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# Economic Integration and Mature Portfolios



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## *Abstract*

This paper documents and studies sources of international differences in asset holdings (stocks, private businesses, and homes) among households well into the accumulation stage (aged 50+) in the US, England, and 11 continental European countries, using newly available and internationally comparable household-level data. With greater integration of asset and labor markets and policies, households of given characteristics should be holding more similar portfolios for their old age. We use econometric techniques to decompose observed international differences in participation rates and in asset holdings into those arising from differences: a) in characteristics of the populations compared and b) in influences of given characteristics. We make comparisons across the Atlantic, within the US, and within Europe. We uncover a rich and often surprising pattern of departures from full integration in the face of the demographic transition. Juxtaposition of econometric results with a range of available indicators suggests that there is considerable room for further harmonization of the institutional and policy framework within which older households manage their assets, within Europe and across the Atlantic.

*Keywords:* Integration, aging, household portfolios, stockholding, private business, housing.

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## 1. Introduction

Integration represents the removal of market segmentation imposed by country (or regional) barriers. In its broad sense, it applies to all markets, for goods and services, assets (financial and real), debts, and labor. As an ideal, often echoed in public discussions on the European Union and on US federalism, it aims at harmonizing the market conditions within which households operate, regardless of their specific location within the Union. This is a demanding objective, unlikely to be attained fully in practice but which can provide a useful benchmark for studying international differences.

Intertemporal optimization models provide a way to formalize its implications. An economic agent of given preferences and characteristics faces a set of processes (e.g. for labor income and asset returns), policies (e.g. for taxation or retirement financing) and constraints (e.g. credit market imperfections, informational limitations) and makes optimizing choices (e.g. for consumption and asset holdings). The resulting policy rules interact with the supply side and produce observed levels of consumption and asset holdings. These need not be the same in different countries, even under full integration, in view of differences in population characteristics. Once such differences are controlled for, however, greater integration should be reflected in greater similarity of the relationship between household characteristics and asset holdings.

Starting from this premise, the paper uses newly available data to document international differences in asset holdings among older households (with heads aged 50+) in the US and in 12 European countries, and decomposes them econometrically into differences arising from population characteristics, and from differences in market conditions, as reflected in the link between given characteristics and asset participation or

holdings among owners. For the United States, we use data from the Health and Retirement Study (HRS); for England, data from the English Longitudinal Study of Aging (ELSA); and for 11 additional European countries, we use data from the Survey of Health, Aging and Retirement in Europe (SHARE). We first use the US as a benchmark against which to compare European countries; then look within the US to compare different regions; and finally we compare countries within Europe (using Germany as the benchmark). Results are reported for a range of assets, from stockholding (direct plus indirect in the form of mutual funds and retirement accounts<sup>1</sup>), to private businesses, to homes. They are also linked to a range of existing indicators of the state of these asset markets and of related institutional features in the countries considered.

The paper makes three contributions to the literature. One is data-based: it is the first paper to document and study international differences in asset market participation and in holdings among participants for this wide range of countries. A second contribution is to focus on the relationship between household characteristics and asset market behavior as an indicator of economic integration across countries, providing a new approach that complements existing approaches in the integration literature. The third contribution is methodological. Since the focus is on similarity in the relationship between household characteristics and asset market behavior, a possibility for cross-fertilization between labor studies of discrimination and household finance presents itself: both literatures deal with differences for people with the same characteristics. This paper is the first to apply such counterfactual techniques to international comparisons of asset market participation and holdings.

Asset holdings of older households are topical not only because such households tend to hold the majority of wealth but also because they tend to be considerably influenced by policies and expectations regarding retirement and its financing.<sup>2</sup> Moreover, they can provide clues to likely future asset market developments, including prospects of an ‘asset meltdown’, as they point to assets in which older households are more heavily invested and thus more likely to want to liquidate in the future. Substantial dissimilarities in the link between characteristics and asset participation or holdings across countries would suggest that market conditions in certain countries are not as conducive to participation and/or to large holdings among asset owners as those in other countries in the group.<sup>3</sup>

The broad existing literature on economic integration has followed three main approaches, each focused on a different feature of a fully integrated group of countries. One approach is based on the idea that integration should be reflected in considerable international *flows* across markets. Depending on which market is chosen for study, emphasis is placed on cross-border flows of goods and services,<sup>4</sup> claims to financial<sup>5</sup> or real assets,<sup>6</sup> or labor with its implications for immigration policy.

A second approach focuses on *prices* instead of quantities. In a fully integrated market for goods, the law of one price should hold.<sup>7</sup> In a fully integrated asset market, the price of risk should be the same, i.e. expected returns should be the same across assets that have the same covariance with world risk.<sup>8</sup> As market segmentation diminishes, expected returns in a country should be more a function of covariance with world risk and less a function of the variance of that country’s returns.

A third approach has focused on *consumption* behavior under international risk sharing. In a fully integrated world, households would insure against output risks

idiosyncratic to their countries by holding securities in other countries subject to different shocks. Under perfect risk sharing, country-specific shocks to consumption growth would bear no correlation to country-specific output growth shocks; and consumption growth rates would have high correlations internationally even if output growth rates did not. Lewis (1999) termed the observed violation of these patterns ‘consumption home bias’, surveyed the literature, and linked it to home equity bias.

In the face of intense interest in issues of asset and debt accumulation among households and of the wealth distribution, as well as of the emergence of data sets that allow comparisons among an unprecedented number of countries, innovative ways of making large-scale comparisons are needed. We show that counterfactual analysis employed in labor discrimination literature can fruitfully be applied to international comparisons. Results point to a rich and plausible pattern of international and interregional variation in the conditions governing participation in this broad range of assets, as well as those governing the level of asset holdings among participants.

In Section 2, we describe the data for households aged 50 or above. In Section 3, we focus on asset market participation. We distinguish between the role of the configuration of characteristics and of the contributions of given characteristics to participation in the US and Europe. In Section 4, we focus on asset holders and decompose observed international differences in asset holdings at various percentiles of the distribution of such holdings into two parts: (i) those that result from differences in configuration of household characteristics; and (ii) those that arise from a different relationship between characteristics and amounts. Again, we compare Europe to the US, but also consider within-US and within-Europe integration. Section 5 offers concluding remarks.

## **2. The Data**

### **2.1 Data Features**

We use the three most comprehensive data sets on portfolios of older households currently available. The Health and Retirement Study (HRS) is a panel survey of Americans aged 50 and above, which has been conducted every two years since 1992. The English Longitudinal Study of Aging (ELSA) is also a panel survey of those 50 and above in England with two waves, in 2002 and in 2004. Finally the Survey of Health, Aging and Retirement in Europe (SHARE), modeled after the HRS and ELSA, collected its first wave in 2004 in Sweden, Denmark, Germany, the Netherlands, France, Switzerland, Austria, Italy, Spain, and Greece; and in 2005 in Belgium.

All three surveys have several modules, which allow comparison of asset holdings across countries while controlling for a wide array of household characteristics: demographic background, family structure, physical and mental health, cognitive abilities, health expenses and insurance, employment status, retirement perspectives, job history, incomes, financial transfers, housing, assets, social activities and expectations.

### **2.2 Descriptives: Participation Rates and Levels of Asset Holdings**

Table 1 reports participation rates and levels by quartiles of three main classes of assets: stockholding, private business, and principal residence. Ownership of stocks, either direct or indirect through mutual funds and retirement accounts, is greatest in Sweden, Denmark, and in the US. It is smallest in Austria, Italy, Spain, and Greece. Homeownership is highest in Spain, and lowest in Germany, Netherlands, Switzerland, and Austria. The highest rates of business ownership are observed in Sweden and

Switzerland, with the US and Denmark a short distance behind them. The lowest rates of business ownership are observed among older households of Austria and England.

The US and Switzerland exhibit the largest medians of stock holdings among owners. Heterogeneity in levels at various quartiles is much more evident across European countries than across US regions. The value of private businesses at all quartiles is lower in the US compared to European countries, where heterogeneity is particularly present at higher levels of the distribution. The Netherlands and Switzerland display the highest median housing wealth levels. Heterogeneity in terms of housing values at all quartiles is evident not only across European countries, but also within the US with values in West and North East being well above those in the South.

International variation in participation rates and in asset holdings conditional on participation is not necessarily a sign of lack of integration. Part of this variation may be due to differences in the configuration of characteristics in the population of households across countries and not to differences in the economic environment a given population faces.<sup>9</sup> Econometric analysis is needed for this decomposition, to which we now turn.

### **3. Sources of International Differences in Asset Participation**

#### **3.1 Estimation Model and Methodology**

In this section, we decompose differences in observed participation rates into those resulting from different configuration of characteristics in the population and those resulting from international differences in the effects of a given set of characteristics. We will refer to the former as ‘covariate effects’ and to the latter as ‘coefficient effects’. This



decomposition is based on a set of probit regressions, where participation in a given asset is regressed on a number of household characteristics.

We use as regressors the following variables: 2<sup>nd</sup> order age polynomial, gender, household size, education (LTHS: high school dropout; HS: high school degree; COL: College degree), work status (retired/working/unemployed-other inactive), marital status (couple/widow/never married), recall ability, self-reported bad health (includes responses ‘fair’ and ‘poor’ in HRS), subjective probability to leave a bequest, whether household provides help to relatives/neighbors, whether it is involved in voluntary activities, income quartile, wealth quartile (where wealth excludes the asset in question).<sup>10</sup>

We first run one probit for each asset in the country used as the ‘base country’ for the comparison. We then construct the counterfactual used in the decomposition, namely the average predicted probability of participation that the population in country  $i$  would exhibit if they faced the coefficients on characteristics that were estimated for the base country. Denote this counterfactual by  $\hat{p}^{i,base}$ . The difference in participation rates between the base and country  $i$  is then decomposed into:

$$pr^{base} - pr^i = \{pr^{base} - \hat{p}^{i,base}\} + \{\hat{p}^{i,base} - pr^i\} \quad (1)$$

The first difference represents covariate effects: the difference between participation by residents in the base country and the average participation probability that residents of country  $i$  would exhibit if they faced the same coefficients as the base country. The second difference represents coefficient effects: the difference between participation in country  $i$  and the participation probability that its residents would exhibit on average if they were faced with coefficients of the base country.

This yields point estimates of the two types of effects. In order to assess their statistical significance, we draw (with replacement) the full sample size from both countries and repeat this estimation and decomposition 100 times, to compute bootstrap standard errors.

The more integrated a set of countries or regions, the closer the probabilities of participation would be for households of given characteristics located in different countries/regions. Coefficient effects would speak directly to this question, but covariate effects are also interesting in that they show the extent to which estimated differences in participation probabilities are due to an unfavorable composition of the population in a particular country or region. We first use the US as the benchmark ('base' country) and compare all European countries to it. In order to set a realistic standard, we then consider the size of coefficient and covariate effects among US regions, which share a common federal government but also allow state discretion, especially on fiscal matters. Finally, we examine of integration among European countries, using Germany as the benchmark.

As our econometric findings are based on reduced form probit estimation, coefficient effects ('market conditions') are in principle a mix of demand- and supply-side factors. For example, better market conditions for stockholding participation in the US could be resulting partly from institutional factors having to do with transactions costs and the functioning of financial markets and partly from taste or cultural factors favoring risky financial instruments in the US. While precise attribution of estimated coefficient effects to specific features of the market environment in each country is beyond the scope of our paper, we find that the pattern implied by our estimates is consistent with various widely-accepted indicators of supply-side conditions. This suggests that our findings are linked

to institutional and policy features of the supply side rather than resulting purely from international differences in investor tastes or culture.

### **3.2 US-Europe Comparisons**

Figure 1 shows estimated coefficient and covariate effects on average participation probabilities for all European countries using the US as a base. Our findings imply that market conditions faced by households in most European countries are not as conducive to participation in stockholding as those of the US. According to our estimates, there are only four European countries whose older households would be discouraged from participating if they were to face US market conditions: Sweden (where the probability effect is huge, exceeding 25 percentage points), Denmark, France and England. Older households of all other countries would be more likely to participate if they faced US market conditions, and all estimates of coefficient effects are statistically significant.

Table 2 presents a number of indicators relating to the stock market. These indicators imply that the US is the country with the lowest transactions costs in the stock market, the greatest spending on information and communication technology as a percentage of GDP, and the highest stockholder protection. All three factors have been shown in existing literature on stockholding participation to contribute to greater participation rates, and our current findings reinforce this view. Regarding the special position of the four European countries, it seems likely that this is also influenced by the state of pension systems.<sup>11</sup> This is a set of European countries in our sample where defined contribution pension plans were available (in 2004) in the second pillar of pensions. While stockholding in occupational pensions is not included in our data, it is plausible that existence of DC

plans familiarized households with stocks, thus enhancing their tendency for stockholding.<sup>12</sup> This is particularly so in Sweden and Denmark, where mandatory retirement accounts exist.<sup>13</sup> The extremely high internet penetration in Sweden must have further contributed to the results. The UK is hardly surprising, as it ranks highly in various supply-side indicators and has also experienced advertising campaigns in favor of direct stockholding as early as the 1980s.

In addition to facing less conducive market conditions, older households in Europe are estimated to have observable characteristics that are less conducive to participation in the stock market than their US counterparts. This is true even in Sweden, where market conditions dominate and result in higher stockholding participation than in the US. We estimate statistically significant effects of household characteristics for all countries except Italy. Although in most cases coefficient effects dominate covariate effects in estimated size, population characteristics are estimated to be more important than market conditions in Spain, France and in England; in the latter two cases, they point in the opposite direction and are responsible for the observed more limited stockholding in these two countries compared to the US.

Let us now turn to ownership of a share in a private business (Figure 2). According to our estimates, market conditions are largely responsible for lower participation in private business in Europe than in the US.<sup>14</sup> There is only one European country in the group where, according to our findings, market conditions are more conducive to such participation than in the US, namely Sweden. Our estimates of covariate effects imply that most European older populations have characteristics equally conducive to business ownership as those of the US population.<sup>15</sup>

A number of indicators suggest that estimated coefficient effects reflect supply-side conditions rather than simply a stronger taste of US households for business ownership. Particularly telling is the ‘Ease of Doing Business’ indicator constructed by the World Bank, reported in Table 3. According to the overall index, the US is where it is easiest to do business among the countries we examine. The index takes a rather simple approach to aggregating rankings across different criteria, taking a straight average of them. However, we can see that Sweden ranks above the US in various aspects of doing business, namely dealing with licenses, registering property, trading across borders, and enforcing contracts. It seems plausible that such issues have considerable weight in the decision of older Swedish households to participate in private business, contributing to the special role of Sweden in our findings.

For homeownership, coefficient effects are positive in most cases suggesting favorable US market conditions (Figure 3). Exceptions are southern countries, EN (and to a small extent BE) where households would have lower probabilities if faced with US market conditions. We discuss indicators of market conditions below, when we look at size of holdings. All covariate effects are positive, suggesting that characteristics of US homeowners are more conducive to homeownership than those of European homeowners.

### **3.3 Integration within the US**

Estimated coefficient effects across the Atlantic look sizeable, but it is useful to put them into perspective by comparing them to some benchmark case of ‘full’ integration. Clearly, zero coefficient effects represent an extreme theoretical benchmark unlikely to be met in practice. In this section, we carry out the same type of analysis as above, but

now across four US regions, using the Midwest as the base. While the US enjoys mobility of labor and capital across geographical regions, a common monetary policy and stock market, and common federal institutions, it also exhibits variation across its States, e.g. with respect to State finances and fiscal matters. It is thus interesting to see if our method is sensitive enough to pick up significant differences in market conditions arising from such considerations, and how large these effects are compared to those currently found across the Atlantic.

The top panel of Table 4 shows regional effects on average participation probabilities within the US. The first column ('Diff.')

reports differences in the actual proportion of owners between the reference region (Midwest) and the region shown. Households in the Midwest have somewhat higher actual participation rates in all three assets examined. Differences are largest with the South for stockholding, and with the Northeast for homeownership and for business ownership.

The second column ('Coeff.')

reports by how much participation probabilities would change on average if the residents of the US region shown faced the market conditions of the reference US region. In virtually all cases, these estimates are statistically significant and positive, suggesting that market conditions in the Midwest are more conducive to participation in any of these asset classes.<sup>16</sup> Though statistically significant, estimated differences are quite small, with only two exceptions (of about eight percentage points).<sup>17</sup>

The third column ('Covar.')

reports covariate effects, i.e. the difference between the actual rate of participation for residents of the reference region (Midwest) and the counterfactual average estimated probability of participation that residents of the region shown would exhibit if they also faced the market conditions of the Midwest. These are

often statistically significant, positive, but all quite small. Thus, the configuration of (older) household characteristics in the Midwest is estimated to be only slightly more conducive to ownership of the three assets considered than in the remaining three regions. All in all, the estimated pattern of coefficient (and covariate) effects suggests much greater integration within US regions than across the Atlantic, strengthening our confidence in the approach.

### **3.4 Integration within Europe**

Finally, in this section we consider the extent of similarity in market conditions facing European households, as these are reflected in the link between asset market participation and household characteristics. The bottom panel of Table 4 reports differences in actual rates of asset market participation, and their breakdown into coefficient and covariate effects, for Europe using Germany as the base country. Our estimates suggest that differences in participation rates across Europe arise mainly from differences in market conditions rather than in the particular mix of household characteristics across European countries. We find that, with very few exceptions, coefficient effects are statistically significant (second column); and they are often quite large, especially for stockholding and homeownership, though they tend to be much smaller for business ownership. Covariate effects are significant more often than not, but they are usually quite small.

As reflected in coefficient effects, market conditions in Germany are estimated to be impressively less conducive to stockholding compared to a number of other countries. The largest coefficient effects are estimated for Sweden: if Swedes were to face German

market conditions, their average participation rate in stockholding would drop by more than 45 percentage points. The Danes and the French would also exhibit substantial drops in participation, between 21 and 28 percentage points. Still, German conditions are more conducive to stockholding than those in Austria, Spain, Italy, and Greece. Covariate effects are generally small for stockholding, except perhaps that Spanish and Italian households are estimated to exhibit 6 to 8 percentage points lower average participation probabilities compared to the German population, if all were to be faced with the same conditions.

Germany has notoriously low homeownership rates. Our estimates show that this has nothing to do with the mix of observed characteristics of German households, which is either similar or more conducive to homeownership (sometimes substantially so – witness Southern countries and England) than the other European countries considered. The real source of the difference is housing market conditions, and the economic significance of this difference is very large indeed. Homeownership rates in the South and England would drop by between 33 and 50 percentage points if their populations were confronted with German conditions. But even in Belgium and France, drops would be of the order of 30 percentage points.

Starting from these findings, it would be worthwhile to find methods to investigate which part of these differences has to do with differential transactions costs, credit market conditions, and policies towards housing across Europe. Undoubtedly, there are also cultural differences with respect to housing: the importance attributed to homeownership, or to providing housing gifts to children when they marry. This task would not be easy, as there is likely close interaction between the two: policies need to be acceptable given



cultural predispositions of the electorate; and long-standing policies or features of the housing and employment markets may promote a particular ‘culture’ with respect to housing (e.g. a tendency to accumulate housing and give housing gifts to children).

Our findings suggest greater similarity across Europe with respect to market conditions for private business ownership. Coefficient effects are insignificant in Belgium, Greece, and England; and relatively small when significant. Except for Austrians, all other populations with significant effects would experience drops in average estimated probabilities of participation if they were exposed to German conditions. Covariate effects are small or insignificant. Our estimates imply that the characteristics of Spanish, Italian, French, and English populations are somewhat less conducive to business ownership, but no differences are visible for other countries.

All in all, we find that although US regions do not provide complete uniformity in market conditions favoring ownership of different assets, European differences are quantitatively larger and by no means uniform across asset categories. In some cases, we also find that population characteristics differ in ways that matter, statistically and quantitatively, for international differences in asset ownership.

#### **4. Levels of Asset Holdings**

We turn in this section to levels of asset holdings across their entire distribution among holders. First, we compare levels of asset holdings in different countries or regions, at various percentiles of the distribution of such holdings among holders. We then ask to what extent observed international differences arise from differences market

conditions facing asset holders rather than to differences in the characteristics of the asset holder pools. We make the same comparisons as for participation.

#### 4.1 Estimation Model and Methodology

We employ a variant of a technique proposed by Machado and Mata (2005).<sup>18</sup> We first estimate 19 vectors  $j$  of Quantile Regression coefficients at every 5<sup>th</sup> percentile,  $\theta_j$ , of the distribution of the asset in question in the base country:

$$Q_{\theta_j}^{base} [y^{base} | X^{base}] = X^{base} b^{base}(\theta_j). \quad (2)$$

We include the following regressors: 2<sup>nd</sup> order age polynomial, gender, household size, education (LTHS: high school dropout; HS: high school degree; COL: College degree), recall ability, self-reported bad health (includes responses ‘fair’ and ‘poor’ in HRS), work status (retired/working/unemployed-other inactive), marital status (couple/widow/never married), subjective probability to leave a bequest, whether provides help to relatives/neighbors, whether is involved in voluntary activities, income quartile, wealth quartile.<sup>19</sup>

We then make  $m$  random draws of characteristics and corresponding weights with replacement from the European country  $i$ , where  $m$  is the number of owners of the asset in question in the sample from country  $i$ . This process is repeated 19 times. Each outcome of these draws, containing  $m$  observations, is denoted by  $X_j^i$ . We generate 19 counterfactual samples of size  $m$  from the desired conditional distribution:  $y_j^* = X_j^i b^{base}(\theta_j)$ . We use these values to generate the unconditional counterfactual distribution:  $f^*(y; X^i b^{base})$ . Finally, for each of the three sequences of

variables (log asset holdings in the base, in country  $i$ , and counterfactual values), we calculate percentiles using population weights.

The decomposition can be represented as:

$$f(y^{Base}) - f(y^i) = \{f(y^{Base}) - f^*(y; X^i b^{Base})\} + \{f^*(y; X^i b^{Base}) - f(y^i)\} \quad (3)$$

The densities without asterisk represent the actual levels of the asset in question among owners. The starred density is the counterfactual we construct. It represents the density that would have been observed if we were to combine the configuration of characteristics of asset holders in country or region  $i$  with the coefficients on those characteristics estimated for the base country or region.<sup>20</sup>

In interpreting this decomposition, we can think of starting with the distribution of asset holdings in a particular country or region  $i$  and comparing it to what would have been observed if the population of asset holders were confronted with the same market conditions facing asset holders in the base country, i.e. if markets were completely integrated. The resulting difference (in the second bracket) represents these coefficient effects. We also compare this counterfactual to the actual density in the base, which obviously results from combining coefficients of the base with the configuration of characteristics among holders of this asset in the base. This difference (in the first bracket) represents covariate effects, i.e. those attributable to differences in configuration of characteristics between holders of this asset in country or region  $i$  and in the base.

We also compute and present confidence bands for covariate and coefficient effects based on bootstrapped standard errors. To this end, we first derive 100 bootstrapped samples from the US sample of asset holders used in step 1. We then derive 19 vectors of QR estimates using each of these bootstrapped samples. Then, by repeating the process

described in steps 2-4 100 times, we generate a series of 100 bootstrapped counterfactual distributions and derive standard errors.

## **4.2 Europe versus the US**

### **4.2.1 Direct and Indirect Stockholding**

Figure 4 shows coefficient and covariate effects for stockholding levels between the US and European countries. US stockholders hold greater amounts of stock wealth across the distribution of stock holdings. Counterfactual decompositions for most of the countries show that this difference across the board comes mainly from strong coefficient effects: European stockholders would achieve considerably higher levels of stock holdings if they were to be confronted with US market conditions. Switzerland presents the only exception to this tendency showing relatively small and insignificant coefficient effects that suggest greater similarity with US market conditions governing stock investments. On the other hand, covariate effects are small and mostly insignificant across percentiles: the US stockholder pool is able to achieve somewhat larger levels of stock holdings than what the European pool of stockholders would achieve if they were to be faced with US conditions. Sweden is the only exception to this tendency.

Coefficient effects are particularly strong in Denmark, Austria, and Greece. Our findings are remarkably consistent with World Bank and other indicators related to equity markets shown in Table 2. Denmark, Austria and Greece exhibit the three lowest scores in terms of the World Bank stock market size indicator, which allows for market capitalization, value traded and turnover ratios. Table 2 suggests that low stockholding levels are observed in countries exhibiting poor institutional characteristics, such as high

transactions costs and limited shareholder rights, rather than being closely linked to properties of stock returns (as reflected in the volatility and market stability measures).

Estimated coefficient effects are strong and mostly unchanged across the distribution in Germany, France and England, while in Belgium they clearly diminish at the upper end. This suggests that Belgian stock owners with substantial investments in stocks face conditions that are more similar to those in the US, compared to the conditions faced by smaller stockholders in their country. Coefficient effects are also dominant in Spain and Italy, but with a tendency to increase as we move across the distribution.

For Germany, France, Denmark, England and the three southern countries, covariate effects are negligible, implying that the configuration of the stockholder pool is every bit as conducive to high stockholding levels as that in the US. It is the conditions they face upon entering that result in observed differences with US stockholders. Indeed, covariate effects dominate coefficient effects only in Sweden. This implies that the configuration of the stockholder pool (among older households) is not as conducive to high stockholding levels in these countries as it is in the US. With participation rates at 71%, Sweden exhibits more widespread stockholding compared to the US. Taken together, participation rates and our findings imply that the stockholder pool in Sweden is less conducive to high stock holding levels, because it contains a larger proportion of ‘marginal stockholders’ with characteristics that warrant limited exposure to the stock market.

#### **4.2.2 Private Businesses**

Figure 5 shows observed differences and counterfactual decompositions for private business holdings among older households across various US-European country pairs. In

most cases, US households hold lower real amounts in private businesses across the entire distribution of such holdings. Most of the difference can be accounted for by differences in market conditions. If European private business holders were faced with US markets conditions, they would be holding lower amounts in private businesses. For countries like Greece, Spain and Italy (with the exception of the high percentiles) these factors play a limited (and in most percentiles) insignificant role. On the other hand, market conditions in Sweden, Germany, France and the Netherlands seem to make much of a difference for entrepreneurs with larger private business holdings. England represents the only case where business holders (in particular small ones) would hold higher amounts if they were faced with US market conditions. Covariate effects are insignificant in all pairwise comparisons.

Findings on relative sizes of business holdings go in the opposite direction from results on participation rates and on the ease of doing business: while it is easiest to do business in the US (Table 3), those who do business there end up investing smaller amounts than Europeans with similar characteristics. Table 3 indeed shows that the US does not rank at the top in several indicators of ease of doing business (most notably in paying taxes, dealing with licenses, trading across borders, and registering property). When we examine indicators of the quality of governance (Table 5), we see that the US does not rank highly in a number of them that could well influence exposure to business property, with the result that eight of the European countries rank above the US in terms of the overall governance indicator. The complete reversal of the ranking in terms of participation probability makes it quite likely that US older business owners hold smaller amounts in business property not so much because doing business is difficult or

governance is poor, but because market conditions for other investment alternatives, such as stockholding, are more favorable.

#### **4.2.3 Value of Main Residence**

In this section we examine differences in real gross value of primary residence between the US and European countries (Figure 6). With the exception of Sweden, the overall picture is one of higher home values among older owners in Europe than in the US, across the entire distribution. We find that European homeowners in virtually all countries considered hold larger real amounts than those they would have if they faced US market conditions. Coefficient effects are particularly strong and well exceed the overall differences in home values observed in England, Spain, Italy and Greece.

Table 6 suggests that larger real holdings do not represent, on average, larger homes in Europe than in the US: there is a quantum leap in average size of dwelling when crossing the Atlantic. They do represent, however, larger asset holdings in housing. Strong coefficient effects seem consistent with the boom in real housing prices that some European countries experienced in the first half of the decade, especially Spain, UK, and Italy. However, not all countries in Europe experienced such strong trends, so this cannot be the whole explanation.

Another possibility is a more favorable tax treatment of housing in Europe. However, Table 7 does not suggest a noticeable difference in this direction, except perhaps in not taxing capital gains in some European countries. Furthermore, it is not linked to availability of bigger mortgages in Europe, as loan to value ratios in mortgage markets are generally lower –or at least no higher - in Europe compared to the US (Table 8). In

view of these observations and of our findings on stock holdings above, we are led to the conclusion that European homeowners tend to devote larger real amounts to their primary residence primarily because they face less favorable conditions in risky financial markets, such as the stock market. Their tendency to do so without relying on larger mortgages probably reflects a combination of more limited needs for mortgage (e.g. due to parental housing transfers) and more limited opportunities to obtain larger mortgages because of lower allowable loan to value ratios.

By contrast to the findings on coefficient effects, covariate effects imply that the pool of US homeowners has characteristics more conducive to large home equity values than the pool of European homeowners. Covariate effects are mostly<sup>21</sup> positive and particularly strong in southern countries.

### **4.3 Integration within the US**

Table 1 shows real PPP-adjusted levels of asset holdings for holders located in four regions of the US: Midwest (MW), Northeast (NE), South (S), and West (W). NE and W exhibit the highest stockholding levels for most of the distribution. The Midwest dominates in values of private businesses. The West dominates in values of primary residence, with NE second.

Table 9 reports counterfactual decompositions at three indicative percentiles: 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup>. Asterisks denote statistical significance of estimated coefficient and covariate effects (ranging from 10% for one asterisk to 1% for 3 asterisks). For stockholding, coefficient effects are largely insignificant, suggesting that households located in different regions of the US face similar market conditions.<sup>22</sup>



However, we find greater incidence of statistically significant coefficient effects for private businesses and even more so for primary residence. For private businesses, coefficient effects are usually even larger in estimated value than the overall differences. Amounts invested in primary residence are larger in the West and in the Northeast than in the Midwest; and smaller in the South. Our results show that coefficient effects can explain the bulk of regional differences across the distribution of home values, with covariate effects making a visible contribution only in the South. Estimated coefficient effects are consistent with indicators of US housing markets (Table 10), which show that home prices are lower and home vacancy rates higher in the Midwest and in the South.

These results are quite plausible. With regard to stockholding (and in view also of the well-known home equity bias), US households face essentially the same stock market but what can differ is the technology they have for investing in stocks (through financial institutions, mutual funds, brokers and the like). At the opposite extreme is housing: those with primary home in a particular region face the local housing market conditions. In order for these to be similar across regions, households need to be willing and able to move to where the housing market offers opportunities to obtain a home at lower real cost. Even if the policy and institutional framework were harmonized across different states, differences could still arise from differential employment opportunities or quality of life across regions. It is also sensible that private business holdings turn out to be somewhere in between financial assets and primary residence. A household does not need to own a private business within the region of its primary residence. However, supervision, control, and any participation in the management of the private business are considerably facilitated by geographical proximity. So, there is less room for taking

advantage of favorable conditions in other regions, unless households are willing to move. This results in some market segmentation whose effects show up in our findings.

#### **4.4 Integration within Europe**

The bottom panel of Table 1 reports PPP-adjusted real holdings of various assets in European countries, by percentiles of the distribution of owners in each case. The first impression from these raw numbers is that there is considerable variation in levels of holdings among European countries, even when focusing on a particular percentile of the distribution. Table 9 decomposes this variation into coefficient and covariate effects, using Germany as the base country.

Stocks were the asset for which coefficient effects were largely insignificant within the US. This is not the case for Europe. The vast majority of countries exhibit strongly significant effects, statistically and economically, relative to Germany. For example, stockholdings in France are only somewhat larger than those in Germany at the percentiles shown, but if the French faced German market conditions, their holdings would have been substantially smaller. The same is true for the Netherlands, even though observed Dutch holdings are substantially larger than German ones. Coefficient effects for Sweden are not only large, but they also go in the opposite direction of total effects: if Swedes faced the same conditions as Germans, they would exhibit significantly lower holdings than they currently do. Very few covariate effects turn out to be significant, all in favor of the German stockholder pool.

Our results are likely to reflect differences in the stock markets in which these households invest (i.e. home equity bias even following the adoption of the Euro) as well

as differences in the ease with which they can invest (brokerage costs, availability of information, etc.). It is noteworthy that differences are present even for large holders, as coefficient effects tend not to disappear at the upper end of the distribution.

Based on our findings for US regions, we would expect to find signs of considerable variation in market conditions for investments in private business. This expectation is confirmed for the 75<sup>th</sup> percentile, with strongly significant and generally larger estimated coefficient effects within Europe compared to within the US. However, coefficient effects are typically insignificant at the 25<sup>th</sup> percentile and (with the exception of southern countries) at the median of the distribution of private business holdings. This suggests that households with small or medium holdings of (shares in) private businesses tend to face quite comparable market conditions across European countries, unlike those with the largest holdings.<sup>23</sup>

As expected, coefficient effects on home values are statistically significant across the distribution of home values. It is noteworthy, however, that their estimated size and sign exhibit considerable variation across European countries, even though Germany has a very low homeownership rate and one might suppose a priori that it offers uniformly less favorable conditions to homeowners compared to other European countries.<sup>24</sup> Finally, there are a number of statistically significant covariate effects having to do with characteristics of homeowners in Europe, but for some countries they are only significant for small homeowners while for others they are only significant for large homeowners.<sup>25</sup>

## 5. Concluding Remarks

In this paper, we have used recently available, internationally comparable data across 13 countries to document and study sources of differences in portfolios of older households, across the Atlantic, within the US, and within Europe. We focused on the question of whether households of given characteristics tend to have similar patterns of asset market participation and of asset holdings across these countries. Counterfactual analysis can be applied to household portfolios to provide a fresh perspective on economic integration, complementary to existing studies based on international flows, prices, and risk sharing.

We have found sizeable and statistically significant differences in the market conditions faced by households across the Atlantic with reference to participation in all three asset markets considered. Neither the market conditions faced by households in most European countries nor their characteristics are as conducive to participation in stockholding (direct or indirect) as those of the US. Market conditions are largely responsible for lower participation in private business in Europe than in the US. For homeownership, coefficient effects are positive in most cases suggesting favorable US market conditions. Exceptions are southern countries, EN (and to a small extent BE) where households would have lower probabilities if faced with US market conditions.

Similarly, when we examine integration within Europe, we find that differences in participation rates arise mainly from differences in market conditions. Coefficient effects tend to be statistically significant and quite large for stockholding and homeownership, though smaller for business ownership. By contrast, when applied to comparisons across US regions, our approach implies that differences in market conditions, though

statistically significant in favor of the Midwest, are quite small. This strengthens our confidence in the usefulness and plausibility of the approach we propose.

Differences in market conditions are also found to govern observed differences in levels of asset holdings across their distribution among holders. US stockholders hold greater amounts of stock wealth across the distribution of stock holdings and smaller amounts of private business wealth and housing wealth in their primary residence. For the first two assets, only coefficient effects tend to matter, with covariate effects being insignificant or small. For the amount held in primary residence, coefficient effects are sometimes even larger than observed differences, more than offsetting statistically significant covariate effects in the opposite direction.

Similarly, coefficient effects within Europe are statistically significant and often large, except for smaller holders of private businesses. For the real amount held in primary residence, there are also a number of statistically significant covariate effects, implying that differences in home values arise partly from differences in characteristics of homeowners across European countries. Finally, the benchmarking analysis of integration within US regions yields an intuitively plausible pattern of coefficient effects. Households located in different regions face similar market conditions with respect to stockholding, but there is a greater incidence of statistically significant coefficient effects for private businesses and even more so for the primary residence, where location is more likely to matter. Comparison with widely used indicators of supply-side conditions confirm the view that our findings do not merely reflect cultural or taste differences.

Our study is positive rather than normative. Finding differences in market conditions does not necessarily imply that these differences should be eliminated through

institutional reform and policy harmonization. Promoting participation in, or large holdings of, a particular type of asset can be a political choice on the part of certain governments or societies. Our findings provide a check on consistency between stated objectives and market conditions. However, our findings do not seem consistent with the notion that European households are already citizens of a Europe-wide (let alone transatlantic) ‘village’ facing similar economic environments, policies and constraints regardless of the country in which they reside. The approach to integration that we have introduced in this paper can in principle be applied to a wide range of assets and debts, as well as to different sets of countries and/or demographic groups of interest, to further explore this conclusion.

## Appendix: Robustness Exercises

In order to check the robustness of our findings we have performed a variety of checks. First, we have estimated different specifications of the quantile regression models estimated in the base country or region (US, Germany and US-Midwest). In particular, we have experimented with specifications that use a non-linear (inverse hyperbolic sine) continuous transformation of income and wealth variables instead of quartiles and the patterns derived are similar to those we present.<sup>26</sup>

Second, we evaluated alternative counterfactual distributions that combine the configuration of characteristics of asset holders in the base country with the coefficients on those characteristics estimated for each comparison country or region  $i$ . This reverses the order of the decomposition in Section 4.1 in the following way:

$$f(y^{Base}) - f(y^i) = \underbrace{\{f(y^{Base}) - f^*(y; X^{Base} b^i)\}}_{Coefficients} + \underbrace{\{f^*(y; X^{Base} b^i) - f(y^i)\}}_{Covariates} \quad (4)$$

In the Machado-Mata decomposition, the relative contribution of the coefficient and the covariate effects can vary, depending on the choice of the base country. A general way to address this problem is to use the Shorrocks generalization a la Shapley (Shorrocks, 1999) according to which the effect of the characteristics and the covariates can be derived as the average of the effects calculated from both possible counterfactual choices. We have estimated the role of coefficient and covariate effects according to the Shapley-Shorrocks generalization and the decomposition in (4) and they are both quite similar to those we present, with some differences appearing only in the case of business holdings, especially at upper and lower quantiles. However, the results are quite similar for the middle range of the distribution and we believe that most of the differences are due to the small samples of business owners observed in all European countries (less than 150 observations).

Third, we have implemented the original Machado-Mata decomposition<sup>27</sup>:

$$f(y^{Base}) - f(y^i) = \underbrace{\{f^*(X^{Base} b^{Base}) - f^*(y; X^i b^{Base})\}}_{Covariates} + \underbrace{\{f^*(y; X^i b^{Base}) - f^*(X^i b^i)\}}_{Coefficients} + error \quad (5)$$

Once again the patterns of coefficient and covariate effects are qualitatively similar to the ones we present.

Finally, we investigate the potential effects of selectivity in the counterfactual decompositions we present. To the best of our knowledge, the only method that corrects quantile regression estimates for selectivity is due to Buchinsky (1998). In his method however, identification of the constant term (which is necessary for our decompositions) rests on the assumption that there is a subset of observations for which participation probability is arbitrarily close to one. Unfortunately, there is no such subset of observations for any of the assets we consider.

Thus, we examine the effects of selection in asset participation on the relative influence of the coefficient and covariate effects at the mean. To this end, we estimate coefficient and covariate effects from a classic Oaxaca-Blinder decomposition (see Blinder (1973) and Oaxaca (1973)) and we compare them with those derived from decompositions computed after taking into account selectivity through a Heckman-type model. There are various such decompositions (for a detailed discussion, see Neuman and Oaxaca, 2004). We choose the decomposition that corresponds to eqn. 14 in Neuman and Oaxaca (2004), which represents the most encompassing view for integration in the sense that country differences in the estimated parameters from the asset ownership equation and differences in the effects of selectivity in the amounts invested are viewed as reflecting lack of integration. On the other hand, differences in the configuration of characteristics determining asset ownership are treated as covariate effects. We perform these selectivity-corrected decompositions only for holdings of stocks and the main home, since we find no evidence of selectivity for private business holdings.

Following the notation in Neuman and Oaxaca (2004) the conditional expectation of the asset amount among owners derived from a Heckman-type model is equal to<sup>28</sup>:

$$E(Y_i | L_i = 1) = \bar{X}'_i \hat{\beta} + \hat{\theta} \hat{\lambda}_i \quad (6)$$

Where  $L$  is an index of participation,  $\bar{X}$  denotes the mean of  $X$ ,  $\hat{\lambda}$  is an estimate of the mean (inverse) Mill's ratio evaluated from the asset participation stage, and  $\hat{\theta}$  is its estimated coefficient. Then, we perform the following two decompositions:

$$\bar{Y}_{Base} - \bar{Y}_i = \underbrace{\bar{X}'_i (\hat{\beta}_{Base} - \hat{\beta}_i)}_{Coefficients} + \underbrace{(\bar{X}'_{Base} - \bar{X}'_i) \hat{\beta}_{Base}}_{Covariates} \quad (7)$$

$$\begin{aligned} \bar{Y}_{Base} - \bar{Y}_i = & \underbrace{\bar{X}'_i (\hat{\beta}_{Base} - \hat{\beta}_i) + \hat{\theta}_{Base} (\hat{\lambda}^0_i - \hat{\lambda}_i)}_{Coefficients} + (\hat{\theta}_{base} - \hat{\theta}_i) \hat{\lambda}_i \\ & + \underbrace{(\bar{X}'_{Base} - \bar{X}'_i) \hat{\beta}_{Base} + \hat{\theta}_{Base} (\hat{\lambda}_{Base} - \hat{\lambda}^0_i)}_{Covariates} \end{aligned} \quad (8)$$

where  $\hat{\lambda}^0_i$  represents the mean value of the inverse Mill's ratio if households in country  $i$  faced the same coefficients for participation in a given asset category as households in the base country. The decomposition in (5) is the traditional Oaxaca-Blinder one and thus does not take into account selectivity, while the one in (6) does. Results are summarized in Table 11, and we observe that accounting for selectivity has very little impact on the estimates.



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**Table 1: Asset ownership rates and levels by asset quartiles**

	Obs.	Stocks						Business					Main Home						
		Owners %	Percentiles among owners					Owners %	Percentiles among owners					Owners %	Percentiles among owners				
			.5	.25	.50	.75	.95		.5	.25	.50	.75	.95		.5	.25	.50	.75	.95
<i>US</i>	13,050	49.6	1,085	8,844	39,797	134,668	532,041	9.8	4,020	32,160	80,399	281,396	1,056,676	77.3	77,688	64,319	120,598	200,997	482,393
MW	3,228	54.5	904	8,040	36,179	120,728	487,217	13.8	5,628	40,199	120,598	321,595	1,260,962	80.9	20,100	65,927	106,126	160,798	325,615
NE	2,158	54.7	1,424	8,844	41,807	138,688	592,941	6.8	4,020	32,160	80,399	241,196	989,107	70.6	24,120	73,967	152,758	273,356	522,592
S	5,250	42.6	965	8,040	35,275	123,010	582,891	9.3	4,020	20,100	72,359	200,997	817,112	78.3	14,391	50,651	80,399	144,718	361,795
W	2,433	52.1	1,588	11,256	42,812	146,728	482,393	8.6	4,020	24,120	80,399	241,196	833,350	76.9	24,120	112,558	200,997	321,595	643,190
<i>EUR</i>	25,394	26.3	866	5,798	20,073	61,818	258,485	6.3	8,118	71,789	195,965	662,590	10,052,160	68.3	49,362	135,682	237,679	380,364	981,167
SE	2,140	71.1	887	4,786	15,281	44,868	191,438	12.8	2,991	37,226	179,473	593,841	4,206,494	69.0	17,947	59,824	119,649	191,438	418,771
DK	1,176	56.0	605	3,239	10,564	35,646	160,740	9.5	4,352	60,304	389,673	636,455	1,889,353	69.0	32,473	103,913	162,364	259,782	586,811
DE	2,002	24.1	797	5,378	18,444	59,753	321,685	6.3	8,516	87,913	239,012	1,487,228	12,025,456	51.1	71,704	175,660	239,012	358,519	717,037
NL	1,954	24.0	1,016	9,529	31,127	111,169	516,861	6.7	20,328	127,051	419,267	1,869,948	14,380,250	55.3	158,813	241,396	330,332	482,792	916,178
BE	2,532	37.5	901	7,390	38,590	163,215	816,286	5.4	33,911	172,611	363,435	908,588	1,539,985	80.0	60,573	150,155	210,218	302,863	603,148
FR	2,110	42.9	725	5,706	22,315	67,439	165,293	5.9	13,441	80,839	220,817	382,256	14,817,674	72.2	69,743	153,304	245,544	398,491	1,662,418
CH	712	35.7	1,455	12,805	40,742	135,614	819,889	10.8	17,461	71,299	235,724	1,121,372	1,906,776	55.1	128,282	289,392	407,425	640,239	2,633,296
AT	1,409	9.8	784	5,705	16,181	51,559	315,131	4.1	12,826	92,920	130,541	189,024	383,734	56.6	62,236	124,471	224,048	373,414	658,706
IT	1,778	10.1	1,988	9,276	23,875	49,694	170,514	6.4	13,252	79,037	136,870	662,590	13,446,175	75.2	40,393	131,048	198,777	370,338	993,885
ES	1,753	11.1	1,218	6,865	18,306	38,137	155,029	7.0	9,153	63,862	145,627	290,503	3,054,535	86.9	45,765	106,784	183,059	305,098	1,128,498
GR	1,982	10.6	311	3,524	10,320	27,073	153,017	6.8	8,155	49,450	163,108	311,119	1,339,492	84.3	40,777	81,554	130,486	244,662	382,938
EN	5,846	39.4	696	5,218	17,742	59,141	260,915	2.5	87	6,958	43,486	304,401	1,739,432	76.1	104,366	217,429	313,098	452,252	834,927

Note: Weighted statistics from 2004 HRS, SHARE and ELSA data. All values are PPP-adjusted.

**Table 2: Indicators Relevant to Stockholding**

Country	Equity Market Size Index	Equity Market Stability Index	Equity Return Volatility (%)	Equity Mkt. Turnover Ratio (%)	Market Cap to GDP Ratio (%)	Transaction Costs (%)	Trade Volume to GDP ratio (%)	Shareholder Rights	Internet Connections (per thousand)	Information and communication Technology Expenditure (% of GDP)
Austria	5.3	5.264	10.043	33.962	29.58	3.469	8.215	2	486	5.5
Belgium	6.428	5.07	19.349	14.925	219.643	2.637	20.094	0	458	5.8
Denmark	6.329	4.984	15.996	71.403	62.27	3.349	40.096	2	89	5.3
France	6.626	4.676	22.783	81.651	92.742	3.922	65.499	3	430	6.3
Germany	6.485	4.344	27.068	123.688	44.006	5.327	51.8	1	455	6.1
Greece	5.574	5.159	15.798	37.474	61.574	3.073	21.379	2	180	4.1
Italy	6.469	5.002	17.654	114.546	47.214	1.508	48.098	1	478	4.3
Netherlands	7.313	4.584	23.798	108.772	107.8	2.54	104.665	2	739	6.3
Spain	7.663	4.89	18.812	143.338	94.879	1.532	120.497	4	348	3.7
Sweden	7.604	4.76	23.052	123.731	108.769	4.065	119.061	3	764	7.4
Switzerland	8.98	4.843	19.438	93.656	229.744	2.238	202.284	2	498	7.5
UK	8.567	4.952	18.276	140.531	131.53	6.345	173.161	5	473	7.3
USA	8.345	5.016	18.219	126.544	139.908	1.266	165.887	5	630	8.8

Sources: For columns 2-7: World Bank, data for 2004. Equity Market - Size Index: A composite index on equity market size is created on the basis of (1) market capitalization to GDP, (2) value traded to GDP and (3) turnover ratio. Each of the above component indicators are standardized by subtracting the median of the distribution of the variable and scaling by the standard deviation of the variable. Equity Market - Stability Index: A composite index on equity market stability is created on the basis of (1) skewness, (2) volatility of market returns. Each of the above component indicators are standardized by subtracting the median of the distribution of the variable and scaling by the standard deviation of the variable. Equity Return Volatility (%): Volatility is the standard deviation of the market index returns. This measure is annualized to give a measure of the annual volatility. Volatility is reported as three year moving averages. (Source: Datastream and Emerging Market Database). Equity Mkt. Turnover Ratio (%): The indicator is defined as the total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period (Source: World Development Indicators). Number of Listed Firms: The indicator is defined as the number of the domestically incorporated companies listed on the country's stock exchanges at the end of the year (Source: World Development Indicators). Market Cap to GDP Ratio (%): The indicator is defined as the ratio of market capitalization to GDP (Source: World Development Indicators). Trade Volume to GDP ratio (%): Stock Traded to GDP is the total value traded divided by GDP. Value traded is the total value of shares traded during the period (Source: World Development Indicators). Column 8: Shareholder rights: an index computed by La Porta, Lopez-de-Silanes, Shleifer, and Vishny ("Law and Finance," Journal of Political Economy, Vol. 106, No. 6, December 1998) aggregating the shareholder rights ("anti-director rights"). The index is formed by adding 1 when: (1) the country allows shareholders to mail their proxy vote to the firm; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent (the sample median); or (6) shareholders have preemptive rights that can only be waived by a shareholders' vote. The index ranges from 0 to 6. Columns 9-10: Source: World Bank, World Development Indicators 2007 (Data from 2005).

**Table 3: Indicators Relevant to Business Ownership**

Economy	Ease of Doing Business Rank	Starting a Business	Dealing with Licenses	Employing Workers	Registering Property	Getting Credit	Protecting Investors	Paying Taxes	Trading Across Borders	Enforcing Contracts	Closing a Business
United States	3	3	18	1	10	7	5	55	10	4	16
United Kingdom	5	8	42	16	19	1	9	11	14	22	10
Denmark	7	15	8	14	31	19	18	19	3	1	24
Sweden	14	20	17	95	6	33	114	37	9	2	17
Switzerland	16	30	36	23	11	19	156	7	47	9	32
Belgium	20	41	43	41	157	41	12	62	38	21	9
Germany	21	53	30	129	33	3	81	70	6	29	29
Netherlands	22	42	81	86	20	13	96	81	16	30	8
Austria	30	68	45	104	26	19	141	102	13	14	19
Spain	38	94	54	163	36	19	81	103	24	41	15
France	47	12	34	135	158	96	58	92	81	17	31
Italy	69	46	109	102	50	41	81	112	103	147	43
Greece	111	134	53	166	146	76	156	100	119	48	33

SOURCE: WORLD BANK, Doing Business (<http://www.doingbusiness.org>). Rankings for 2005, as reported on the web site in 2007. The ease of doing business index is calculated as the ranking on the simple average of country percentile rankings on each of the 10 topics covered in Doing Business. The ranking on each topic is the simple average of the percentile rankings on its component indicators. Starting a business: Procedures, time, cost and paid-in minimum capital to open a new business. Dealing with licenses: Procedures, time and cost of business inspections and licensing (construction industry). Employing workers: Difficulty of hiring index, rigidity of hours index, difficulty of firing index and firing cost. Registering property: Procedures, time and cost to register commercial real estate. Getting credit: Strength of legal rights index, depth of credit information index. Protecting investors: Indices of the extent of disclosure, extent of director liability and ease of shareholder suits. Paying taxes: Number of tax payments, time to prepare tax returns and total taxes as a share of commercial profits. Trading across borders: Documents, time and cost to export and import. Enforcing contracts: Procedures, time and cost to resolve a commercial dispute. Closing a business: Recovery rate in bankruptcy.

**Table 4: Decompositions of Differences in Asset Ownership Rates within USA and Europe**

	STOCKS			BUSINESS			HOME		
	Difference	Coefficient	Covariate	Difference	Coefficient	Covariate	Difference	Coefficient	Covariate
USA									
NE	-0.002	-0.021 ***	0.020 **	0.070	0.052 ***	0.018 ***	0.102	0.079 ***	0.024 ***
S	0.119	0.083 ***	0.036 ***	0.045	0.028 ***	0.017 **	0.025	-0.004	0.029 ***
W	0.025	0.024 ***	0.001	0.053	0.043 ***	0.009	0.041	0.026 ***	0.015 **
Europe									
Sweden	-0.469	-0.456 ***	-0.013	-0.065	-0.069 ***	0.004	-0.178	-0.227 ***	0.048 **
Denmark	-0.318	-0.277 ***	-0.041 ***	-0.032	-0.031 ***	-0.002	-0.178	-0.190 ***	0.012
Netherlands	0.001	-0.001	0.002	-0.004	-0.013 *	0.008	-0.042	-0.093 ***	0.051 ***
Belgium	-0.133	-0.133 ***	0.000	0.009	0.006	0.003	-0.289	-0.304 ***	0.015
France	-0.187	-0.213 ***	0.026 *	0.004	-0.009 *	0.013 **	-0.211	-0.276 ***	0.066 ***
Switzerland	-0.116	-0.080 ***	-0.036 **	-0.046	-0.046 ***	0.001	-0.040	-0.049 ***	0.009
Austria	0.144	0.131 ***	0.013	0.021	0.015 ***	0.006	-0.055	-0.120 ***	0.065 ***
Italy	0.140	0.082 ***	0.058 **	-0.001	-0.024 ***	0.023 ***	-0.241	-0.334 ***	0.093 ***
Spain	0.131	0.058 **	0.072 ***	-0.007	-0.039 ***	0.031 ***	-0.358	-0.495 ***	0.137 ***
Greece	0.135	0.109 ***	0.026	-0.005	-0.010	0.006	-0.332	-0.417 ***	0.085 ***
England	-0.153	-0.179 ***	0.026	0.038	-0.001	0.039 ***	-0.249	-0.410 ***	0.160 ***

Note: All decompositions for US Regions refer to differences from the Mid West, while for European countries to differences from Germany. The estimated difference in the asset ownership rates, 'diff', is decomposed into two parts: one reflecting the effect of coefficients ('coeff') and one due to the effect of covariates ('cov'). \*\*\*, \*\*, \* denote significance at 1%, 5% and 10% statistical level, respectively. Standard errors have been computed using 100 bootstrap replications.

**Table 5: Indicators of Governance**

Country	Percentile Rank	Rule of Law Governance Score	Std Error	Percentile Rank	Regulatory Quality Governance Score	Std Error	Percentile Rank	Political Stability Governance Score	Std Error	Percentile Rank	Control Of Corruption Governance Score	Std Error
	(0-100)	(-2.5 to +2.5)		(0-100)	(-2.5 to +2.5)		(0-100)	-2.5 to +2.5		(0-100)	(-2.5 to +2.5)	
Austria	95.2	1.81	0.14	91.7	1.49	0.2	80.8	0.97	0.22	97.1	2.13	0.15
Belgium	92.4	1.51	0.14	90.7	1.43	0.2	70.7	0.78	0.22	91.7	1.51	0.15
Denmark	98.1	1.97	0.14	97.1	1.79	0.2	83.7	1.03	0.22	99	2.42	0.15
France	91.4	1.41	0.14	83.4	1.16	0.2	63.5	0.51	0.22	90.3	1.39	0.15
Germany	93.3	1.73	0.14	90.2	1.42	0.2	67.8	0.69	0.22	93.2	1.9	0.15
Greece	73.8	0.81	0.14	76.6	0.87	0.2	60.1	0.4	0.22	70.9	0.55	0.15
Italy	68.6	0.65	0.14	80	1.05	0.2	57.2	0.27	0.22	71.4	0.56	0.15
Netherlands	94.3	1.77	0.14	97.6	1.81	0.2	80.3	0.95	0.22	95.1	2.04	0.15
Spain	87.1	1.2	0.14	87.3	1.31	0.2	57.7	0.3	0.22	89.8	1.39	0.15
Sweden	96.7	1.87	0.14	96.1	1.73	0.2	93.3	1.31	0.22	97.6	2.17	0.15
Switzerland	99.5	1.98	0.14	93.7	1.58	0.2	94.2	1.33	0.22	96.6	2.12	0.15
United Kingdom	93.8	1.73	0.14	96.6	1.76	0.2	59.6	0.4	0.22	94.2	1.99	0.15
United States	91.9	1.48	0.14	91.2	1.47	0.2	52.9	0.12	0.22	92.7	1.76	0.13

Source: Kaufmann D., A. Kraay, and M. Mastruzzi (2007), "Governance Matters VI: Governance Indicators for 1996-2006", World Bank. The governance indicators presented here aggregate the views on the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. These data are gathered from a number of survey institutes, think tanks, non-governmental organizations, and international organizations.



**Table 6: Housing Size**

Country	Year	Average m <sup>2</sup> for total dwellings
Austria	2004	97
Denmark	2005 <sup>a</sup>	111
France	2002	90
Germany	2002	90
Italy	2001	92
Spain	2001	93
United Kingdom	2003	85
United States	2003	165

Source: United Nations Statistics. Notes: <sup>a</sup>Data refer to average living floor space.

**Table 7: Taxation of residential property**

Country	Imputed Rental Income taxed	Tax relief on mortgages		Capital gains on housing assets taxable	Inheritance tax	Stamp duty
		interest	Principal payment			
Austria	N	Y (up to ceiling)	N	Y (if sold <10 years)	Y	6%
Belgium	Y (with fixed deduction)	Y (up to imputed rental income)	Y (within limit)	Y (if sold < 5 years) POOD are exempt	Y	10%-12.5% (5%-6% for modest houses)
Denmark	Y	Y	n.a.	Y POOD are exempt	Y	1.5% total trading costs 7.2%
Germany	N	N	N	Y (if sold <10 years) POOD are exempt	Y (lower than for financial assets)	3.5%
Greece	Y (for POOD)	Y (for POOD)	n.a.	N	Y	11%-13%
France	N	N	N	Y POOD are exempt	Y	2%-3%
Italy	N (for POOD)	Y (for POOD)	N	Y (50% for POOD)	Y (until 2001)	10% (3% for POOD)
Netherlands	Y	Y	N	N	Y (above tax free threshold)	6%
Spain	N (for POOD)	Y	Y	Y (exempt if reinvested)	Y	n.a.
Sweden	Y	Y	N	Y	Y	1.5%-3%
Switzerland	Y	Y (up to total property income + fixed amount)	N	Y (cantonal only) POOD are exempt	Y (cantonal only)	n.a.
United Kingdom	N	N	N	Y POOD are exempt	Y	1%, 2% or 4% (depends on house value)
United States	N	Y (up to ceiling)	N	Y (until 2002) (deduction for POOD if held >2 years)	Y (to be phased out)	n.a.

Source: Pietro Catte, Nathalie Girouard, Robert Price and Christophe André (2004), Housing Markets, Wealth and The Business Cycle, OECD Economics Department Working Papers No. 394. Note: POOD = principal owner-occupied dwellings.

**Table 8: Characteristics of Mortgage Markets**

Country	Mortgage debt to GDP (ratio)	Home ownership ratio*	Loan to value ratio**	Interest rate adjustment***	Typical duration (years)
BE	31%	72%	80-85%	F(75%) M(19%) V(6%)	20
DE	52%	39%	≈70%	Mainly F and M	≤30
DK	67%	59%	80%	F (75%) M (10%) V (15%)	30
GR	21%	80%	70-80%	F(5%) M(15%) V(80%)	15-20
ES	46%	85%	≈80%	V(≥75%) Rest mainly M	15-25
FR	26%	58%	80%	F/M/Other(86%) V(14%)	15
IT	15%	69%	50%	F(28%) Rest mainly M	10-25
NL	111%	53%	112%	F(74%) M(19%) V(7%)	10
AT	20%	56%	60%	F(75%) V(25%)	20-30
UK	73%	70%	70%	M(28%) V(72%)	25
US	69%	69%	80%	F(85%) M(15%)	30

\* Share of owner-occupied dwelling. \*\* Estimated average loan-to-value ratio on new mortgage loans. \*\*\* Breakdown of new loans by type. Fixed (F): Interest rate fixed for more than five years or until expiry; Mixed (M): Interest rate fixed between one and five years; Variable (V): Interest rate renegotiable after one year or tied to market rates or adjustable at the discretion of the lender. Source: Alessandro Calza, Tommaso Monacelli and Livio Stracca (2007). "Mortgage Markets, Collateral Constraints, and Monetary Policy: Do Institutional Factors Matter?"

**Table 9: Decompositions of Differences in Asset Distributions within USA and Europe**

<b>Stocks</b>									
	<b>.25</b>			<b>.50</b>			<b>.75</b>		
	<b>Diff</b>	<b>Coeff</b>	<b>Cov</b>	<b>Diff</b>	<b>Coeff</b>	<b>Cov</b>	<b>Diff</b>	<b>Coeff</b>	<b>Cov</b>
NE	-0.10	0.10	-0.19 **	-0.14	-0.04	-0.11	-0.14	-0.02	-0.12
S	0.00	0.10	-0.10	0.03	0.02	0.01	-0.02	0.04	-0.06
W	-0.34	0.07	-0.41 ***	-0.17	0.19 *	-0.36 ***	-0.20	0.14 *	-0.33 ***
SE	0.12	-0.69 ***	0.81 ***	0.19	-0.58 ***	0.76 ***	0.29	-0.45 ***	0.74 ***
DK	0.51	0.32 ***	0.19	0.55	0.36 ***	0.19	0.52	0.31 **	0.21 *
NL	-0.57	-0.76 ***	0.19	-0.52	-0.58 ***	0.06	-0.62	-0.74 ***	0.12
BE	-0.32	-0.32 *	0.00	-0.74	-0.67 ***	-0.07	-1.01	-1.0 ***	0.03
FR	-0.06	-0.51 ***	0.45 **	-0.19	-0.51 ***	0.32 **	-0.12	-0.35 ***	0.23 **
CH	-0.87	-0.98 ***	0.11	-0.79	-0.80 ***	0.01	-0.82	-0.90 ***	0.08
AT	-0.06	0.13	-0.19	0.13	0.25	-0.12	0.15	0.13	0.02
IT	-0.55	-0.64 ***	0.09	-0.26	-0.41 **	0.15	0.18	0.12	0.06
ES	-0.24	-0.54 **	0.30	0.01	-0.14	0.15	0.45	0.29 *	0.15
GR	0.42	0.14	0.28	0.58	0.28 *	0.30 **	0.79	0.53 ***	0.26 **
EN	0.03	-0.39 ***	0.42 **	0.04	-0.18 *	0.21	0.01	-0.20 *	0.21
<b>Business</b>									
	<b>.25</b>			<b>.50</b>			<b>.75</b>		
	<b>Diff</b>	<b>Coeff</b>	<b>Cov</b>	<b>Diff</b>	<b>Coeff</b>	<b>Cov</b>	<b>Diff</b>	<b>Coeff</b>	<b>Cov</b>
NE	0.22	0.35	-0.13	0.40	0.41 **	-0.01	0.29	0.26	0.03
S	0.69	0.86 ***	-0.17 *	0.51	0.52 ***	-0.01	0.47	0.41 ***	0.06
W	0.51	0.69 **	-0.18	0.41	0.49 **	-0.08	0.29	0.33	-0.04
SE	0.86	0.95 ***	-0.09	0.29	1.03 ***	-0.75 **	0.92	1.84 ***	-0.92 **
DK	0.38	0.33	0.05	-0.49	0.02	-0.51 *	0.85	1.30 ***	-0.45
NL	-0.37	-0.38	0.01	-0.56	-0.09	-0.47	-0.23	0.24	-0.47
BE	-0.67	-0.47	-0.20	-0.42	0.16	-0.58 **	0.49	0.89 ***	-0.40
FR	0.08	0.04	0.04	0.08	0.57 **	-0.49	1.36	1.71 ***	-0.35
CH	0.21	0.41	-0.20	0.01	0.52	-0.51	0.28	0.63 *	-0.35
AT	-0.06	-0.49	0.43 *	0.60	0.26	0.34	2.06	1.76 ***	0.30
IT	0.11	0.39	-0.28	0.56	1.53 ***	-0.97 ***	0.81	1.61 ***	-0.80 *
ES	0.32	0.00	0.32	0.50	0.77 **	-0.27	1.63	1.93 ***	-0.30
GR	0.58	0.63 **	-0.05	0.38	0.69 **	-0.31	1.56	1.80 ***	-0.24
EN	2.54	2.84 ***	-0.30	1.70	2.23 ***	-0.53	1.59	1.97 ***	-0.38

**Table 9: Decompositions of Differences in Asset Distributions within USA and Europe (continued)**

Main Home									
	.25			.50			.75		
	Diff	Coeff	Cov	Diff	Coeff	Cov	Diff	Coeff	Cov
NE	-0.12	-0.09 *	-0.03	-0.36	-0.34 ***	-0.02	-0.53	-0.50 ***	-0.03 *
S	0.26	0.17 ***	0.09 ***	0.28	0.20 ***	0.08 ***	0.10	0.05 *	0.05 **
W	-0.53	-0.50 ***	-0.03	-0.64	-0.62 ***	-0.02	-0.69	-0.66 ***	-0.03
SE	1.08	1.02 ***	0.06	0.69	0.71 ***	-0.02	0.63	0.67 ***	-0.04
DK	0.52	0.46 ***	0.06	0.39	0.43 ***	-0.04 ***	0.32	0.37 ***	-0.05 *
NL	-0.32	-0.35 ***	0.03	-0.32	-0.25 ***	-0.07 ***	-0.30	-0.23 ***	-0.07 **
BE	0.16	0.09 ***	0.07	0.13	0.18 ***	-0.05 ***	0.17	0.24 ***	-0.07 **
FR	0.13	0.04	0.10 **	-0.02	-0.01	-0.01	-0.11	-0.09	0.02
CH	-0.50	-0.45 ***	-0.05	-0.53	-0.39 ***	-0.14 ***	-.058	-0.44 ***	-0.14 ***
AT	0.34	0.17 ***	0.18 ***	0.06	0.02	0.04 **	-0.4	-0.07 ***	0.03
IT	0.29	0.12 *	0.17 ***	0.18	0.11 **	0.07 **	-0.04	-0.07	0.03
ES	0.50	0.27 ***	0.23 ***	0.27	0.21 ***	0.06	0.16	0.18 ***	-0.02
GR	0.77	0.60 ***	0.17 ***	0.61	0.57 ***	0.04	0.38	0.39 ***	-0.01
EN	-0.21	-0.41 ***	0.20 ***	-0.27	-0.30 ***	0.03	-0.23	-0.17 ***	-0.06

Note: All decompositions for US Regions refer to differences from the Mid West, while for European countries to differences from Germany. The actual difference in the (log) asset levels, 'diff', is decomposed into two parts: one reflecting the effect of coefficients ('coeff') and one due to the effect of covariates ('cov'). \*\*\*, \*\*, \* denote significance at 1%, 5% and 10% statistical level, respectively. Standard errors have been computed using 100 bootstrap replications.

**Table 10: Housing Market Conditions by US Region.**

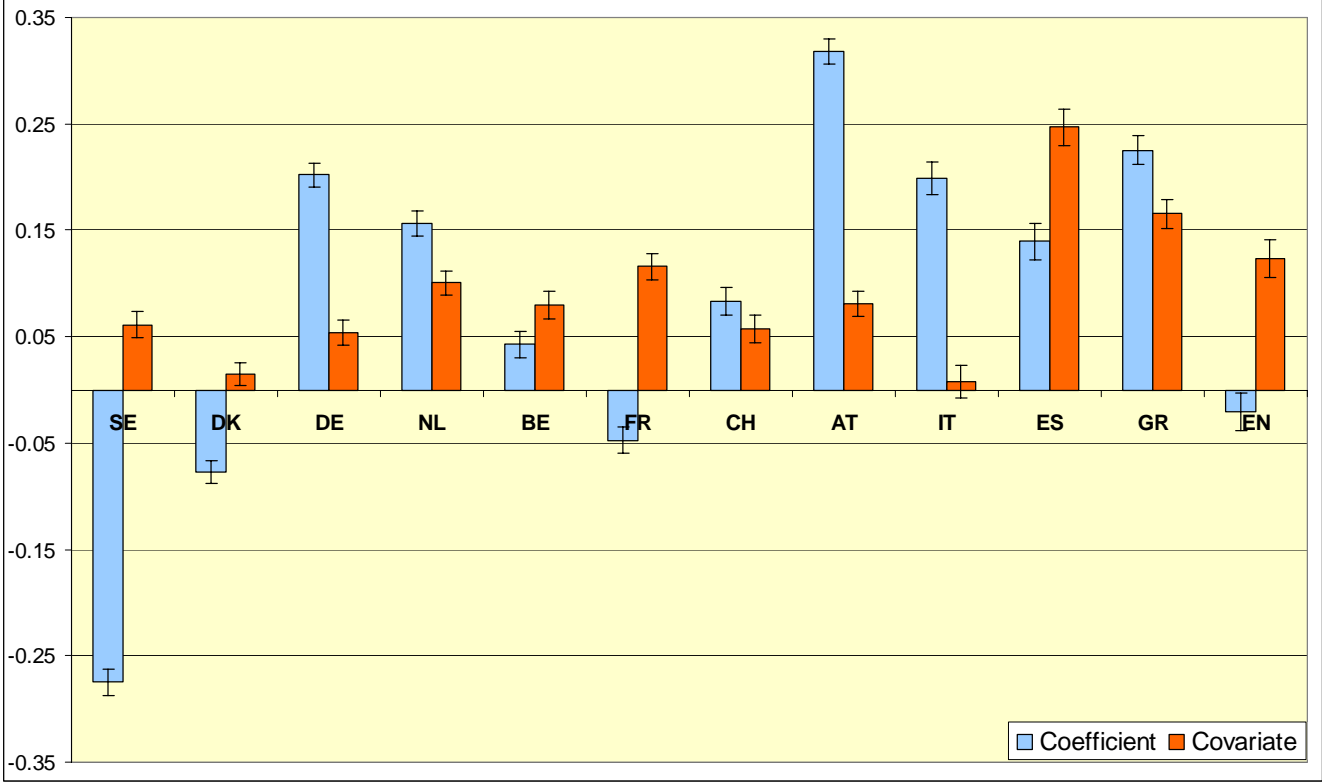
Median Asking Sales Price (dollars)					
Year and quarter	US	North-east	Midwest	South	West
<b>2004</b>					
1Q	126700	232100	111000	111700	183600
2Q	124700	125000	128800	99200	192300
3Q	113600	135000	115000	94000	178400
4Q	121800	123500	82900	122900	206200
Annual	122100	150000	111000	104500	189600
Quarterly Homeowner Vacancy					
<b>2004</b>					
1Q	1.7	0.9	2.1	2	1.3
2Q	1.7	1.1	1.7	2	1.4
3Q	1.7	1.2	2.1	1.9	1.4
4Q	1.8	1.2	2.2	2	1.5
<i>Source:</i> Current Population Survey/Housing Vacancy Survey, Series H-111, Bureau of the Census, Washington, DC 20233.					

**Table 11: Effects of Selection on Coefficient and Covariate Effects for Mean Holdings**

		Stocks					Primary Residence				
		Mean Difference	Covariate	Coefficient	$\hat{\theta}_{US}$	$\hat{\theta}_i$	Mean Difference	Covariate	Coefficient	$\hat{\theta}_{US}$	$\hat{\theta}_i$
<b>US-SE</b>	Mean	0.7409	0.4607	0.2803			-0.1084	0.0125	-0.1209		
	Sel. Corrected	0.7409	0.4774	0.2636	1.47 ***	0.39	-0.1084	0.0098	-0.1181	-0.71 ***	1.01
<b>US-DK</b>	Mean	1.2086	0.2866	0.9220			-0.4557	-0.0374	-0.4183		
	Sel. Corrected	1.2086	0.2891	0.9195	1.47 ***	-1.14	-0.4557	-0.0401	-0.4156	-0.71 ***	-1.80 ***
<b>US-DE</b>	Mean	0.6058	0.0591	0.5466			-0.9035	-0.0716	-0.8319		-1.04
	Sel. Corrected	0.6058	0.074	0.5318	1.47 ***	-1.66	-0.9035	-0.0763	-0.8272	-0.71 ***	
<b>US-NL</b>	Mean	0.0104	0.0928	-0.0825			-1.2653	-0.0519	-1.2133		
	Sel. Corrected	0.0104	0.1171	-0.1067	1.47 ***	-10.07	-1.2653	-0.0587	-1.2065	-0.71 ***	0.52 *
<b>US-BE</b>	Mean	0.0134	0.1851	-0.1717			-0.7707	0.1096	-0.8803		
	Sel. Corrected	0.0134	0.2074	-0.1941	1.47 ***	2.56*	-0.7707	0.1039	-0.8746	-0.71 ***	0.47
<b>US-FR</b>	Mean	0.6776	0.4522	0.2254			-0.9613	0.1543	-1.1156		
	Sel. Corrected	0.6776	0.4497	0.2279	1.47 ***	1.23	-0.9613	0.1499	-1.1112	-0.71 ***	-1.12 **
<b>US-CH</b>	Mean	-0.2029	0.3039	-0.5067			-1.4812	0.0198	-1.5009		
	Sel. Corrected	-0.2029	0.3300	-0.5329	1.47 ***	3.34	-1.4812	0.0139	-1.4950	-0.71 ***	0.88
<b>US-AT</b>	Mean	0.8411	-0.2850	1.1262			-0.7474	0.0547	-0.8021		
	Sel. Corrected	0.8411	-0.2540	1.0957	1.47 ***	7.16	-0.7474	0.0495	-0.7970	-0.71 ***	0.80
<b>US-IT</b>	Mean	0.5173	0.2126	0.3048			-0.7682	0.2586	-1.0268		
	Sel. Corrected	0.5173	0.2511	0.2662	1.47 ***	-15.18	-0.7682	0.2536	-1.0218	-0.71 ***	0.97
<b>US-ES</b>	Mean	0.7359	0.4475	0.2884			-0.7433	0.3663	-1.1096		
	Sel. Corrected	0.7359	0.4824	0.2535	1.47 ***	-5.12	-0.7433	0.3533	-1.0966	-0.71 ***	-0.92
<b>US-GR</b>	Mean	1.3686	0.2217	1.1469			-0.2863	0.2081	-0.4944		
	Sel. Corrected	1.3686	0.2363	1.1322	1.47 ***	-0.97	-0.2863	0.2026	-0.4889	-0.71 ***	0.34
<b>US-EN</b>	Mean	0.6308	0.2103	0.4205			-1.0659	0.0694	-1.1352		
	Sel. Corrected	0.6308	0.2405	0.3903	1.47 ***	0.96	-1.0659	0.0646	-1.1305	-0.71 ***	-0.03

Note: This Table reports estimates of coefficient and covariate effects from a classic Oaxaca-Blinder decomposition (see Blinder, 1973; and Oaxaca, 1973) and compares them with those derived from decompositions computed after taking into account selectivity through a Heckman-type model, as in Neuman and Oaxaca (2004). In the form chosen, country differences in the estimated parameters from the asset ownership equation and differences in the effects of selectivity in the amounts invested are viewed as reflecting lack of integration. See Appendix.

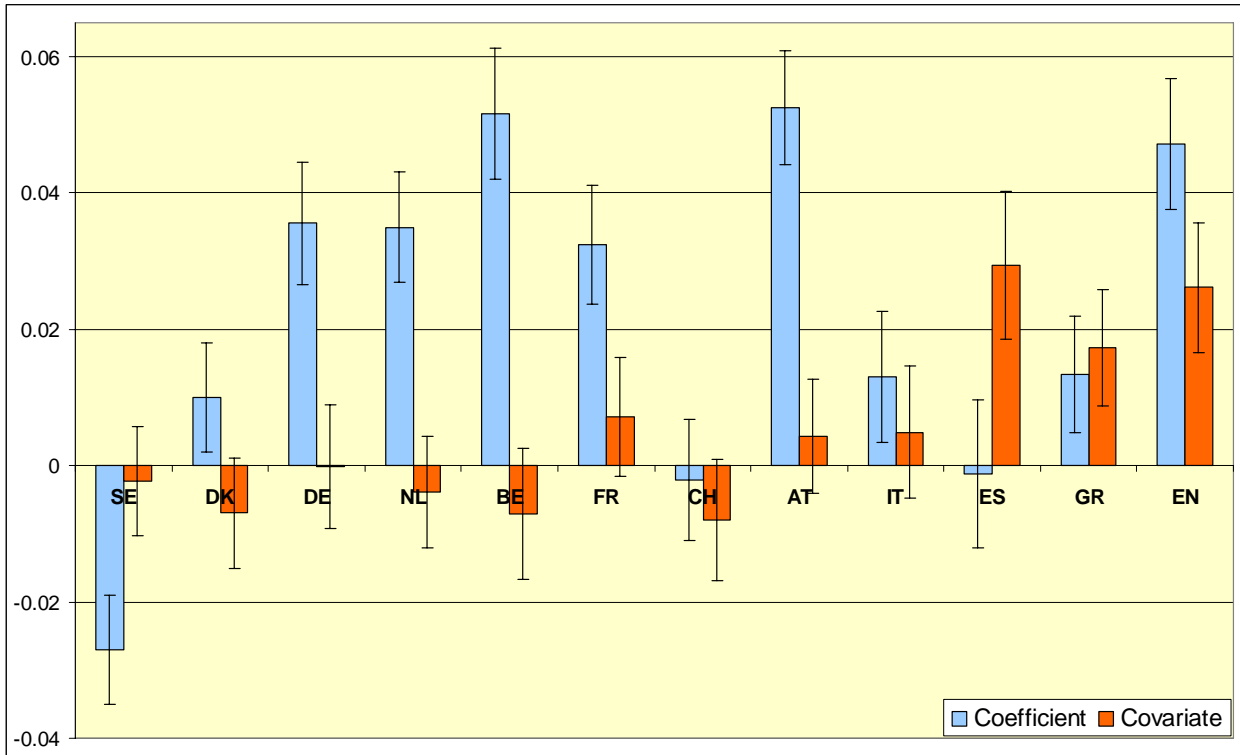
**Figure 1: Decompositions of Differences in Stock Ownership Rates (relative to the US)**



Note: All decompositions refer to differences from the US. The error bands reflect 95% confidence intervals.

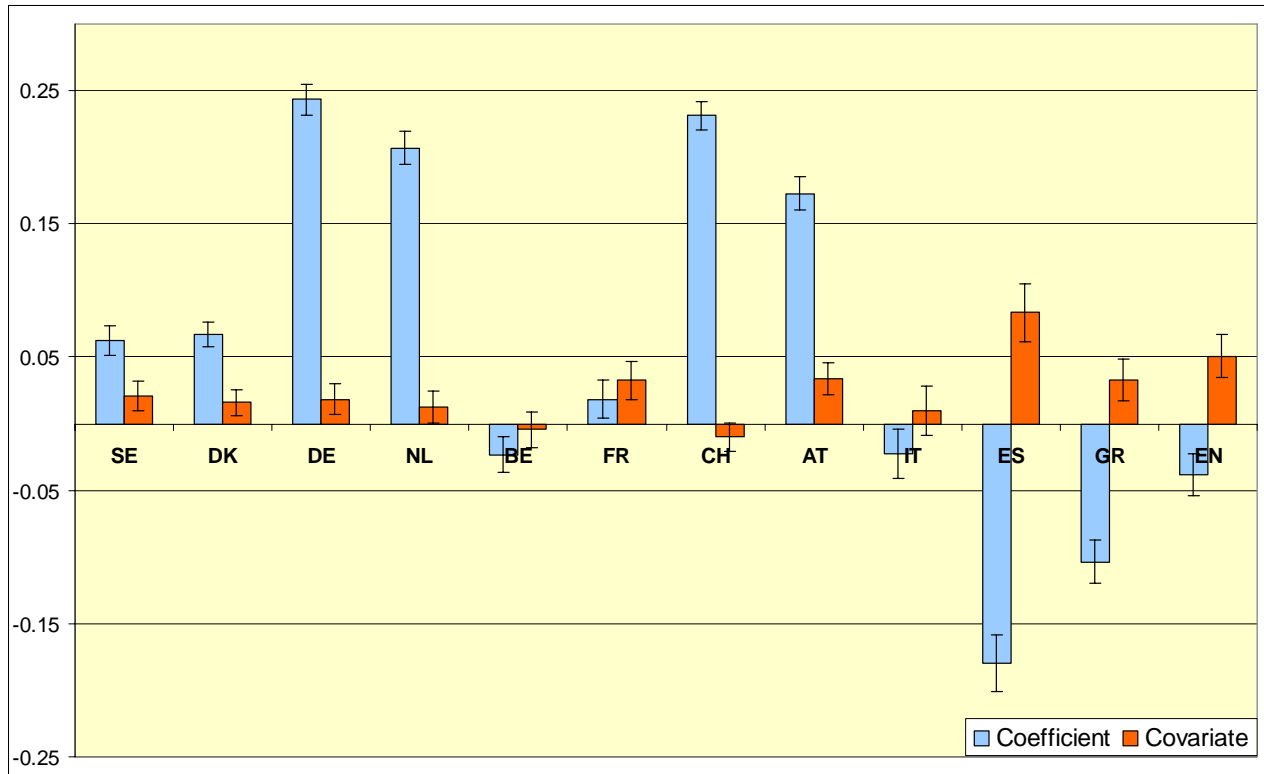


**Figure 2: Decompositions of Differences in Business Ownership Rates (relative to the US)**



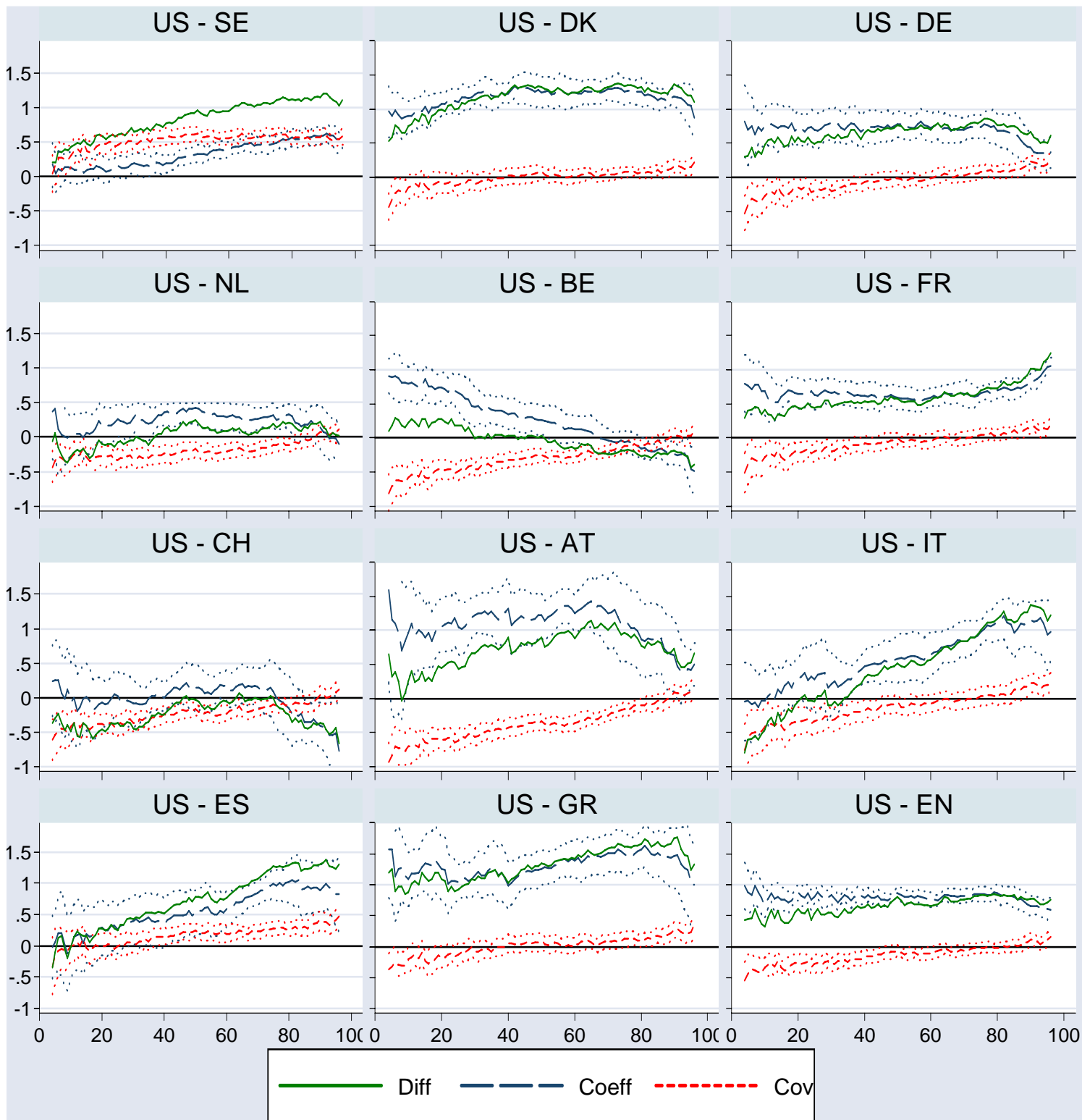
Note: All decompositions refer to differences from the US. The error bands reflect 95% confidence intervals.

**Figure 3: Decompositions of Differences in Home Ownership Rates (relative to the US)**



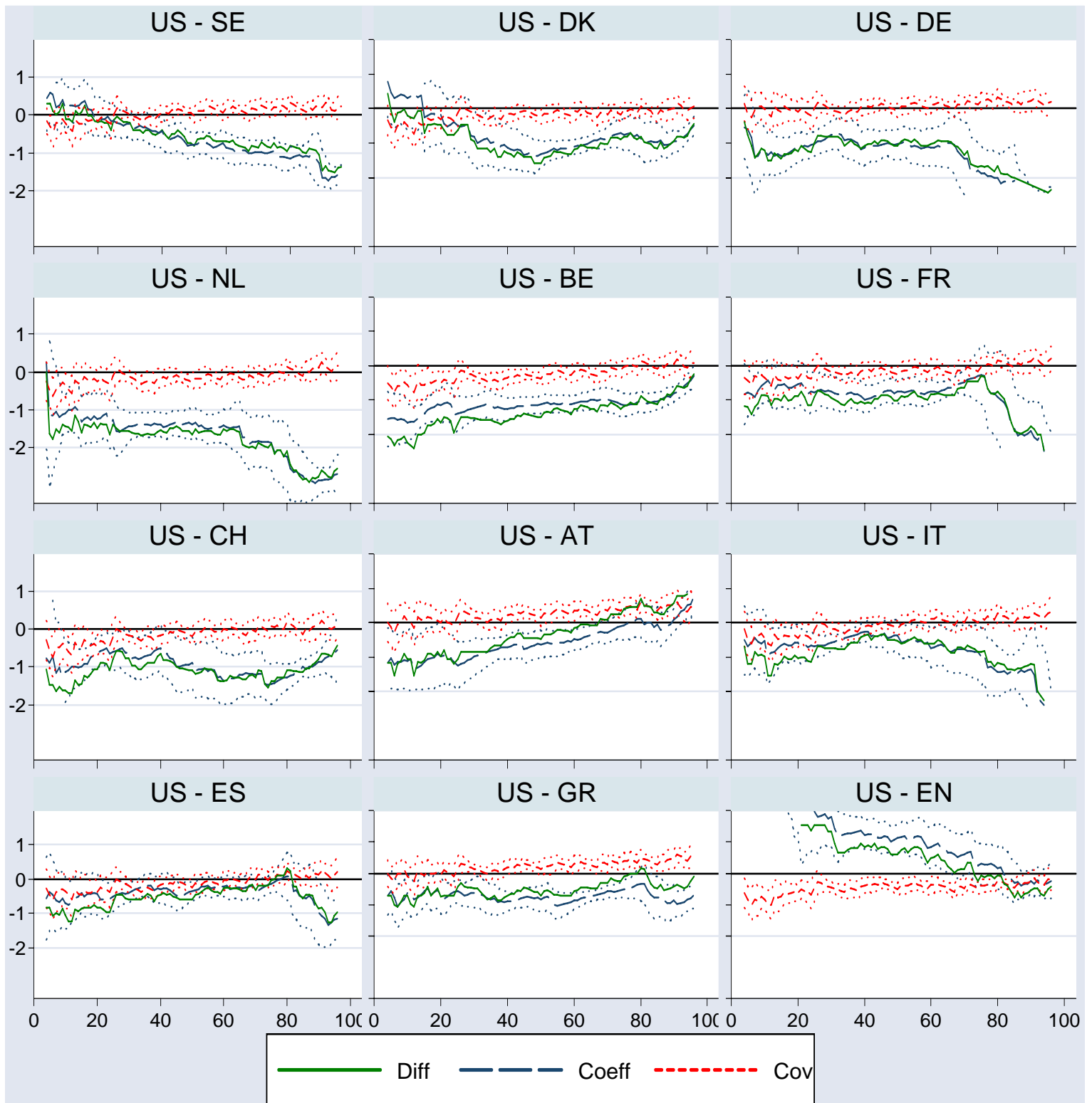
Note: All decompositions refer to differences from the US. The error bands reflect 95% confidence intervals.

**Figure 4: Decompositions of Differences in Stock Wealth Distribution (relative to the US)**



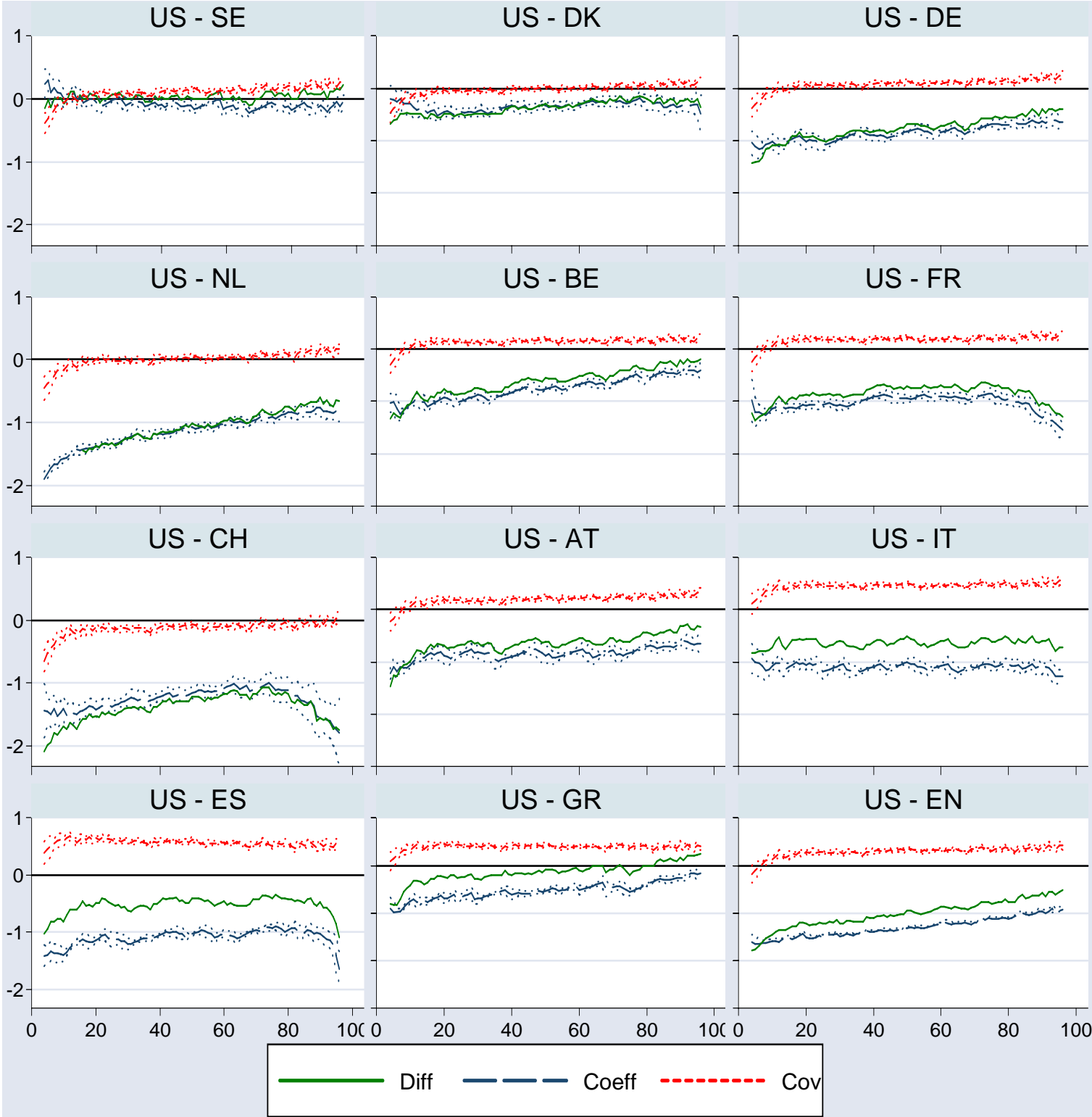
Note: The actual difference in the (log) stock wealth level, ‘Diff’, is decomposed at each percentile into two parts: one reflecting the effect of coefficients (‘Coeff’) and one due to the effect of covariates (‘Cov’). Dots represent 95% confidence bands derived using 100 bootstrap replications.

**Figure 5: Decompositions of Differences in Business Wealth Distribution (relative to the US)**



**Note:** The actual difference in the (log) business wealth level, ‘Diff’, is decomposed at each percentile into two parts: one reflecting the effect of coefficients (‘Coeff’) and one due to the effect of covariates (‘Cov’). Dots represent 95% confidence bands derived using 100 bootstrap replications.

**Figure 6: Decompositions of Differences in Housing Wealth Distribution (relative to the US)**



**Note:** The actual difference in the (log) housing wealth level, ‘Diff’, is decomposed at each percentile into two parts: one reflecting the effect of coefficients (‘Coeff’) and one due to the effect of covariates (‘Cov’). Dots represent 95% confidence bands derived using 100 bootstrap replications.

## Endnotes

<sup>1</sup> Indirect stockholding in the form of stocks in defined-contribution occupational pension plans is not available in the data and is therefore not included in our analysis.

<sup>2</sup> Studying portfolio structure has recently become both more informative and more interesting in its own right. Theory and country-level data on the structure of household portfolios are presented in the contributions contained in Guiso, Haliassos, and Jappelli (2001); and in the review paper of Haliassos (2006). Retirement accounts were a major factor promoting stockholding participation in the US. Limited stockholding participation in the early to mid 1980s was documented in US data by King and Leape (1984), Mankiw and Zeldes (1991), and Haliassos and Bertaut (1995). A number of authors have recently explored determinants of participation in stockholding. See, for example, Haliassos and Bertaut (1995), Cocco, Gomes and Maenhout (2005), Heaton and Lucas (2000), Gollier (2001), Campbell and Viceira (2002), Haliassos and Michaelides (2003), and Gomes and Michaelides (2005). Biliias, Georgarakos, and Haliassos (2006 a, b) explore effects of increased participation on the distribution of wealth and stock trading patterns, respectively. Campbell (2006) discusses stockholding participation, as well as under-diversification, and mortgage behavior of households, while reviewing the relevant literature. Campbell and Cocco (2003) study optimal mortgage choice, while Cocco (2005) studies effects of housing on the composition of the financial portfolio.

<sup>3</sup> For example, the demographic transition and the resulting inability of social security systems to provide customary benefit levels are forcing households in major European countries and the US to accumulate for retirement on their own, and governments to provide tax and other incentives for doing so. The process neither started simultaneously nor is it progressing at an even pace across countries, thus intensifying cross-country variation in mature portfolios.

<sup>4</sup> There is a vast literature on import controls and other trade restrictions, but we can point here to studies that find a home bias in trade, namely a tendency for trade to occur within national borders than across them with neighboring countries, even after controlling for tariffs (McCallum, 1995; Helliwell, 1998).

<sup>5</sup> The reference here is to the literature on foreign portfolio investment. Perhaps the most telling subset focuses on the observed tendency of households to under-invest in foreign stocks, the well-known ‘home equity bias’ (French and Poterba, 1991; Tesar and Werner, 1995; Kang and Stulz, 1997; Pastor, 2000).

<sup>6</sup> Foreign direct investment is a prime example of acquisition of a foreign real asset extensively studied in the literature. In their seminal paper, Feldstein and Horioka (1980) found that domestic saving rates explain over 90% of the variation in investment rates in a sample ending in 1974. Obstfeld and Rogoff (2000) report similar findings for the more recent period 1990-1997.

<sup>7</sup> For surveys of the vast literature on the law of one price and the purchasing power parity hypothesis, see for example Rogoff (1996) and Taylor and Taylor (2004).

<sup>8</sup> While the international version of the capital asset pricing model, ICAPM, is not rejected for developed countries (with the exception of Japan), it performs much more poorly for emerging markets that are more likely segmented (see Harvey, 1991; Bekaert and Harvey, 1995 and 2000).

<sup>9</sup> This notion corresponds closely to the motivation based on usual portfolio choice models: if households of given characteristics were faced with the same economic environment, they would make the same portfolio choices. One could go even further and argue that a subset of characteristics (e.g. the education level) is endogenously determined by the economic environment and that differences in the configuration of these characteristics are a further sign of lack of integration. We prefer to understate lack of integration rather than attempt a potentially arbitrary division of characteristics into exogenous and endogenous parts.

<sup>10</sup> Regression results are available upon request.

<sup>11</sup> We are grateful to Julia LeBlanc for providing us with comparative information on pension systems from her own dissertation work on individual retirement accounts in the SHARE countries.

<sup>12</sup> Only Spain is missing from this list picked up by our estimates.

<sup>13</sup> In Sweden, 2.5 percentage units of the 18.5 percentage units of lifetime income that are required as contribution to the public retirement scheme are saved and earn interest in a premium reserve account. The person insured can choose an investment manager for his or her premium reserve account, with the option to invest in stocks. In Denmark, The Special Pension (SP) is a mandatory individual retirement program (second pillar) with an annual contribution rate of 1% which was introduced in 1999.

<sup>14</sup> Countries where market conditions are found to favor business ownership less than those in the US include Denmark, Belgium, Austria, Germany, France, the Netherlands, Italy, Greece and England.

<sup>15</sup> Exceptions are Spain, Greece and England.

<sup>16</sup> The exception is that the Northeast is estimated to have more favorable conditions for stockholding than the Midwest.

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<sup>17</sup> Market conditions in the South are estimated to be substantially less favorable to stockholding than in the Midwest; and similarly for the Northeast and homeownership.

<sup>18</sup> See also Albrecht et al. (2003).

<sup>19</sup> Regression results are available from the authors upon request.

<sup>20</sup> The thresholds for income and wealth quartiles are defined for the base country or region over all older households. Households in the country or region under comparison to the base are then placed in quartiles according to those thresholds.

<sup>21</sup> Exceptions are Sweden, Denmark, the Netherlands and Switzerland.

<sup>22</sup> except for the West where we estimate a weakly significant (10%) effect at the middle and upper end of the distribution.

<sup>23</sup> We do not find significant coefficient effects for the Netherlands; and significant but smaller estimated effects for Switzerland and Belgium, measured as differences of log holdings.

<sup>24</sup> For example, Dutch and Swiss homeowners would have invested less in a home if they faced German conditions, consistent with this view. However, homeowners in most other countries would actually invest more in their home if they were homeowners faced with German conditions (since most coefficient effects are positive).

<sup>25</sup> The characteristics of small homeowners in France, Austria, Italy, Spain, and Greece are less conducive to large home values than those of German homeowners: if they were all faced with German conditions, small German homeowners would have larger homes. There are no statistically significant effects for large homeowners in these countries. On the other hand, large homeowners in Switzerland, Belgium, the Netherlands, and Denmark would actually invest more in a home than German homeowners; there is no evidence that small homeowners would invest differently.

<sup>26</sup> We chose as our baseline specification the one with income and wealth quartiles because it is less subject to measurement error and is found preferable according to both the Akaike and Schwarz information criteria.

<sup>27</sup> Given the computational intensity of this decomposition we estimate 19 quantile regressions (at every 5<sup>th</sup> percentile).

<sup>28</sup> We estimate a standard Heckman model with selection using the same set of explanatory variables we employ in our baseline specifications (presented in Sections 3.1 and 4.1) in both the first and the second stage. In this case the model is only identified through the nonlinear form of the Mills ratio term.