recently, the literature has tried to understand the exact mechanism through which payday loan indebtedness generates problems for borrowers. Skiba & Tobacman

(2011) explore whether households who borrow simply view payday loans as a solution to their immediate cashflow difficulties without adequately accounting for the additional interest burden they impose, and find evidence to support this conjecture using administrative loan-level data. They exploit a regression discontinuity design using the applicants' credit scores, to show that payday loans causally and substantially increase overall personal bankruptcy rates. This echoes the finding of Campbell et al. (2012), who find that access to payday lending is associated with involuntary bank account closure.

Significant regulation has been imposed on payday lending around the world. In the UK, the Financial Conduct Authority has recently exercised its mandate to impose a payday lending rate cap, explicitly citing rollover lending, punishing repayment schedules, and default fees as factors resulting in debt traps for low income households. Such caps also exist in Canada. In the US, fifteen states have banned payday lending altogether.

Zinman (2010) suggests that imposing such restrictions on borrowing may not be effective at averting the negative consequences of payday loans. He uses cross-state variation in the US, and shows that borrowing restrictions have *negative* consequences on the overall household financial situation. Households appear to simply substitute one product with another, often opting for even worse terms than those initially offered by payday lenders.

Evidence from developing countries also serves to challenge the negative view on payday loans. Karlan & Zinman (2010) use a randomized control trial in South Africa and question the popular presumption that vulnerable consumers over-borrow in the expensive consumer credit markets. They document significant net benefits for households, which can mostly be attributed to a relaxation of binding borrowing constraints. In emerging markets, payroll loans are a widespread form of employer-provided payday loans. In Brazil, they are essentially personal loans with principal and interest payments directly deducted from the borrower's payroll check. Costa & de Mello (2008) exploit the fact that a high-level federal Brazilian court upheld a regional ruling that had declared employer-based payment deduction illegal. Using personal loans without payment deduction as a control group, they find that payroll loans help to decrease overall borrowing costs.

The contrast in these results for developed and developing countries shows the potential of the international comparative approach. It suggests the hypothesis that in the early stages of economic development, when access to tailored financial products is limited, documentation scarce, and monitoring costly, short-term high-cost credit may temporarily ease the financial burden on households and help them to avoid unemployment and long-term health problems. On the other hand, in developed countries, less financially sophisticated and uneducated people self-select into more expensive forms of credit, which can easily push them into financial and economic distress. More research

is needed to test this hypothesis more carefully and to evaluate the effects of payday lending regulation.

The literature finds a clear connection between the life stage (young, single parent), financial position (low-income), employment situation (fragile) and the propensity to take short-term consumer credit (Autio et al. 2009). Interestingly, this also holds for retail sales debt. Vissing-Jorgensen (2011) uses transaction-level data from Mexico to show that different product categories are associated with different likelihood of default. She attributes these effects to variation in the type of individuals who buy certain products, suggesting that the purchase of luxury goods on credit is a sign of conspicuous consumption or lack of self-control. Using data from Sweden, Bos et al. (2012) find that pawn shop borrowers are more often female, experience instability in both their job and marital status, more likely to be divorced or separated, less likely to own a home, more likely to have bad credit scores, and often have exhausted their outstanding lines of credit. Lusardi & DeBassa-Scheresberg (2013) survey US households to understand the prevalence of a number of forms of unsecured credit, including payday loans, pawn shops, auto title loans, refund anticipation loans, and rent-to-own shops. They find that roughly one in four Americans had used these types of credit in the previous five years, and that most borrowers were young adults with low levels of financial literacy.

### *Personal bankruptcy*

Households' mistakes and poor management of unanticipated expenditures can lead to declarations of personal bankruptcy—itsself an important area of investigation. The literature has concentrated on understanding the principal determinants of personal bankruptcy, as well as the optimal design of bankruptcy regulation, an important institution in household finance.

Health shocks appear to be an important determinant of bankruptcy. Gross & Notowidigdo (2011) use cross-state variation in Medicaid expansions to show that an increase in Medicaid eligibility reduces the personal bankruptcy rate. Out-of-pocket medical expenses are shown to cause about a quarter of personal bankruptcies among low-income households. Duygan-Bump & Grant (2009) find, using cross-country data from Europe, that bankruptcy declaration is typically associated with an unexpected (often health) shock.

Several studies have undertaken simple cross-country or cross-state analysis to understand the features of the regulatory environment that are associated with high bankruptcy rates. Unsurprisingly to an economist, these studies find that formal bankruptcy is more prevalent when this procedure is cheap and easy, and when the alternative of informal default is costly and difficult. (See for example Duygan-Bump & Grant (2009) who use European data and Lefgren & McIntyre (2009) who use US data.) There is also research on how debtor protections, both in bankruptcy and in mortgage foreclosure, affect the willingness of lenders to extend credit. Gropp et al.

(1997) and Pence (2006) find that state-level debtor protections reduce the availability of auto loans and the size of mortgages, respectively.

More structural models have also been used to understand the effects of debtor protections. For example, Mitman (2015) calibrates a model to fit cross-state variation in mortgage recourse provisions as well as bankruptcy laws, and to understand the effect of US bankruptcy reform in 2005. Consistent with the empirical literature discussed above, Mitman finds that reduced access to bankruptcy after 2005 reduced bankruptcy rates; but he also finds that it inadvertently increased foreclosure rates. Dobbie & Goldsmith-Pinkham (2015) present related empirical work, focusing on consumer deleveraging in the aftermath of the Great Recession.

Finally, some recent work has looked at the welfare effects of bankruptcy for households, using approaches for causal identification. For example, Dobbie & Song (2015) use administrative tax data and exploit the random assignment of bankruptcy filings to judges to study post-bankruptcy outcomes. They find that after declarations of personal bankruptcy, annual earnings are relatively higher, mortality decreases, and subsequent foreclosure rates are lower.

## 6 Mortgages

Mortgages epitomize the promise and the challenge of international comparative household finance. Mortgages are of first-order importance in every country, as shown in Tables 1 and 2. This is the natural result of three facts: housing is the most important asset of the household sector; the indivisibility of houses and high costs of moving make it desirable to finance home ownership through debt; and houses provide good-quality collateral for secured borrowing.

At the same time, the details of the mortgage system vary widely across countries, as reviewed in Campbell (2013) and illustrated in Table 3. The table shows that the US and Germany rely primarily on fixed-rate mortgages (FRMs), while Australia, Ireland, the UK, and southern European countries have almost exclusively adjustable-rate mortgages (ARMs). Some other countries, such as Belgium, the Netherlands, Denmark, and Sweden, show considerable variation in the ARM share over time. FRMs in Germany cannot be refinanced without compensating the lender for any change in interest rates since mortgage issuance, while the US system allows refinancing provided the borrower has sufficiently positive home equity and good credit standing, and the Danish system provides an absolute right to non-cash-out refinancing (Andersen et al. 2015). Some US states have non-recourse mortgages, effectively giving homeowners a put option on their houses with strike price equal to the mortgage principal; and even in other states with recourse mortgages, personal bankruptcy allows consumers to escape residual mortgage debt relatively easily. This is not the case in most European countries which have strong recourse provisions. Finally, mortgages are funded pri-

marily through government-supported securitization in the US, through covered bonds in many European countries including those where FRMs are available, and through depository financial institutions elsewhere.

*Mortgage choice: ARMs vs. FRMs*

From an individual household's point of view, the choice of an ARM versus a FRM trades off risks and costs. An ARM, like a floating-rate note, is an instrument with stable capital value but volatile interest payments. Monthly payments on an ARM increase with the nominal interest rate. To the extent that the nominal interest rate moves with inflation, the increased payments merely compensate for inflationary erosion of real principal value and can be offset by further borrowing—provided that the homeowner has unused borrowing capacity. If the homeowner is borrowing-constrained, however, or if the nominal interest rate increase is also an increase in the real interest rate, then increased monthly ARM payments have a negative effect on the borrower's budget. A FRM, by contrast, has volatile capital value and stable nominal interest payments. The risk to the borrower is that inflation declines, increasing the real burden of the fixed nominal payments. The option to refinance a FRM is intended to limit this risk, but within the US system refinancing depends on the borrower's home equity and credit score, and on the functioning of mortgage-backed security markets (Campbell & Cocco 2003, 2015).

The relative costs of ARMs and FRMs vary over time with market conditions. There is a debate in the literature about how to measure these costs. Koijen et al. (2009) argue that homeowners estimate the average ARM rate over the likely tenure of a mortgage, using a backward-looking rule of thumb to do so, and compare the result with the prevailing FRM rate. Their model describes recent time-variation in the US ARM share quite well. However Campbell & Cocco (2003) argue that borrowing-constrained homeowners compare the current ARM rate to the FRM rate because they value budget relief today, and because they may be allowed to take out a bigger ARM than FRM if banks impose a limit on the current ratio of mortgage interest to income. Badarinza et al. (2015) use international panel data on mortgage rates and ARM shares, and find evidence that homeowners look no further forward than one year when deciding upon an ARM versus a FRM. These authors also present evidence for inertia in the ARM share, which may reflect gradual adjustment of banks' marketing strategies or households learning gradually from each others' choices.

The variation in the ARM share across countries seems to be influenced by several deeper factors including a country's historical inflation volatility (Campbell 2013), regulatory system (notably in the US where government housing policy implicitly subsidizes FRMs), and mortgage funding arrangements. Foà et al. (2015) study variation in the ARM share across Italian banks, showing that banks with greater floating-rate funding have greater ARM shares even after controlling for the rates they quote. Foà et

al. interpret this as showing that banks can manipulate the choices of their customers through advertising or by steering their clients into mortgages they prefer to originate.

As with other areas of household finance, reinforcement learning and experience effects may play a role in mortgage choice as well. Botsch & Malmendier (2014) show that variation across cohorts in experienced inflation levels across their lifetimes appears to help to explain their choices of ARMs versus FRMs, with lower experienced inflation rates associated with a greater choice of ARMs.

Mortgage choice is important in part because of its macroeconomic consequences. Reductions in interest rates to combat a recession are likely to be more effective in an ARM system where lower rates feed through immediately into mortgage payments without requiring refinancing. Di Maggio et al. (2015) and Keys et al. (2014) use geographical variation in the ARM share across the US (which results largely from differences in housing costs interacting with the upper limit on the size of FRMs eligible for implicit subsidy through GSE securitization) to argue that regions with high ARM shares recovered more quickly from the Great Recession.

### *Mortgage refinancing*

Another longstanding theme of the household finance literature is that households often fail to refinance their mortgages even when it is advantageous for them to do so. Such households have been given the derogatory name of “woodheads” in mortgage industry slang. The optimal refinancing decision is hard to calculate because the combination of fixed refinancing costs and random variation in interest rates makes refinancing a real option problem. In fact, an empirically realistic solution has only recently been offered in the academic literature by Agarwal et al. (2013b). However some households seem to pay rates that are far above any reasonable refinancing threshold (Campbell 2006).<sup>9</sup>

In the US context, it is challenging to measure the incidence of refinancing mistakes because borrower characteristics are only measured at mortgage origination, so researchers cannot easily tell whether non-refinancing borrowers have poor credit standing or negative home equity that constrain them from refinancing. Andersen et al. (2015) circumvent this problem by exploiting the different rules of the Danish mortgage system, which grants an absolute right to refinance to lower the interest rate. Using high-quality Danish data on household characteristics, they find that refinancing mistakes are made more often by households with lower income and education and by older households. Financial and housing wealth have opposite effects, with refinancing more likely for households with high housing wealth relative to financial wealth, that is, households for whom the mortgage is a particularly important balance sheet item.

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<sup>9</sup>Sluggish refinancing is not confined to FRM-based systems. It also occurs in the UK, where ARMs have been offered with teaser rates and no refinancing penalties (Miles 2004).

Andersen et al. model the failure to refinance as a failure to pay attention to incentives. An alternative perspective is offered by Johnson et al. (2015) who argue that mistrust of banks is an important deterrent to refinancing.

Sluggish refinancing provides profits to mortgage originators that, in a competitive mortgage market, are passed on to mortgage borrowers in the form of lower interest rates. This implies that sophisticated borrowers, who know how to refinance optimally, are subsidized by unsophisticated borrowers, another instance of a “shrouded equilibrium”. It also inhibits the introduction of easier-to-use products such as automatically refinancing mortgages, because the sophisticated households who might naturally be early adopters of such products will lose the subsidy if they switch away from conventional mortgages.

Do banks take advantage of or even manipulate these behavioral patterns? Mounting international evidence seems to point in this direction. Gurun et al. (2013) document a positive relationship between local advertising and mortgage pricing in the US. They show that advertising is associated with higher costs only for lenders who rely heavily on minorities and low-education areas. Almenberg & Karapetyan (2013) use data from the Swedish association of real estate agents and show significant consumer confusion and loan take-up mistakes in co-op loans, whose terms are less salient, in the sense that they are less visible and easier for the consumer to ignore. Worryingly, Van Ooijen & van Rooij (2014) also find that Dutch households with a limited understanding of loan contracts, who may need the advice the most, do not more often seek professional financial advice than more sophisticated homeowners. Allen et al. (2014) use data from Canadian bank mergers to show that such consolidation weakens consumer bargaining power in mortgage markets.

### *Mortgage default*

The literature has also explored the determinants of mortgage default rates. In the US, authors have emphasized the role of supply (the expansion of credit to subprime borrowers) and demand (unreasonable house price expectations) factors as driving the increases in delinquencies seen during the recent mortgage crisis (Mian & Sufi 2009 and Adelino et al. 2015).

There has been increasing attention to the effects of regulation on mortgage default. Several authors in the US have highlighted the role of subsidies to low income borrowers through the Community Reinvestment Act (see, for example, Dahl et al. 2000, Kroszner 2008, and Agarwal et al. 2012). Using regulatory treatment discontinuities in India, Campbell et al. (2015) also find evidence that subsidies matter for mortgage default, and that when regulators force lenders to recognize delinquencies early in the life cycle of a loan, this has significant impacts on longer-run default rates. Corbae & Quintin (2015) highlight the role of regulation in changing possible contract types, and the attendant effects on default and foreclosure. Their model shows that relaxations in

payment to income requirements are well able to explain increases in US default rates during the crisis.

Others have studied the effects of lender market structure on foreclosure. For example, Favara & Giannetti (2015) conjecture that lenders with a large share of outstanding mortgages on their balance sheets internalize the negative spillovers associated with the liquidation of defaulting mortgages and are thus less inclined to foreclose. They find evidence using zip-code level data in the US that those areas with a higher fraction of outstanding mortgages experience fewer foreclosures, and more renegotiations of delinquent mortgages.

## 7 Conclusion

Research in household finance has shown conclusively that some households make better financial decisions than others, and that poor decisions can have first-order consequences for households' lifetime welfare. The international comparative household finance literature confirms these findings using high-quality administrative data and strong identification that exploits unique features of international financial systems and their changes over time.

Household financial systems are remarkably variable across countries. This paper has explored some possible determinants and consequences of these international differences. As the literature moves forward, there will be an active debate about the relative merits of different systems, and the possibility of transferring successful design features across national boundaries. Household finance economists both in academia and in consumer financial regulators—such as the Financial Conduct Authority in the UK and the Consumer Financial Protection Bureau in the US—will be leading contributors to this discussion.

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Table 1: International comparison of participation rates

We report the fractions of households which hold respective categories of assets and liabilities. We include accounts with positive balances, as well as ones which households report as active, but which hold amounts equal to zero during the time of the interview. Panel A refers to financial and non-financial assets and Panel B to mortgage- and non-mortgage debt. We calculate net wealth levels as the difference between total assets and total liabilities. Retirement assets include all types of defined contribution plans (public, occupational, or private) which have an account balance. The symbol "n.a." denotes asset or debt categories for which holdings are not separately classified, or for which data has not been collected.

**Panel A**

The assets side of the household balance sheet

	Australia	Canada	Germany	Greece	Spain	France	Italy	Netherl.	Slovenia	Slovakia	Finland	UK	USA
Financial assets	99.5%	96.7%	99.3%	74.5%	98.3%	99.6%	92.0%	97.8%	93.9%	91.7%	100.0%	99.0%	94.0%
Deposits and transaction accounts	97.4%	93.6%	99.0%	73.4%	98.1%	99.6%	91.8%	94.2%	93.6%	91.2%	100.0%	97.4%	92.6%
Mutual funds	3.3%	11.6%	16.9%	1.2%	5.6%	10.7%	6.3%	17.7%	12.0%	2.7%	27.4%	5.4%	8.7%
Bonds	1.7%	7.4%	5.2%	0.5%	1.4%	1.7%	14.6%	6.0%	0.7%	1.0%	0.8%	28.2%	13.2%
Directly held stocks	34.5%	10.0%	10.6%	2.7%	10.4%	14.7%	4.6%	10.4%	10.0%	0.8%	22.2%	17.5%	15.1%
- hh. with below-median net wealth	17.9%	3.4%	3.5%	0.6%	3.0%	5.5%	1.2%	5.0%	4.4%	0.3%	10.0%	6.1%	4.2%
- hh. with above-median net wealth	51.2%	16.6%	17.7%	4.8%	17.8%	23.9%	8.0%	15.8%	15.6%	1.2%	34.4%	28.8%	26.0%
Retirement assets and life insurance	82.6%	70.5%	46.5%	3.8%	23.6%	37.5%	18.0%	49.8%	18.3%	15.0%	23.7%	76.1%	57.6%
Other financial assets	16.3%	20.1%	22.0%	3.9%	6.8%	10.2%	4.2%	10.7%	6.5%	10.2%	n.a.	31.9%	13.4%
Non-financial assets	94.6%	100.0%	80.2%	92.2%	95.3%	100.0%	97.7%	89.8%	96.2%	96.0%	84.3%	100.0%	91.3%
Main residence	67.4%	62.5%	44.2%	72.4%	82.7%	55.3%	68.7%	57.1%	81.8%	89.9%	67.8%	68.0%	67.2%
Other real estate	20.5%	18.4%	17.8%	37.9%	36.2%	24.7%	24.9%	6.1%	23.2%	15.3%	29.8%	10.9%	14.4%
Vehicles, valuables and other assets	91.3%	100.0%	73.2%	73.5%	79.9%	100.0%	95.1%	82.6%	80.4%	68.5%	67.9%	100.0%	87.5%
Private businesses	12.2%	17.1%	9.4%	9.8%	15.0%	10.7%	18.4%	4.8%	11.6%	10.8%	13.8%	n.a.	12.1%
Total direct and indirect holdings of stocks	n.a.	n.a.	23.7%	4.7%	25.1%	23.0%	11.5%	19.3%	20.4%	6.8%	33.9%	n.a.	49.8%

Table 1: International comparison of participation rates (continued)

**Panel B**

The liabilities side of the household balance sheet

	Australia	Canada	Germany	Greece	Spain	France	Italy	Netherl.	Slovenia	Slovakia	Finland	UK	USA
Household liabilities	69.1%	71.1%	47.4%	36.6%	50.0%	46.9%	25.2%	65.7%	44.5%	26.8%	59.8%	63.2%	74.9%
Mortgage debt for primary residence	36.7%	33.8%	18.0%	13.9%	26.8%	16.9%	9.6%	43.9%	12.5%	9.3%	32.8%	36.2%	47.0%
Other debt secured with real estate	10.0%	6.4%	6.0%	3.9%	7.3%	10.1%	1.6%	2.5%	1.6%	0.6%	n.a.	4.8%	5.4%
Overdrafts and credit lines	n.a.	39.9%	19.8%	5.7%	0.6%	7.0%	3.6%	20.8%	24.0%	8.0%	n.a.	n.a.	2.1%
Credit cards	27.9%	24.8%	3.4%	13.7%	7.3%	n.a.	1.4%	4.6%	3.0%	5.1%	n.a.	24.8%	39.4%
Vehicle-, student loans and other debt	38.8%	42.7%	21.7%	12.6%	27.2%	28.7%	15.3%	24.6%	27.1%	12.6%	51.2%	44.0%	48.5%

Table 2: International comparison of the allocation of household wealth

We express absolute holdings of assets and debt in 2010 US Dollars. We calculate the respective share of each wealth category relative to the total asset and debt holdings of the household and report averages across the population. Panel A refers to financial and non-financial assets and Panel B to mortgage- and non-mortgage debt. We calculate net wealth levels as the difference between total assets and total liabilities. Retirement assets include all types of defined contribution plans (public, occupational, or private) which have an account balance. The symbol "n.a." denotes asset or debt categories for which holdings are not separately classified, or for which data has not been collected.

**Panel A**

The assets side of the household balance sheet

	Australia	Canada	Germany	Greece	Spain	France	Italy	Netherl.	Slovenia	Slovakia	Finland	UK	USA
<b>Total household assets</b> ('000 US Dollars)	742.8	623.9	307.7	220.6	486.0	357.7	397.4	348.2	213.3	114.9	273.4	651.8	635.0
- median value	477.8	358.4	94.0	152.1	315.5	208.2	260.3	300.7	146.9	89.3	183.3	408.3	189.9
Financial assets	36.5%	37.7%	47.9%	12.5%	13.6%	30.8%	16.1%	41.7%	10.0%	12.4%	29.7%	33.9%	30.2%
Deposits and transaction accounts	9.7%	9.9%	30.0%	11.5%	10.5%	22.0%	11.9%	21.3%	7.0%	10.4%	24.2%	5.9%	11.6%
Mutual funds	0.4%	1.3%	2.4%	0.1%	0.4%	0.7%	0.6%	1.6%	0.6%	0.2%	1.9%	0.3%	1.3%
Bonds	0.2%	0.2%	0.6%	0.1%	0.1%	0.1%	1.6%	0.6%	0.1%	0.0%	0.0%	1.1%	0.5%
Directly held stocks	2.8%	1.0%	0.9%	0.2%	0.5%	1.0%	0.2%	0.6%	0.4%	0.0%	1.9%	0.6%	1.3%
- hh. with below-median net wealth	1.8%	0.4%	0.5%	0.0%	0.3%	0.7%	0.2%	0.6%	0.7%	0.0%	1.7%	0.2%	0.3%
- hh. with above-median net wealth	3.8%	1.5%	1.2%	0.3%	0.7%	1.3%	0.3%	0.6%	0.2%	0.0%	2.1%	1.0%	2.2%
Retirement assets and life insurance	23.2%	24.1%	10.5%	0.4%	1.4%	6.1%	1.5%	16.8%	1.1%	1.2%	1.5%	25.1%	13.3%
Other financial assets	0.2%	1.2%	3.5%	0.3%	0.7%	1.0%	0.3%	0.8%	0.9%	0.6%	n.a.	0.8%	2.1%
Non-financial assets	63.5%	62.3%	52.1%	87.5%	86.4%	69.2%	83.9%	58.3%	90.0%	87.6%	70.3%	66.1%	69.8%
Main residence	42.5%	31.9%	29.9%	54.7%	61.2%	38.9%	53.2%	43.3%	67.7%	73.6%	46.5%	34.6%	40.6%
Other real estate	7.9%	5.2%	6.7%	16.0%	13.3%	9.1%	8.2%	2.2%	7.8%	3.8%	11.6%	2.8%	3.2%
Vehicles, valuables and other assets	10.5%	22.6%	13.4%	13.5%	8.6%	18.5%	19.1%	11.1%	11.6%	8.4%	11.2%	28.7%	22.5%
Private businesses	2.5%	2.6%	2.0%	3.1%	3.2%	2.7%	3.4%	1.7%	2.8%	1.7%	1.0%	n.a.	3.5%

Table 2: International comparison of the allocation of household wealth (continued)

**Panel B**

The liabilities side of the household balance sheet

	Australia	Canada	Germany	Greece	Spain	France	Italy	Netherl.	Slovenia	Slovakia	Finland	UK	USA
<b>Total household liabilities</b> ('000 US Dollars)	135.0	88.6	37.4	16.5	48.9	34.5	16.3	113.1	7.3	4.6	50.2	70.0	104.6
- median value (conditional on positive holdings)	92.7	58.8	17.7	20.3	54.0	25.5	20.8	124.3	5.5	4.4	40.7	55.3	75.7
Mortgage debt for primary residence	47.4%	38.1%	33.8%	34.4%	48.3%	31.5%	35.5%	60.6%	21.9%	33.0%	46.1%	51.1%	52.7%
Other debt secured with real estate	10.4%	5.4%	9.5%	9.7%	12.2%	15.7%	4.7%	2.4%	2.5%	1.5%	n.a.	4.8%	3.3%
Overdrafts and credit lines	n.a.	15.9%	21.7%	10.9%	0.5%	8.3%	6.2%	13.4%	22.3%	15.3%	n.a.	n.a.	0.7%
Credit cards	12.3%	12.4%	2.3%	19.7%	3.4%	n.a.	3.0%	1.1%	1.8%	9.9%	n.a.	9.8%	12.1%
Vehicle-, student loans and other debt	29.9%	28.2%	32.7%	25.2%	35.5%	44.5%	50.8%	22.5%	51.4%	40.3%	53.9%	34.2%	31.2%
<b>Household net wealth</b> ('000 US Dollars)	607.8	535.3	270.2	204.1	437.0	323.2	381.1	235.2	206.0	110.3	223.2	581.7	530.4
- median value	355.8	237.8	71.3	140.9	274.1	160.4	240.2	143.3	139.1	84.7	118.5	326.6	82.5

Table 3: International comparison of mortgage markets

We report the time-series average and standard deviation of the share of adjustable-rate mortgages relative to the total amount of new mortgage issuance (ARM share). The sample covers the period between the early 1990s and 2013, except for the European countries, for which the sample starts in 2003. We also indicate the degree to which prepayment penalties are a feature of respective mortgage markets. The term "Varying" is used to denote the situation in which different amounts of prepayment penalties apply to different mortgage contracts or financial institutions. The data on sources of mortgage market funding refers to the total stock of outstanding mortgages in 2013 and is obtained from the European Mortgage Federation. The total outstanding value of mortgages for the US is obtained from the Federal Reserve Board. The category "Mortgage-backed securities" comprises both agency- and non-agency securities.

	Average	Std. dev. of	Prepayment	Sources of funding		
	ARM share	ARM share	penalties	Deposits	Covered bonds	Mortgage-backed securities
Australia	88.3%	5.1%	Varying	n.a.	n.a.	n.a.
Belgium	23.2%	17.0%	Yes	62.3%	4.3%	33.4%
Denmark	44.6%	13.2%	No	n.a.	n.a.	n.a.
Finland	96.1%	2.5%	Yes	66.3%	33.7%	0.0%
Germany	15.9%	2.2%	Yes	82.2%	16.5%	1.3%
Greece	63.1%	23.3%	Varying	70.7%	23.3%	6.0%
Ireland	81.6%	9.1%	Yes	38.4%	22.0%	39.7%
Italy	70.7%	16.8%	Yes	42.5%	33.8%	23.7%
Netherlands	24.3%	7.4%	Yes	50.9%	9.7%	39.5%
Portugal	97.2%	3.0%	n.a.	43.3%	32.1%	24.6%
Spain	85.3%	7.8%	Yes	26.1%	54.6%	19.3%
Sweden	53.6%	17.7%	Yes	36.0%	64.0%	0.0%
UK	46.9%	15.3%	Yes	75.0%	8.5%	16.5%
USA	8.5%	7.1%	No	40.0%	0.0%	60.0%

Figure 1: Pension coverage at household level

We report the fraction of the population which is contributing to pension plans with a defined contribution (DC) feature and the average value of accounts, conditional on contributing. All quantities are reported in 2010 US Dollars. The types of pension holdings are not separately classified in the Canadian household survey.

