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Household Saving in Developing Countries – Inequality, Demographics and All That: How Different are Latin America and South East Asia ?

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Abstract: [*]

East Asia and Latin America have diverged in several dimensions in the past three decades. This paper compares household saving behavior in two countries in each region (Mexico, Peru, Thailand and Taiwan). We make four contributions. First, we provide the first comparisons of savings in these two regions at the micro level using synthetic cohort techniques. Second, rather than focusing only on total household saving, as is common in the literature, we disaggregate the population into education groups to determine whether there are differences in saving behavior along the distribution of income. Third, we construct forecasts of future aggregate household saving rates, based on demographic projections. Fourth, we provide evidence that allows for testing the relevance of the life cycle model for explaining the differences in saving behavior.

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1. Introduction

Due to the absence of efficient credit and insurance markets, household savings are a crucial determinant of welfare in developing countries. On the one hand, without savings, households have few other mechanisms to smooth out unexpected variations in their income, and so, shocks may leave permanent scars, such as interrupting the process of human capital accumulation at early ages. On the other, since savings are one of the only means to accumulate assets in the absence of credit and insurance markets, the capacity to save becomes one of the main vehicles of social mobility and of enhancing future income-earning possibilities. Additionally, although there is controversy regarding the relation between savings and economic growth, it is generally agreed that once savings start to rise–perhaps due to increases in income–they enhance the potential to finance investment, and lead to the creation of more opportunities in the economy.

So far there have been few studies examining saving behavior at the micro level in developing countries, since comparisons have mainly focused, with very few exceptions, on aggregate savings data. This paper uses micro data from household surveys to compare and try to understand saving behavior at the micro level in two Latin American countries, Mexico and Peru, and two East Asian countries, Thailand and Taiwan.[1] The experiences of these regions have been remarkably different in many dimensions over the past decades and we believe that an analysis based on household behavior could shed some light on why they have diverged.

We contribute to the literature on household saving behavior in four ways. First, to our knowledge, this is the first time that savings at the micro level for these two regions are compared. Analyzing household saving rather than aggregate saving–which has been compared in the literature–is useful because, without the help of microeconomic data, it is very difficult, if not impossible, to interpret aggregate saving trends and discriminate among alternative models.

Second, rather than focusing only on total household saving, as is common in the literature, we disaggregate the population into education groups to determine whether there are differences in saving behavior along the distribution of income. By focusing on different education groups rather than income levels, we focus on permanent income effects rather than cyclical fluctuations. This analysis is crucial in determining whether different sectors of

[1]These are among the only countries in each region with information on income and consumption at the household level for a series of years.

the population have different saving motives and different capacities to smooth out shocks and build up assets.

Third, we use our analysis of the life cycle profiles of household saving to construct forecasts of future aggregate household saving rates based on demographic projections. The aim of this exercise is not primarily to provide an efficient forecast of future saving rates. Rather, we want to judge to what extent projected demographic changes have the potential to bridge (or intensify) the differences in household saving between these two regions. Recently, the hypothesis that changes in demographic structure can potentially affect in fundamental ways the process of growth and, at the same time, saving, has received renewed attention. It has been argued that East Asia benefited in the recent past from demographic shifts in which the relative size of the age groups that produce and save the most has been increasing, and that this is one of the main reasons why East Asian countries' economic performance and savings have been enhanced.[2] Latin America is on the verge of experiencing similar–although somewhat smaller–demographic changes, so it is of interest to verify the extent to which these shifts will contribute to increased savings in the region.

Fourth, micro data allows for testing different theories of household saving, and in particular, the relevance of the life cycle model in its different incarnations. We provide evidence that helps to judge the usefulness of the theory for explaining the facts.

An additional element of interest of the evidence we present is that the two Latin American countries we consider experienced economic shocks during the period under analysis, which are similar to those observed in the recent past in East Asia. Thus our analysis, and especially the evidence on different groups, may also provide suggestive insights about the reaction of savings to shocks and about the capacity of different groups of the population to smooth them out, which may be of relevance for policies aimed at protecting vulnerable groups in East Asia.

We complement our analysis of saving behavior by examining a number of household decisions that are closely related to the inter-temporal allocation of resources. For instance, savings are likely to be affected by demographic variables via family composition effects, so heterogeneity in this dimension is likely to be quite important. It is also very likely that saving behavior is linked to labor supply decisions and, in particular, to labor force participation. Additionally, if different groups of the population, such as those endowed with different quantities of human capital, face different earning life cycle profiles, they will also

[2] See Bloom and Williamson (1999) and Behrman *et al*. (1999).

have different incentives to save. It is therefore important to characterize, as we do below, the behavior of different groups of the population, such as those with different education attainment, as well as characterizing changes in household composition and labor force participation over time.

An analysis of this type is not without limitations. First of all, both micro and macro data are affected by severe measurement problems. Not only are they measured with error, but also they often measure different concepts. Differences in the definition of consumption (in particular for items such as housing and health expenditure), in the population of reference (which is typically much smaller for survey data), and in the treatment of income sources (especially for pension contributions, interest income, capital gains, and imputed rents), all prevent a direct comparison between aggregate measures of saving rates and measures derived from micro sources. Furthermore, in the National Accounts of many developing countries national saving is not disaggregated into private and public, and, when available, private saving is not divided between households and corporate. On the other hand, in the few micro data sources available, data on asset ownership, entitlements to pensions and so on, is of very limited scope and quality. Thus, matching aggregate private saving to micro data is not easy. Even if one thinks that households are the ultimate owners of corporations and assumes that they are able to "pierce the corporate veil," aggregate private saving and micro data may differ if foreign investors own some firms.

In addition to these measurement problems, there are important conceptual problems. The main one is that some expenditure items, such as durables, housing, education, and health, have important saving components, but it is difficult to establish how large the saving components are. We will cut through these issues by making some strong assumptions and trying alternative definitions of consumption and saving. In the end, however, given the data available, some problems cannot be solved and one will have to keep in mind some important caveats in interpreting the results.

Another issue that needs to be borne in mind is that while saving is an intrinsically dynamic phenomenon, micro data, when available, do not typically follow the same individuals over time because they lack a genuine longitudinal dimension. To obviate this problem, we make extensive use of the synthetic cohort techniques pioneered by Browning, Deaton and Irish (1985) and used, since then, in a variety of situations. The basic idea is to follow the average behavior of groups whose membership is assumed to be fixed over time. This procedure allows us to study the dynamic behavior of the average of the variable of

interest in different years. Even this technique, however, is not exempt from problems. The most important are the endogeneity of family formation and dissolution, and the differential mortality and migration rates across socioeconomic groups (see Behrman *et al*., 1999 and Attanasio and Hoynes, 1998). We discuss some of these issues below.

Apart from this introduction, the paper includes seven sections. Section 2 briefly reviews the evidence on aggregate saving trends across regions and individual countries between 1960 and 1997, as well as the changes in demographics, schooling levels, and labor force participation that have taken place. The rest of the paper focuses on saving at the household level. Section 3, discusses the main methodological issues for the micro analysis as well as the databases for the empirical section. In Section 4 we report evidence on saving profiles by age, schooling and income at a single point in time to shed light on the nature of the differences in the most recent year available. Section 5 analyzes the evolution of fertility, female labor force participation, household structure, and the demographic structure of the countries, all of which are closely related to saving decisions. Section 6 focuses on the life-cycle analysis of household saving. The savings patterns are presented for the whole sample and are further disaggregated by classifying the population into education groups. Section 7 uses the micro data and demographic projections to forecast changes in household saving in the future, in order to verify whether the savings gap between the regions will tend to narrow or widen. Section 8 concludes.

2. Aggregate Saving Trends in East Asia and Latin America

It is well known that one of the main differences in the development experiences of East Asia (EA) and Latin America (LA) is that EA has registered much higher savings rates for quite some time. Panel 1a in Figure 1 plots the patterns for national saving as a share of GDP for these two regions, based on data from the World Bank World Development Indicators, 1999. In EA we include only Korea, Singapore, Hong Kong and Thailand, which are some of the fastest growing economies with high saving rates (Taiwan is not included due to lack of data). The LA aggregate includes all the countries in the region for which information is available. Rather than presenting means by region, which are quite "noisy," we present smoothed profiles obtained by regressing the saving rate on dummies for each year and controlling for all country characteristics.[3] According to the figure, national saving rates were

[3] Specifically, the graphs plot the coefficients for the year dummies that result from putting together two panels with a different mix of countries depending on the region, and then estimating fixed effects regressions on each

already slightly higher in EA by 1970, but they have diverged quite dramatically since then. National saving rates increased in LA in the early 1970s and then collapsed in 1982 with the initiation of the debt crisis. There was a slight recovery in the second half of the 1980s, while the rate in EA increased continuously throughout the following 28 years. The gap between the regions by 1997 was about 20 percentage points.

Panel b in Figure 1 plots the trends in *domestic* saving as a share of GDP smoothed out in the same way as Panel 1a. The story is similar, although the differences are even more apparent. The average domestic saving rate of the two regions was the same in 1965, but a gap appeared–and widened continuously–thereafter. Thirty-two years later, in 1997, the average domestic saving rate in LA was around 17%, while the rate in EA reached almost 40%. So, most of the difference observed in the overall savings rates by region is attributed to the patterns in domestic saving.

Figure 2 presents the domestic saving rate for selected EA and LA countries.[4] There are several interesting features from this graph. The most important from the perspective of this paper is that the four EA countries start out with domestic saving rates lower than the LA countries in 1960, but they experience a huge increase during the following 28 years. With the sole exception of Chile, there is not one LA country among those selected in the figure that registers a saving rate significantly higher in 1997 than in 1960. Apart from Chile the only exceptions could be Mexico and Ecuador, but even in these cases the domestic saving rate increased by less than 10 percentage points, while the average increase in EA was 30 points. Another feature is that the saving rate in LA is much more volatile than in EA. The four EA countries show a much smoother pattern and continuous increases throughout. In LA, the saving rate changes quite dramatically from year to year in some countries (see for instance Peru, El Salvador and Nicaragua), and there is not a single case where there is a positive trend throughout the period. By 1997, all the EA countries in the figure have much higher saving rates than any of the selected LA countries.

The results in Figure 2 are especially important in light of the analysis with micro data in later sections. They reveal that we will be comparing two countries (in LA) going through intensive crisis and volatility in saving rates, with two others (in EA) where domestic saving have increased continuously and smoothly throughout. When interpreting our results, we will have to keep this in mind.

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panel, where the dependent variable is the saving rate.

[4] The source is also the World Development Indicators.

At the same time that domestic saving patterns were diverging in EA and LA, there were also significant differences in other related dimensions. One of the most closely related to saving is fertility. Total fertility rates declined much faster in East Asia than in LA. Panel 1c presents the smoothed young dependency ratio between 1950 and 1997 and illustrates that by 1965 the demographic structure of the two regions was almost the same, but that after this year there is an expanding gap. Fertility in both regions started declining around the 1950s, but since the reduction was much faster and steeper in EA, by 1965 the cohorts entering working age were much larger than the newborn cohorts. The implication for savings is that since 1965 a much larger share of the population was entering the ages characterized by higher saving rates, and this composition effect might be an important force behind the differences in panels 1a and 1b.[5]

The reductions in fertility in the two regions are highly correlated with sharp increases in female labor force participation. Fertility and female labor force participation are usually jointly determined, and they have a double effect on savings behavior: lower fertility rates imply fewer children in the average household, while higher participation implies more household members in the work force, and thus more income. The result of both effects is higher household per capita income, and thus higher saving capacity. Figure 1d illustrates not only that EA registered a much faster demographic transition, but also that the proportion of females in the labor force has been considerably higher. Female participation was already lower in LA since 1960, and although the pace at which it has increased has been slightly faster than EA, the gap between the regions remains high.[6]

Another important transformation taking place in these two developing regions at the time when their saving patterns were diverging, is the schooling transition towards higher levels. Here also EA has had much faster progress than LA. Figure 1e plots the average years of schooling of the population over 25 years of age (taken from Barro and Lee, 1994) and illustrates how on average EA had .7 years of schooling more than LA around 1960, but the difference is more than 2.5 years in 1990. More educated individuals usually have higher incomes, and thus, higher savings capacity, so this is another of the potentially important factors behind the differences in domestic saving documented above.

Finally, as discussed in the introduction, it is not totally clear if economic growth precedes higher savings rates, or the other way around. Figure 1f shows that since the mid-

[5] Young dependency rates are calculated from the United Nations Population Statistics, 1998 revision.
[6] The proportion of females in the total labor force is taken from the WDI, 1999.

1970s EA has had higher levels of GDP per capita (PPP adjusted), but that the differences in growth rates started becoming apparent in the mid-1960s, precisely when domestic saving rates surged (Figure 1b).

Regardless of the causality between savings and demographics, female participation, schooling progress and GDP growth, it is evident that EA and LA have diverged considerably in all these dimensions since around 1965. To explore these relationships further we rely on household survey data in what follows, but before doing so, we discuss some important methodological issues.

3. Methods and Data

The main purpose of the analysis in the following sections is to characterize the patterns of household saving over the life cycle. The conceptual framework on the background is the life-cycle model, even though we do not take a stance on the particular version (with precautionary saving, liquidity constraints, bequest motives, habit formation) that might be most appropriate to describe the data. In addition to the description of life cycle profiles for savings for the population at large, we focus on the differences in behavior among different groups of individual households. We also relate the observed saving behavior to other variables, in particular demographic ones, which are likely to be important determinants of savings. This type of analysis is useful for several reasons. First, the focus on different groups of the population, characterized by differences in earning profiles, demographics and shocks received over the sample period, could be useful in shedding light on the determinants of saving. We also stress the important differences across groups that are hidden by the aggregate analysis. This is particularly important for Latin America, which is characterized by a substantial amount of inequality. Second, the identification of age profiles for saving, if one gives them a semi-structural interpretation, allows the extrapolation of the relationship that links saving rates to demographic variables and thus forecasts future household saving rates.

The type of micro data available in different countries dictates the type of technique we use. Unfortunately, most Latin American countries with household surveys containing information on both income and consumption have only one or two data points available. Since we think that cohort effects are particularly important, in the rest of the paper we perform a dynamic analysis focusing on the two Latin American countries (Mexico and Peru) and two South East Asian countries (Thailand and Taiwan) with the information available to

us for several points in time. As we will study a dynamic phenomenon and we use time series of cross sections, we are forced to use synthetic cohort techniques. These allow us to follow the same groups of individuals over time, even in the absence of a genuine longitudinal dimension in the data.

3.1 Methods

The age profile of saving rates, consumption or any other variable in a single cross-section might not correspond, in the presence of strong cohort effects, to the age profile of any individual. To obviate this problem we group the observations in each of several repeated cross sections according to one or more variables chosen so that the group membership from which the observations are drawn is likely to be fixed. In this way, instead of following the behavior of single individuals over time, one follows the average (or any other moment) of the variables of interest for the groups. In the context of a life cycle model, an obvious way to form groups is on the basis of the year of birth of the household head, so that we can follow the behavior of different cohorts as they go through different phases of their life cycle. In what follows, however, in addition to year of birth cohorts, we also consider education groups, under the assumption that the accumulation of human capital can be done only in the early phases of the life cycle.

While the use of synthetic cohorts is extremely useful, the technique is not exempt from problems, since group membership might be changing over time and family formation and dissolution could be endogenous to the phenomena under study. Differential mortality and migration can also induce changes in composition. Endogeneity of family formation and dissolution is relevant if the propensity to form a household at the beginning of the life cycle is different in different groups of the population and if family dissolution results in elderly individuals going to live with their offspring. Extended families and family arrangements in old age are particularly relevant for our analysis as they are directly related to life cycle saving and the incentives to it.

Most of the analysis we conduct will be graphical. In particular, with the purpose of identifying the life cycle profile of several variables of interest, we will plot the average data for each cohort against age. As different cohorts are observed over different parts of their life cycle we will be able to track the age profiles. Moreover, if the sample period covered by the time series of cross section is longer than the interval used to define a cohort, we will observe different cohorts at the same age, although, obviously, at different points in time.

In what follows, an important identification caveat should be kept in mind. While it is true that with a long enough sample period, one observes different cohorts at the same age, one should resist the temptation to always interpret the resulting differences as due purely to cohort effects. The obvious reason is the possible presence of year effects. In general, while we use smoothing techniques to present age and cohort effects, strictly speaking, age and cohort effects can never be disentangled without additional information or restrictions from time effects, because of the exact linear relationship linking age, time and year of birth. While in some cases, such as demographic variables, it is natural to impose the absence of year effects, in other cases this assumption is a strong one and the results should be taken with caution. One should always remember that any combination of cohort and age effects can be obtained as a combination of age and time or time and cohort effects. We discuss these issues further below.

Once we estimate the age effects for saving rates in Section 7, we extrapolate them to forecast future aggregate saving rates. In particular, we use the following relationship. If we indicate with S_t^{ag} *and* Y_t^{ag} the aggregate saving and income at time t, and with S_t^c, Y_t^c *and* N_t^c the saving, income and size of group *c* (cohort) at time *t*, the aggregate saving rate will be given by the following expression

(1)
$$sr_t^{ag} = \frac{S_t^{ag}}{Y_t^{ag}} = \frac{\sum_c S_t^c N_t^c}{\sum_c Y_t^c N_t^c} = \sum_c \frac{S_t^c}{Y_t^c} w_t^c$$

where $w_t^c = \frac{Y_t^c N_t^c}{\sum_c Y_t^c N_t^c}$. If one assumes that group saving rates are a function of age and cohort effects, one can project in the future the group saving rates $\frac{S_t^c}{Y_t^c}$ estimated in the micro data with equation (1), relative income profiles and demographic projections to forecast future saving rates. These forecasts, however, should be treated with extreme caution. They are based on the behavior generated in a given economic environment (that is, by households facing given earning and demographic profiles and a given set of institutions, including arrangements for old age). Moreover, the data problems mentioned above make matching between the micro and macro measures of saving very difficult. Nonetheless, these forecasts

are informative regarding the potential effects of demographic trends and changes in the composition of the population on aggregate saving.

If the groups are defined not only on the basis of the year of birth of the household head, but also on education achievement, forecasting using the aggregate saving rate in equation (1) becomes even harder. This is because it involves forecasting not only the age structure of the population (for which demographic projections can be used), but also the accumulation of human capital. General equilibrium effects, and in particular the effect that the relative size of different skill groups might have on the returns on human capital, complicate this type of exercise even further. Notice that, in the absence of cohort effects, one can in principle use the age profile from a single cross section to perform the same exercise. Additional caution, however, is needed when interpreting such an exercise.

Even if one does not want to disentangle age and cohort effects and considers equation (1) at two points in time, one can use it to decompose the changes in aggregate saving rates in changes due to shifts in the cross sectional age profile and changes in the weights:

$$(2) \qquad sr_t^{ag} - sr_{t-1}^{ag} = \sum_c s_t^c (w_t^c - w_{t-1}^c) - \sum_c w_{t-1}^c (s_t^c - s_{t-1}^c)$$

Changes in weights can be in turn be decomposed into changes in the relative sizes of different age groups and changes in their disposable income. We perform this accounting decomposition in Section 5.

3.2 Data and definitions

Good quality micro data including information on income and consumption are few, and when available for a country, they tend to be far apart in time. This is true both in developed and developing countries. For Mexico, Peru, Thailand and Taiwan cross-sectional data, observed at several points in time, is available to us. For Mexico we have data from five surveys, collected in 1984, 1989, 1992, 1994 and 1996. The last year of data is of particular interest because it refers to the year just after the Peso crisis. The data from Peru refer to the years 1985, 1991, 1994 and 1997. Again, in the case of Peru, two surveys surround the 1990 crisis that drastically affected the Peruvian economy.[7] The data from Thailand are from the

[7] The Mexican surveys are the "National Survey on Income and Expenditure of Households" by INEGI. The

Socio-Economic Survey (SES) by the National Statistical Office and refer to eight years, 1975, 1981, 1986, 1988, 1990, 1992, 1994 and 1996. Finally, the data from Taiwan, are annual data from 1976 to 1996 from the Family Income and Expenditure Survey, by the National Statistics of Taiwan. For all these data we are able to construct measures of disposable income, consumption, family composition, educational attainment and labor supply. Some of the definitions that are relevant for the analysis of saving are:

1) In all four cases, income is defined as household disposable income. This includes earnings, transfers, capital income, and non-monetary income.
2) We use four definitions of consumption to calculate savings rates (s), when available: the first includes all household expenditure and is the closest to the definition typically used in National Account data (we call this s_1). With the second definition we try to take into account the fact that some expenditure items have an important saving component. Therefore, we exclude from consumption all expenditures on durable goods as well as expenditures on health and education. We label this measure s_2. While far from perfect, as, for example, it does not include the services accrued from durable goods, the analysis of this alternative definition of consumption and saving deserves attention. The third definition excludes only expenditures on durable goods, but considers health and education as current consumption, rather than as savings (s_3), as in s_2. Finally, a measure we label s_4 includes durable and non-durable expenditures in the definition of consumption but excludes health and education, which are considered as savings in this case.
3) All surveys include some definition of human capital. We divide the population into three groups, primary education or less, some secondary schooling, and higher education. Different institutional factors across countries are taken into account for this classification.
4) Household arrangements are somewhat different across countries. While we present some evidence on this and we document the extent of possible problems with endogenous family formation and dissolution, in the end we use the standard definition of declared household head across countries.

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surveys considered here are strictly comparable in terms of questionnaires, objectives and sampling techniques. The data for Peru come from the "National Household Survey for the Measurement of Living Standards" and are comparable to a large extent. The only difference is that the 1991 survey excludes some rural areas from the sample. However, restricting the comparison to exactly the same geographic areas in all four years does not change any of our conclusions.

Throughout the analysis we divide the samples in year of birth cohorts. To be able to work with cells of reasonable size we use a five-year definition. The cohort definition is homogeneous across countries and is given by Table 1. In the table, in addition to the definition of each cohort, we report the average cell size for each of the sets of surveys used in the dynamic analysis. Interestingly, one of the smallest samples is observed in the country with the largest population. Mexico's population is larger by around 70 million individuals than the population in Taiwan, and still the Taiwan data has 50% more observations than the Mexican data set. The differences are larger at higher ages. Since Mexico and Peru have the smallest samples, any estimate derived for these countries will have a lower degree of precision, especially for older cohorts, than the two Asian countries. With the single exception of Thailand (where they are not available) we use population weights to compute our results.

4. Static Analysis for the Most Recent Data

The data on aggregate private savings rates presented in Figure 2 are far from perfect for many reasons. One of the main reasons is that savings in the National Accounts are calculated as residuals of other aggregates that are also measured with some error. In this section, we first complement the aggregate evidence by presenting household saving rates calculated from the micro data for the most recent year available in each of the four countries. Since we have access to the micro data, we also characterize saving for different population subgroups and ask if the differences in savings rates across EA and LA are due to the demographic differences illustrated in Figure 1. We leave to Section 5 the dynamic analysis.

4.1 Differences in Savings, Demographics, Participation and Schooling

To make the link between the aggregates presented in Section 2 and the results from the micro data, we concentrate on the most standard definition of savings, which corresponds to total disposable income minus total expenditures, divided over total disposable income (s_1). The figures we present are computed as ratios of average saving and average income, rather than the average of the ratio. This procedure reduces the effect of outliers. Table 2 presents s_1 along with the aggregate domestic saving rates from the World Development Indicators 1999 for 1996 (plotted in Figure 2). Thailand appears to have a higher rate of domestic saving (almost 36%), while Mexico, Peru and Taiwan do not show significant differences. However, when we turn to the micro data, a totally different picture emerges. Mexico and Peru register

an s_1 of around 9.5 points, while Thailand and Taiwan have rates of 29.7% and 49.1%, respectively. Thus, Thailand has a much higher rate of domestic saving, and it seems that an important source of the difference is originated at the household level. In the case of the comparison with Taiwan, there is a huge gap at the household level. So, if we set aside the issue of the comparability of micro and macro sources, the small difference at the aggregate level must be originated by lower public and corporate savings in this country.

In the table we also report young dependency ratios, female labor force participation rates, average years of schooling and GDP per capita. As expected, dependency ratios are much higher in Mexico and Peru (by about 10 points), reflecting that these countries are at an earlier stage of the demographic transition, with a smaller proportion of its population in working (and saving) ages, which is consistent with their lower savings rates. Thailand has much higher female participation rates than Mexico and Peru, and since higher participation is associated with higher savings capacity, the result is also consistent with the huge gap in household saving rates. However, Thailand also registers lower average years of schooling than the two Latin American countries, and similar GDP per capita. Since these measures are normally associated with lower savings capacity, they cannot account for the difference. Institutional factors, such as the lack of compulsory retirement benefits in Thailand up to 1999, along with a tradition of public pension provisions in Mexico and Peru, might be one of the elements behind the gap in household savings rates. In the case of Taiwan, the lower dependency ratios, the higher average years of schooling, the greater GDP per capita, and the higher female participation rates (than Mexico) are also consistent with the huge gap in household savings rates with respect to Mexico and Peru.

One possible explanation for the differences between aggregate household saving rates between the two regions, suggested by the evidence in Table 2, might be that the Asian countries are at a later stage of the demographic transition, with larger shares of their populations in ages where saving rates typically peak. Table 3 plots the saving rate for 5-year age groups (using household heads as reference), as well as the share of all households in each group for each of the four countries. The total saving rate obtained as a weighted sum of age-specific rates is also presented in the third line. The most interesting feature is that for all ages the saving rate in Thailand and Taiwan is higher. The weight of the middle-age groups is also somewhat greater, as expected. As a gross approximation to assess the role of demographics in these differences, we re-compute the saving rate in Mexico and Peru using Taiwan weights, and vice versa, and present the results in the first group of calculations at the

end of the table. Although the rate for Mexico and Peru increases and declines for Taiwan, the difference with the original saving rate in each country is only marginal. This suggests that having larger shares of household heads in age-groups that save more does not account for the major differences in saving behavior between these two countries.

But this accounting exercise accounts for demographic differences only partially, since it considers the distribution of households across working ages, but it ignores that the major source of demographic difference is that larger shares of the *total* population in LA are in the 0-15 age range. The line below the original weighted savings rates in Table 3 includes the share of each age group relative to the *total* population. The results clearly show that the two LA countries have relatively fewer individuals in prime working ages. The second accounting exercise presented at the bottom of the table is an attempt to take this into account, at least in a very general way. The calculations simply consist of weighting the age-specific savings rates in Peru, Mexico and Thailand, by the total population weight of Thailand, while Peruvian shares weight the Taiwan rates. When we do this, the difference between the LA countries and Taiwan narrows from the original 37 points to around 14 points, which gives us a gross idea of the importance of differences in demographic structure.

In Table 4 we report saving rates by education groups. In this case also, we observe that Taiwan and Thailand have much higher rates, and interestingly, the largest differences between Thailand and LA are among the most educated households (a difference of 28 points, as compared to 22 points for the least educated). The table also presents the population weights as well as the weighted average of the saving rates in each group. Clearly, the differences in total household savings rates are not given by the size of the education groups, but by the differences in the group-specific rates. The simple accounting exercise at the bottom of the table, where we recomputed the LA averages using Taiwan weights, and vice-versa, confirms this.

To examine differences along the income distribution, Table 5 presents income quintile-specific saving rates. In this case also, the most apparent difference between Thailand and the LA countries lies in the fact that the rates in Thailand are considerably higher at the top of the distribution. They are already positive in the second quintile, but the gap between the countries is greatest among the top 20%. Surprisingly, the only group where Mexico presents higher (less negative) savings rates is in the poorest 20% of the population. This might be an indication of the importance of transitory income components in the two countries, or of larger measurement error that characterizes the lowest incomes. A large part

of the difference between the aggregate saving rate in these two countries is explained by the extremely high rates among the population in quintile 4, and especially among the households in the richest quintiles.

The only country to have small differences in income distribution is Taiwan, where there is only a 14-percentage point gap between the poorest and richest quintile. This is not surprising, since this country has very low inequality levels, as indicated by the last column of the table. In the bottom part of Table 5 we present the difference between the quintile savings rates in Taiwan and that in each of the other countries. The most interesting feature is that, in all cases, the largest difference is observed among the poorer quintiles. The comparison between Peru and Taiwan is especially illustrative. The difference in total household saving rates between these two countries is about 40 percentage points, but practically all the difference is explained by the disparities among the first four quintiles of the distribution. In fact, the richest 20 percent in Peru save only 15 points less than their counterparts in Taiwan. Although the comparison between Mexico and Taiwan is less extreme, the conclusion that the largest part of the difference in household savings originates among poorer quintiles also holds.

So, differences in the relative importance of education groups do not account for the large disparities in household savings across EA and LA, while differences in demographic structure have the potential for explaining part of the gap. An important part of the story, however, is the difference in saving rates across the income distribution. It is difficult to determine whether the discrepancy is because (i) when income is more equally distributed all groups of society have similar earnings and saving potential, or (ii) that when more individuals are able to save for reasons other than their income, then they are able to build up income-earning assets which provide them with higher incomes. But regardless of the causality between income inequality and savings, the finding is important because it reveals that in Mexico, Peru and Thailand, the richest sectors of the population have a much greater capacity to accumulate assets and much better possibilities of smoothing out unexpected shocks than the rest of the population, while in Taiwan this is not the case. In Mexico and Peru practically all household savings originate among the richest 20% of the population. After accounting for these differences along the distribution, it is much less surprising that Taiwan and Thailand have savings rates well above those registered in the two LAC countries.

5. Evolution of Aggregate Household Data Over Time: Evidence from Mexico, Peru, Thailand and Taiwan

Table 6 presents the evolution of the four definitions of household saving for each country.[8] In Mexico, s_1 increased between 1984 and 1989, a period characterized by stagnation and the partial recovery of growth after a substantial drop in 1986. The 1989-1994 years were characterized by a consumption boom, but, at the same time, by an increase of 3 percentage points in the saving rate. The trend followed by s_2, s_3, and s_4 is similar between 1984 and 1989, while for 1989-1994 the increase is much smaller, and there is even a decline in some cases. This reveals that while the consumption of durable goods was increasing, expenditures on non-durables, education and health where increasing at a lower rate. Between 1994 and 1996, the averages for s_1 and s_3 decline sharply, while s_2 and s_4 increase. In the case of the median, for all four definitions savings rates declined during this period. They increase much less or decline between 1984 and 1989, and drop in 1992, rather than increasing. Thus, the savings rates of the poorest 50% of the population have been less responsive to the increase in income after 1989, while the 1994 tequila crisis had a larger negative effect on their savings, perhaps because of the limited income smoothing mechanisms available to this group.

Household savings for Peru have been much more erratic. Average rates increase between 1985 and 1991, decline toward 1994 and rise in 1997. This trend is quite surprising, since the country experienced sharp declines in GDP per capita during the 1980s and a more stable growth pattern during the first half of the 1990s. The only period where savings rates behave as would be expected is 1994-1997, where GDP per capita was growing at a much higher pace. In the case of the median rates, the results reveal that the 1991 crisis had a larger negative effect on the poorest 50% of the population, while the 1994-97 recovery years have not had the positive effect observed at the upper part of the distribution.

The picture for Thailand and Taiwan (for which we plot selected years) is quite different. For instance, if we compare the pattern between 1985-6 and 1996, which is similar to the period covered in LA, we find that, with few exceptions, household savings have

8 In Peru we are only able to compute s1 due to the lack of data by expenditure item. The estimates for 1984, 1989 and 1992 for Mexico do not coincide exactly with the estimates of S1 and S3 reported in Table 1 in Székely (1998) although they are produced with the same data. The difference is that Székely measures saving as the difference between disposable income and non-durable consumption, but he adjusts consumption to include interest payments from debt. We have not done the same adjustment here, and therefore, the saving rates are 2.6, 1.8 and 2.3 percentage points higher for S1, and 2.4, 1.7 and 2.6 point greater in the case of S3, than those reported in Table 1 in Székely (1998). However, all estimates for Mexico are compatible with the ones in

increased rather smoothly. They peak in the last year at 33%, 62.3%, 56.9% and 38.8% for each of the definitions, respectively, in Thailand, and at 49.1%, 84%, 74.8% and 58.5%, respectively, in Taiwan. The pattern followed by each saving rate, and the median rates, shows that the increases have been quite generalized across definitions and along the income distribution.

The last two columns of Table 6 present the domestic saving rate as a share of GDP and use the volume of annualized household savings from the surveys to estimate the relative importance of household savings at the national level. This is only a gross approximation, however, because household surveys normally suffer from income misreporting or under-reporting, so we are not sure that this data reflects the total volume of household savings with precision. Furthermore, the calculation does not account for the savings that households have in firms, the value of pensions, and other important items. In any case, the results are useful for identifying differences across countries. As expected, household savings rates account for the largest share of GDP in Taiwan, but interestingly, although household savings are lower in Mexico than Thailand and similar to Peru, they represent a much larger share of GDP in this country. The results confirm that a very large part of total domestic saving in Taiwan is originated at the household level.

Table 7 uses the decomposition in equation (2) of Section 3 to decompose the changes documented previously into three effects. The first is an age profile effect, which accounts for the increase in savings that is due to the fact that cohorts age through their life cycle and save more or less depending on their needs and future prospects. The second is a demographic effect that measures the change in savings due to the fact that the population weight of different age groups shifts. The third is an income effect that accounts for the fact that, as individuals age, their income tends to rise, and thus they have greater savings capacity.

The table only presents the decomposition for the first and last year available for each country and shows stark contrasts between EA and LA. In Mexico and Peru all of the shift is driven by the age profile effect of cohorts moving along the life cycle, while in Thailand and Taiwan, the age profile effect is also positive, but most of the shift is accounted for by demographic and income effects. This supports the view that the EA countries have experienced much larger increases in savings because of the increase in their income and the shift in the weight of age groups that save more, and not because of households moving along the life-cycle.

Attanasio and Székely (1998).

It must be borne in mind that the time span for the comparison in Table 7 for EA is larger, and most importantly, that the period under analysis in LA is characterized by economic instability and low economic growth. So, a large part of the difference may be reflecting that the economic environment in EA has been much more favorable for building up savings than in LA.

6. A Life Cycle Analysis of Household Saving Behavior

We are now ready to analyze the life cycle patterns of household saving in the four countries under study. For such a purpose we use the time series of repeated cross sections to construct synthetic panel data. As mentioned above, we divide each survey into twelve birth cohorts and three education groups. As we mentioned above, much of the analysis in this section is graphical. In particular, we will be plotting the life cycle profile for several variables of interest. It is therefore worthwhile to describe briefly the way in which we construct the graphs. We plot the cohort averages at different points in time against the age of the household head and connect the points referring to each cohort. Visually, therefore, we follow the average behavior of each cohort as it ages. If the interval that defines a cohort is shorter than the length of the period covered by our sample, we will observe different cohorts at the same age. While it is tempting to interpret such a difference as a cohort effect, one should remember that these figures refer to different years and, therefore, could be equally explained by a time effect.

6.1 Changes in Family Formation and Composition

We start the analysis by looking at the issue of family formation. For this reason, the first graph we present, rather than being based on household data, is based on individual data. In particular, in each of the panels of Figure 3, we plot the average age of the head of the household where an individual lives against the age of the individual. To produce this graph, therefore, we use all individuals in the sample, regardless of their position within the household. The set of graphs at the top refers to Mexico (left) and Peru (right), while those at the bottom are for Thailand (left) and Taiwan (right). For each country we have four panels. The top left is the picture for the whole sample, while the remaining three refer to the three education groups considered (from low to high). As explained above, each connected segment in this figure tracks the average of the variable of interest for a cohort of individuals as they age over time.

If all individuals in a given cohort were household heads (or living in a household with a head of the same age), the 45-degree line would coincide with the cohort profile of the average household age. In the figure, the cohort profiles diverge from the 45-degree line at the beginning and at the end of the life cycle. Naturally, headship rates are quite low at the beginning of the life cycle, so that the cohort profile lies above the 45-degree line, indicating that some young adults are still living with their parents. The speed with which the profile gets close to the 45-degree line is an indication of how early new families are formed. Toward the last stages of the life cycle headship rates decline and they fall below the 45-degree line, because the elderly merge into other households where the head is younger.

Two things are quite apparent. First, in all countries there are strong differences across education groups, especially in the extent to which the profiles fall below the 45-degree line. Typically less educated individuals seem to be more prone to move in with younger household heads. In contrast, the most educated have much higher headship rates and continue to be heads of households even at older ages. This suggests that the family plays an important role for smoothing consumption for the elderly, especially among those with lower income-earning capacity. Second, there are strong differences across countries at both ends of the life cycle. In particular, the phenomenon of elderly individuals living in households headed by younger individuals is much more prevalent in the two Asian countries. At the beginning of the life cycle, on the other hand, the differences cut across continents. The process of family formation seems to occur much later in Peru than in the other countries. At the opposite extreme is Taiwan, where by age 30 the profile already coincides with the 45-degree line.

The results in Figure 3 are also interesting from a methodological standpoint, because they show that family composition changes in important ways along the life cycle, especially among the uneducated. This means that even though we are tracing the same type of household in the repeated cross sections available, the composition of the group is changing, blurring our inferences about the behavior of cohorts as they age.

Figure 4 plots the average years of schooling of household heads, as well as the proportion of household heads with secondary and higher education, respectively. Since after 26 years of age only few individuals continue to acquire formal education, we plot the cohorts from this age on. If there were no composition effects in the cross sections under analysis there would be differences in level across cohorts, but the age pattern of each would be close to a horizontal line. In the figure, the first element worth noticing is the size of the

cohort effects, which is a good measure of the process of human capital accumulation. Cohort effects seem to be much larger in EA for the average years of schooling and for the proportion of individuals with secondary and higher education. The second thing to notice is the presence of some compositional changes in the surveys. While some of this could be attributed to sampling error, systematic positive trends in the years of education and/or in the proportion of well-educated individuals could be a symptom of differential mortality effects. While these effects are there, they are not particularly strong or significant for Mexico, Thailand, and Taiwan. The only case where there are significant shifts is Peru, so the results for this country should be taken with more caution.

In Figure 5 we start using household data. In particular, we consider the evolution of family size. In the four panels for each country we plot, for the whole population and the three education groups, the log of family size against the age of the household head. Three features deserve to be stressed. First, there are large differences in family size among education groups, with the least educated having the largest families in all cases. Second, there are large cohort effects, especially for Thailand and Taiwan, with the youngest cohorts having much smaller family size. Third, family size is much smaller in EA than in the LA countries. In Thailand and Peru, family size does not decline in the last part of the life cycle at the same speed as in Mexico or Taiwan. This might be a consequence of children leaving home much later and/or of older adults joining what becomes an extended family in the first two countries.

The patterns in Figure 5 are mirrored in Figure 6, where we plot the average number of children against the age of the household head. Notice that both in this and in the previous figure it is not implausible to interpret the differences between different cohorts as pure cohort effects, since it is plausible to rule out the existence of systematic year effects.[9] Again, cohort effects are stronger in the two EA countries, and the number of children is smaller. The differences across countries tend to be larger among groups with primary and secondary schooling.

6.2 Income, Consumption and Savings Profiles

In Figure 7 we plot the average of the log of disposable family income and of log total consumption expenditure (note that the scale is different for every country). As in other

[9] Sampling error, induced by small cell sizes, could be interpreted as a time effect. However, it is plausible to assume that this has zero mean and does not exhibit any time trend.

countries, consumption and income track each other quite closely. Moreover, differences in the shape of the income profile across education groups are mirrored in differences in consumption profiles.[10] Once again we should stress important differences both across education groups and across countries. First, the most educated not only have higher income but their income profile also looks steeper over the life cycle. This difference is particularly apparent in Mexico and in Thailand. Second, the experience of the two Asian countries, and in particular that of Taiwan, is marked by the impressive growth experienced by all cohorts. It seems that the whole life cycle profile is shifted up year on year starting in the early 1980s. Third, the experience of Peru, for which we only have four data points per group, is marked by the crisis of 1990, which is reflected in the 1991 survey. The decline in disposable income seems to have affected all education groups, and it seems more pronounced for the youngest cohorts. In comparison to this drop, even the declines observed in Mexico after the 1995 crisis (reflected in the 1996 survey) look small. Notice that in Mexico, unlike in Peru, the decline is more apparent for the highest education group.

In Figure 8 we plot the log of *per capita* total and non-durable consumption. Overall, the per capita profiles look flatter than the corresponding household graphs, even though strong aggregate growth somewhat masks this in Taiwan. This is consistent with the evidence reported by Attanasio and Browning (1995) for the UK and by Attanasio (1994) for the US. Once again, an important difference between EA and LA is that in LA the crises of 1995 (in Mexico) and 1991 (in Peru) are quite evident, while the data for EA is much smoother.

In Figure 9 we plot two definitions of saving rates. The first includes all expenditure items (s_1), while the second excludes durable goods from the definition of consumption (s_3). Notice that the shape of the profiles is roughly similar, regardless of the particular definition one uses. More importantly, the better-educated households do most of the saving in Mexico and Peru. This feature is not inconsistent with the life-cycle model, as the better educated face a steeper income profile. However, it should be noticed that there seems to be no strong tendency for life cycle profiles of saving to decline (and become negative) in the last part of the life cycle. It can also be observed that the differences between the two definitions are greatest in Taiwan, where the hump-shape is also more apparent.

As recently stressed by Deaton and Paxson (2000), one of the reasons why a clear hump-shape consistent with the life-cycle hypothesis is not observed, may be due to the

[10] Carroll and Summers (1991) interpret this as a failure of the life cycle model. Attanasio and Browning (1995) and Attanasio, Banks, Meghir and Weber (1998) offer reasons, in the context of the US and the UK, why the life

changes in family composition documented previously. Even though individuals may in fact behave as the theory predicts, aggregation into households that change in size, composition and needs, may mask these shifts in behavior. The authors suggest a method to identify individual savings profiles from household data under some assumptions, and they conclude that a clearer hump is observed for individuals than for households in Thailand and Taiwan.

6.3 Labor Supply and Wages

As already mentioned, the capacity that households have for saving is determined to an important extent by their income. In the case of labor income, the resources available to households are a combination of the wages paid in the market and labor market participation rates. In Figure 10, we plot male wages for Mexico, Peru and Taiwan (Thailand is not presented due to data limitations). The evidence from this picture is not particularly surprising. First, the profile for better-educated individuals is not only higher but also much steeper, especially in Peru and Mexico. Second, for all groups the effects of the 1995 crisis are quite apparent in Mexico, while in Peru there is a strong negative effect for 1991. Again the patterns for Taiwan are much smoother and increase continuously.

But perhaps the most interesting feature of the figure is that these income profiles for individuals are much more hump-shaped than the household profiles reported in Figure 7. This is consistent with the argument by Deaton and Paxson (2000) that even though individuals may behave according to the life-cycle model, their behavior may be blurred by aggregation into households.

In Figure 11 we plot male and female labor force participation rates by education level and country. The evidence that emerges from this picture is of strong differences between males (the curve above) and females (the curve below), especially for the groups with lower education. Relatively large cohort effects, however, are visible in the labor force participation of females in the lowest educated households. As far as the male data are concerned, it seems that retirement is much more synchronized for the better-educated males and, on the contrary, is much more gradual for the group with the lowest education level, especially in the LA countries and in Thailand. This phenomenon might be related to the fact that better-educated individuals are more likely to participate in the formal sector and are therefore covered by social security arrangements. Higher labor force participation rates

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cycle model is not necessarily at variance with these figures.

enhance savings capacity, so these results are compatible with the apparent cohort effects on saving presented previously.

As far as female labor force participation is concerned, several interesting features are worth pointing out. First, in Thailand, labor force participation is much higher than anywhere else. For educated Thai women, labor force participation is essentially the same as that of men. Second, labor force participation seems also quite high in Peru, at least by Latin American standards. Third, there are strong cohort effects in Mexico, especially for educated women. Finally, Taiwan is the only country for which labor force participation seems to decline in the most fertile years of women's lives and later climb again. This dip seems to be absent in the other countries and is much less pronounced for educated Taiwanese women.

The evidence on female labor force participation should be taken with care, however, as cross-country differences might reflect differences in the way questions are asked in the survey. It is nonetheless important to stress the role that female labor force participation might have on measured saving, as it is typically linked to a substitution of home production with market goods. Moreover, female labor supply could also have the effect of diversifying risk and thereby reducing the incentive to save for precautionary reasons. If these two effects are negative, there are also reasons why households where the wife is working should save more. If labor force participation is temporary for women, it makes sense to save more to smooth out income over time.

Apart from wages and labor force participation, another key determinant of savings is access to pension arrangements. If individuals believe they will receive a pension after retirement, the incentive to save is lower. This is especially relevant for individuals engaged in the formal sector of the economy where pensions are an important benefit. We are not able to document differences by country in detail because household surveys have only limited information on this issue. However, it can be said that, at least broadly speaking, the evidence presented so far is consistent with some general differences between East Asia and Latin America. While most Latin American countries (including Mexico and Peru) have long traditions of providing pensions as benefits in the formal sector, this has not been standard practice in Asia.[11] In particular, in Thailand, compulsory retirement benefits were only introduced in 1999. So, apart from the fact that Mexico and Peru have lower wage levels and lower female labor force participation rates than Thailand and Taiwan, the fact that formal

[11] See Lora and Pagés (2000).

jobs in these countries have traditionally provided pensions may be an additional source for the difference.

6.3 Smoothing Saving Profiles

In this subsection we proceed to smooth the saving profiles presented in Figure 9. The aim is to identify the age profile for saving rates. However, as discussed above, one cannot separately identify time, age and cohort effects without additional restrictions. Therefore, we regress the data points plotted in Figure 9 on a polynomial in age, a set of cohort dummies and a set of year dummies constrained to have zero mean and to be orthogonal to a time trend. The restriction we impose on the data is equivalent to assuming that all the deterministic trends in the saving rate data originate from a combination of cohort and age effects.[12] We also assume that the age profile for saving is the same across cohorts, except for an intercept shift. While this assumption is not necessary for identification, it is forced on us by the fact that, at least for Mexico and Peru, each cohort is observed only for few years.

In Figure 12, we plot the polynomial for an arbitrary cohort. The first thing to notice is that, given our assumptions and restrictions, in none of the countries or education groups considered does the life cycle profile take a marked hump-shaped profile. The profile for less educated individuals is very flat in Mexico, Peru and Thailand, but not in Taiwan. For the best-educated individuals, instead, the profile increases monotonically with age in Mexico, Thailand and Taiwan, and increases toward the end of the life cycle in Peru.[13] Only in Taiwan and in the middle groups in Mexico and Peru do the smoothed profiles present something similar to the hump-shaped profile implied by some versions of the life cycle model.[14] Even for these groups, however, the decline starts only after age 65 and is very gentle, which is quite surprising in light of the reductions in labor force participation documented previously. Regardless of whether the evidence is consistent with the life cycle model, the lack of a hump

[12] On this issue see the discussions in Heckman and Robb (1987), MacCurdy and Mroz (1995), Attanasio (1998), Deaton and Paxson (1994) and Paxson (1996).

[13] The increase in the last part of the life cycle in Peru is implausibly strong. We tried different specifications for the age polynomials obtaining similar results. The result is driven by the marked increase in saving rates for the oldest two cohorts.

[14] There are two separate issues. On the one hand the life cycle model implies that, with a hump-shaped income profile, savings should also be hump-shaped, *if needs are constant over the life cycle.* As we saw above, family size, and therefore needs, change considerably over the life cycle. On the other, simple versions of the model imply that saving should decline (and become negative) after retirement. In principle, a number of data issues might explain the fact that we typically do not observe negative saving rates in the last part of the life cycle. However, the evidence from the four countries seems to indicate that, at least for the best educated, saving *increases* in the last part of the life cycle!

in the middle of the life cycle will have, as we discuss below, important implications for the effect of projected demographic trends on aggregate saving rates.

In Figure 13, we plot the cohort dummies obtained from the same regression. The pattern of indicates the presence of substantial differences across cohorts. In particular, the youngest cohorts (those with the lower cohort number) seem to have much higher saving rates than older cohorts, even though in Mexico this effect is not present for the population at large.

We also observe important differences across education groups. For example, in Mexico and Peru positive cohort effects are only observed for the middle group and the most educated, with much stronger effects for the latter. In Thailand there are positive cohort effects in all groups, but they are still stronger among the middle and most educated.[15] Taiwan is the only case where differences across groups are not apparent.[16]

Figure 14 plots the restricted year effects estimated together with the age profile plotted in the previous two figures. The large negative shock for 1996 and 1994 is evident for all education groups in Mexico and Peru. In Mexico, for the highest education group, the 1996 shock is very large and negative, while the effects in previous years are all mildly positive (or very small and negative, as for 1984). For the lowest education group the aggregate shock is negative in 1992, and the positive time effects in the years prior to 1996 are smaller than for the rest of the population. The 1996 effect is similar for all groups.

The results for Peru are surprising, as it seems that in 1991, the year after the main crisis, the estimated residual is positive. This is a direct consequence of the fact that in the survey data consumption falls more than income. All groups, instead, experience a strong negative shock in 1994. Only the most educated have a positive time effect in 1997. In Thailand, time effects are smaller, and stronger for the least educated. Taiwan is the case

[15] Our results on age and cohort effects in Thailand differ from those reported by Paxson (1996). In particular, Paxson, who only considers the whole population and does not look at education groups, finds an age profile for saving rates that is very flat over the life cycle. While we use slightly different selection criteria (and unlike Paxson, we do not use expansion factors for difficulties with computing them in most of the household surveys available), the main difference seems to be due to the fact that Paxson does not use the data from 1994 and 1996. When we drop those years, we obtain results that are much more similar to what she gets. The reason is that in the last two years saving rates increase for all cohorts considerably. Our smoothing procedure forces us to interpret these trends as either age or cohort effects, as time effects are assumed to be orthogonal to a time trend. This gives us the raising age profiles for the whole population and for each of the education groups and should remind us of the interpretative caveats already discussed in Section 3. Interestingly, our results for Thailand are similar to those that Paxson reports for Taiwan.

[16] Our results on age and cohort effects in Taiwan are very similar to those reported by Deaton and Paxson (1994), even though these authors use data up to 1990, and are also consistent with those reported in Deaton and Paxson (2000).

where the effects are of very small magnitude, and where time effects do not vary considerably across education groups.

The most important feature of the figure is that while Mexico and Peru have experienced severe economic crisis during the period under analysis, the economic environment in Thailand and Taiwan seems to have progressed much more smoothly. Households in LA have been exposed to an economic environment characterized by the use rather than accumulation of savings, which seems to be one of the reasons why they have lower rates and why savings have increased much less than in EA.

The age and cohort profiles estimated so far depend on the arbitrary normalization that year effects sum up to zero and are orthogonal to a linear trend. An alternative restriction, which allows the identification of age profiles, is the assumption that there are no cohort effects on saving rates. This would be the case if cohort effects on income and consumption would exactly cancel out. It has been suggested by Deaton and Paxson (1994) that some versions of the life cycle model do imply such a restriction. By imposing it, we can identify unrestricted year effects.

We plot these age profiles in Figure 15, using the first year of the sample as intercept. For the whole sample, the effect of assuming no cohort effects is to increase the size of the hump in all countries, with saving rates peaking just after 60. This pattern is roughly consistent with the life cycle model. For the lowest education group the effect is roughly similar. A profile that looked basically flat now shows a modest hump with a peak just past 60. While the profile for the middle education group is almost unaffected, the largest effect is observed for the high education group. The assumption of no cohort effects implies a hump-shaped profile with a dramatic decrease after age 65 in Mexico, Thailand and Taiwan, while the previous profile was monotonically increasing in age. In Peru there is a clear hump shape, with an increasing trend after age 60.

The unrestricted time effects in Figure 16 are also different. These time dummies now capture all the trends in the data that were previously interpreted as cohort effects. In Mexico, clearly, the strongest negative effect for 1996 is observed among the least-educated household heads. Time effects are also negative in 1996 for the intermediate group and, surprisingly, the most educated show a positive time effect for this same year. This might be an indication of their greater capacity to smooth out shocks. The same applies for Peru in 1997. In Thailand and Taiwan, the strong cohort effects are mirrored in strongly increasing time effects.

6.4 A Comparison of Saving Profiles in South East Asia and Latin America.

Given the exercise we propose in the following section, it is worth focusing on the comparison of the demographic factors and of the smoothed saving profiles between EA and LA. The demographic factors confirm the aggregate figures: the demographic transition is much more advanced in EA, in that fertility rates are much lower and family size is smaller. By the size of the cohort effects in family size and number of children, however, it is likely that Mexico and Peru will be in a similar position in a few years.

The picture emerging from the analysis of saving behavior is more complex and of more difficult interpretation, if for no other reason because the estimated effects are conditional on strong and non-testable identification assumptions. If one assumes that all the trends in the data are to be explained by age and cohort effects and compares the aggregate saving age profile, in Mexico we find a mild hump shape, with a peak around age 60, while in Peru and Thailand the profile is steadily increasing with age. This picture, however, hides strong differences among education groups. For the three countries, better-educated individuals do not seem to show any tendency toward decreasing saving rates in the last part of the life cycle. In Thailand, similar patterns emerge for the other two groups, even though the profile for the least educated is basically flat, rather than increasing. In the case of Mexico and Peru, the two lower groups show a mild hump in the last part of the life cycle. It is surprising that a mild hump is observed in the aggregate data, but presumably this is because, although most of the saving is done by the better educated, their population weight is much lower than for the other two groups.

If we move on to the cohort effects, the differences between the two regions are even more apparent. In Thailand and Taiwan, the two groups with more education show strong positive cohort effects, while in Mexico and Peru a similar pattern is only observed for the most educated. At the other extreme, the uneducated have negative cohort effects in Mexico, and no cohort effects in Peru, while in Thailand and Taiwan they are mildly positive. Time effects, as expected, also differ markedly. In Mexico and Peru there is a strong negative shock in 1996 and 1994, respectively, while in Thailand and Taiwan, time effects are mostly positive. The effects are reinforced when cohort effects are assumed to be equal to zero, and interestingly, time effects in both LA countries are stronger (more positive) for the most educated groups.

As discussed above, however, the picture changes once we use a different identification assumption, namely the absence of cohort effects. Under this alternative strategy, it turns out that the estimated profiles do exhibit a hump in the middle of the life cycle, with a peak just before retirement. While this identification assumption is certainly questionable, the results one gets, indicating a slight hump in the middle of the life cycle, are not inconsistent with the life cycle model.

7. Projections to the Future

Perhaps the main question that remains open after documenting the large differences in household savings between LA and EA is whether the gap in aggregate saving is likely to narrow in the future or if it will continue to expand. For a believer in a standard version of the life cycle model, there are reasons to believe that the gap will narrow. Specifically, Latin America is on the verge of a fast demographic transition that will result in population shifts toward age groups that should be expected to save more. Although less pronounced, the predicted demographic changes are somewhat similar to those that preceded the boost in private savings rates in East Asia.[17] Whether this expectation is going to be fulfilled depends largely on the shape of the saving age profile and how that is going to evolve in the future.

The basic idea we investigate in this section is the following. If one believes that life cycle saving is important and that saving is concentrated among certain age groups, then an economy or a region in which the fraction of the population within that age group increases because of the dynamics of the demographic transition (neglecting possible general equilibrium effects on factor prices) might experience an increase in aggregate saving during such a "transition" period. As it is plausible that most life cycle saving is done in the middle of the life cycle, it might be expected that economies that experience an increase in the share of middle-aged individuals (and a decrease in both young and old dependency ratios) also experience a temporary increase in saving. This argument is relevant for Latin America, since the region is about to enter such a demographic phase. The aim of this section is to quantify the possible magnitude of these effects using the evidence on saving behavior discussed in the previous section.

[17] Bloom and Williamson (1999) and Behrman *et al*. (1999) are among the studies that have argued along these lines. Attanasio and Violante (2000) simulate the effects of demographics and private savings and predict a large increase in the Latin American region as a result of future reductions in the old dependency ratio. The focus of that paper, however, is on the general equilibrium effects, i.e., changes in wage and interest rates.

The projections we present should still be taken with care. The simulations are based on simple reduced form relationships, and their use in forecasting future aggregate saving rates assumes that they are stable over time. Specifically, we need to assume that the saving profiles identified in the previous section (and the income profiles used to weight them) do not change in the future. Changes in saving age profiles could be induced by changes in the shape of the earning life-cycle profiles, changes in factor prices (wages and interest rates) and, in the case of models with habit formation, by the process of growth itself. Moreover, in some cases, we use the last year of our sample as a benchmark, which is not necessarily a representative year.[18] With these caveats in mind, however, we should stress that the exercises proposed should serve as benchmark calculations to quantify the potential effects of demographic trends on aggregate saving given the existing evidence on life cycle saving. One important difference between what we do and previous efforts that have used either macro aggregate data (for instance as in Behrman *et al.*, 1999) or simulations of general equilibrium models (see Attanasio and Violante, 2000), is that they focus on domestic saving, which includes public and firm savings, while we focus only on household saving. Moreover, those studies are more likely to take into account pension assets and liabilities. Therefore, in some sense the scope of the exercise that is based on micro data is more limited. However, as already noted, even if the analysis with micro data excludes some important elements of household savings, there is a considerable gain in that it allows one to identify some of the mechanisms driving the dynamics of savings. In this section we first discuss the mechanics of the method, and we then present our empirical evidence.

7.1 Forecasting the Evolution of Household Savings with Micro Data

To forecast aggregate household saving rates using the evidence presented in Section 5 we basically use the accounting identity (1), the smoothed profiles we estimated above and demographic projections. Specifically, for any year starting from the late 1990s, we compute:

(1')
$$\hat{s}_t^{ag} = \sum_c \hat{s}_t^c \frac{\hat{Y}_t^c N_t^c}{\sum_c \hat{Y}_t^c N_t^c}$$

[18] These are particularly important issues in Mexico, where 1996, which is the year we use as benchmark, is by no means a standard year for comparison. As shown in the results in the previous section, there are strong negative effects that are picking up the shock that the economy faced in 1995, so assuming that the same conditions will prevail is a rather pessimistic scenario. In the case of Thailand and Taiwan the benchmark is 1996, which is two years before the recent financial crisis. Thus, in these cases, economic conditions may have changed for the worse, and projections based on conditions in 1996 can be regarded as rather optimistic.

Where $\hat{s}_t^c$ is the saving rate of group *c* at time *t* predicted by the smoothing procedure used to produce Figure 12. In particular, we use the estimated age profile (if *c* is the year of birth of a cohort, its age will be *t-c* at time *t)*, and the relevant cohort effects. An analogous procedure is followed to compute $\hat{Y}_t^c$. That is, we estimate age and cohort effects using the same procedure used to identify the age and cohort effects for saving rates reported in Figures 12 and 13. The N_t^c, instead, are obtained from UN demographic projections.[19]

We define the aggregate saving rate as the rate of households aged 23 to 75. As we forecast aggregate saving rates far into the future, new cohorts will join the sample and some cohorts will leave it. For the new cohorts we use the same age profile as for the other cohorts and the cohort effect of the youngest cohort in the sample. This exercise can then be extended to consider different education groups. One simply needs to repeat the exercise for each education group and then aggregate across education groups given some projections about each group's relative size. As we do not have forecasts about the education attainment of future generations, for future cohorts we use the proportions observed in the youngest cohort. This procedure ignores the fact that future generations are likely to be better educated. On the other hand, ignoring education groups completely is equivalent to assuming that changes in the composition of future households will leave the shape of the life cycle saving rates profile unchanged, which is obviously unrealistic.

We should stress that our aim is not to reproduce the level of aggregate saving rates or efficiently forecast its evolution. As we discuss above, there are many reasons why micro data do not match up exactly with aggregate statistics. These reasons are then compounded by the fact that the shape of the life cycle profile is likely to change as a consequence of changes in its determinants. Our more modest aim is to understand what are the implications of our estimated age profiles and the predicted demographic trends for the evolution of aggregate saving rates. The reasons why even this limited exercise has to be taken with caution are several. First, as already stressed, we identify age and cohort effects under the arbitrary normalization that year effects have zero mean and no trend. Second, we assume that the age profile for saving rates and income is the same across cohorts, except for an intercept shift.[20] Third, even if existing cohorts (within an education group) have the same age profile for saving rates and income, it is likely that changes in wage profiles, in family

[19] United Nations Demographics Data, 1998 revision.
[20] As discussed above, this assumption is forced on us by the lack of a long time series of cross sections.

size and composition, labor force participation, and in institutional factors, will, in all likelihood, have an effect on saving age profiles. Fourth, changes in the stock of human and physical capital are likely to change wage rates and interest rates, inducing further changes in age profiles.

7.2 Evidence based on Micro Simulations

We start with the forecast for Mexico. As with the other countries below, we perform two different exercises. In the first we use the overall population age profile and cohort effects (the top-left panel of Figures 12 and 13). In the second we use education-specific profiles and cohort effects (the remaining three panels of the figures). To aggregate across education groups we use the proportion in the sample for cohorts currently alive and the proportion in the last cohort for future cohorts. We plot both sets of forecasts in the first panel of Figure 17. Both forecasts show a marked increase in aggregate saving rates that starts leveling off only around 2040. The increase without taking into account the education split is actually higher, even though the forecast that uses the education specific profiles does, to a limited extent, "catch up" with the one that does not.

The exercise for Peru is very similar in nature. The second panel in Figure 17 shows an increase much like to Mexico's, but when we use education-specific profiles and cohort effects the forecast catches up more rapidly. The most interesting result, however, is that for the two EA countries the two forecasts reveal even greater increases in savings than in LA.

While at first glance these forecasts seem to support the hypothesis that demographic trends will lead to an increase in aggregate saving rates in LA, a more careful consideration of the mechanics behind the forecasts shows that this is not necessarily the case. Demographic shifts actually play a small role. The main reason for this is because of the lack of a hump in the shape of the saving age profiles. Therefore, even when the population share of individuals aged 40-60 increases, as it is projected to do in the next 40 years in Latin America, this will have little effect on aggregate saving rates. Most of the effect is driven by the cohort effect. Notice that in Figure 12, the cohort effect of the youngest cohort is the highest. As we are giving that intercept to future cohorts that enter our computation, as older cohorts (with lower intercepts) disappear, the aggregate saving rate increases. The reason why the increase is lower in the case of the education specific profiles is because the cohort effect for the first cohort "averaged across education groups" is lower than that estimated for the whole population. The reason for the relative "catching up" is due to the fact that as the

population becomes more and more similar to the first cohort, not only will they have the intercept of that cohort, but also the education shares of that cohort. As the youngest cohort is more educated, the increase in the saving rate is slightly quicker after the first few years.

Very similar considerations hold for Thailand and Taiwan. There are two noticeable differences. First, the increase is more marked than in Mexico, and the forecast that uses education specific profiles catches up faster. We should not read much into the first effect as the increase is mainly driven, as in the case of Mexico, by the estimated intercept for the first cohort. Moreover, we should stress again that the absolute level of these profiles does not have a very straightforward interpretation for the definitional and measurement issues discussed above.

Given that the projected increases in aggregate saving rates are driven by the estimate of a single parameter, these results should be taken with extreme care. On the other hand, it is a fact that, given our identification assumptions, younger cohorts seem to be saving more than their predecessors. The issue is whether this pattern can be maintained into the future. The answer depends, in all likelihood, on the evolution of the determinants of savings.

In section 5, we showed that the shape of the estimated profiles depends strongly on the assumption one makes to identify the age profile of saving rates. If one assumes that all the trends observed in the data are originated by either cohort or age effects and that year effects have zero mean and are orthogonal to such trends, neither in LA nor in Thailand is there strong evidence of a hump-shaped saving profile. On the other hand, if one assumes that there are no cohort effects, so that year effects can be estimated on an unrestricted fashion, the Mexican and Peruvian age profiles show a marked hump, while the same is true in Thailand for the best educated households. Both sets of profiles can be used to forecast future household saving rates to check to what extent the demographic transition is likely to affect aggregate household saving rates. In particular, we perform the exercise described above for Mexico using the numbers plotted in Figure 15 as age profile for saving rates, which, for the population as a whole and for two of the three education groups, show a marked hump. This approach, however, assumes that there are no cohort effects, so that we shut down the main source of increase in the aggregate saving rate in Figure 17.[21] The result we obtain is that saving rates start to decline around 1995 and keep declining for about 20 years, to increase around year 2020 as the population share corresponding to the hump in the saving rate profile

[21] In this exercise the *level* of saving rates is particularly difficult to pin down as year effects are, by definition, unpredictable.

starts to increase. The size of the increase, however, is miniscule, at about 0.002. There are two reasons for the small size of this effect. First, the hump in Figure 15 is not extremely pronounced, and second, even though the demographic change we project is relatively large, this results only in a change in weighting that cannot have a very large effect given the size of the hump.

Although the scope of this exercise is limited, we can conclude that, given the estimated shapes of the age profiles for saving (and the projected demographics), it is unlikely that these forces will result, in their own right, in a large shift in aggregate saving rates, if the current economic environment prevails.

8. Conclusions

EA and LA have diverged considerably during the past three decades. This paper compares one important dimension, household saving behavior, where empirical evidence has been practically non-existent. In addition to the life cycle profile of household saving and other variables of interest, we have also characterized differences across education groups in two countries in each region. The evidence indicates the presence of large differences both across countries and, within each country, across education groups.

With regards to the differences across regions, we document the huge disparity in the *level* and growth rate of household saving between Mexico and Peru, on the one hand, and Taiwan and Thailand on the other. Normalizing time effects to have zero mean and no trend, we identify cohort effects in the data and confirm that younger generations in the EA countries are saving much more than their counterparts in LA, relative to older generations. Our analysis suggests that there are three main reasons why cohort effects are stronger and total household savings are much higher in EA. First, EA households and younger generations have had greater saving capacity. This is because (i) income growth has been higher, (ii) fertility rates are lower, with fewer children per household, (iii) family structure is different, with more elderly individuals living in extended households that prevents us from observing a decline in saving toward the end of the life-cycle of individuals, and (iv) the demographic transition is much more advanced, with larger shares of the population in the ages where productivity and savings peak.

Second, the macroeconomic environment in LA has been highly volatile, and the two specific countries we analyze were subject to severe shocks during the period under analysis, while the economic context in EA was much more stable. Thus, in LA the context has been

one where household savings are typically used rather than created, while in EA savings have been built up smoothly in a context that is favorable to the accumulation of resources. Third, in the LA countries, practically all the household savings are generated by the richest 20% of the population, while in EA savings are much more widespread. Furthermore, while the savings rates among the richest quintile are not that different across regions, there are huge disparities among the rest of the population. For households in the lower 50% of the distribution in LA, savings have been much less responsive to income increases during periods of economic growth, while they have been more sensitive to decline during downturns. Thus, differences in the capacity to save across the income distribution account for an important part of the difference in total household saving.

A common feature across countries is that we do not find strong evidence of negative saving or even declining saving in the last part of the life cycle in any country. While this evidence contradicts a simple version of the life cycle model, a conclusive judgment can only be obtained if one takes into account explicitly the variation in needs induced by changes in family size and composition over the life cycle as well as changes in labor supply behavior. In this study we have documented differences in life cycle profiles in these variables, but have not considered explicitly their effect on saving rates. Another issue that we have ignored is the effect that different institutional settings, and in particular pension arrangements, have on saving behavior over the life cycle. Using the evidence on household saving with the purpose of testing alternative models of consumption and saving decisions, one cannot avoid the considerations of these factors. However, some of the evidence, and in particular that from the two Asian countries we study, is suggestive of the need of a model more complex than the simple version of the life cycle model. Paxson (1996) and Deaton and Paxson (1994) have suggested the possibility of considering models with habit formation, where growth, per se, induces, at least until the stock of habits "catches up," an increase in saving rates. As the issue is extremely relevant for the understanding of the relationship between growth and saving, a more detailed study of these phenomena is called for.

With regard to differences across education groups, we find that in all countries, the best educated save considerably more than households headed by individuals with less education (the only exception could be Taiwan). This finding is in line with the fact that better educated individuals experience more variation in their lifetime income.

As in the case of aggregate population, we also identify age, cohort and time effects in the data for each of the education groups. Regardless of the identification assumptions, we

find that time effects are small and mostly homogeneous across groups in EA. In LA, however, they are much stronger, and most importantly, there are large differences across groups, with more negative effects in downturns and less positive increases in upturns for the least educated households. This is especially true under the assumption of no cohort effects. This suggests that relatively uneducated individuals in LA have a more limited capacity to smooth out unexpected shocks and build up income-earning assets in good times.

In the case of cohort effects, identified under the assumptions on time effects mentioned above, the main conclusion is that they are strong and positive in EA for all education groups, while in Mexico and Peru they are only strong and positive for the most educated. In fact, cohort effects among the most educated in LA appear to be even stronger than those registered by their counterparts in EA, but overall they are practically flat because of negative or no cohort effects for the other groups.

As with the total population, age effects are estimated with two alternative specifications. When year dummies are constrained to have zero mean and to be orthogonal to a time trend, the main difference is that in Mexico, Peru and Thailand age profiles for the uneducated and those with secondary education are mostly flat, while they increase monotonically for the most educated. In Taiwan the monotonic increase is observed across all groups. When the age profiles are estimated under the assumption of no cohort effects, the difference is that the profile for the most educated in the first three countries appears to be more hump-shaped than for households whose head has lower schooling. In Taiwan, the age profile also becomes much more hump-shaped, but in this case there are no differences across education groups. So, under some identification assumptions, we would conclude that saving behavior among the most educated households in LA and Thailand is more in line with the life-cycle hypothesis than the behavior of other education groups.

It has been argued that, as Latin America is on the verge of a demographic transition similar to that already experienced by South East Asia, the future demographic trends might bring about an increase in aggregate savings that will reduce the gap between the regions. We present simulations indicating that, although our life cycle profiles and cohort effects predict an increase in aggregate saving rates, these cannot be attributed to the current demographic trends. The increase is driven mainly by strong cohort effects, identified under the assumption that all the trends in the data can be interpreted as either age or cohort effects. Moreover, although when we use the alternative identifying assumption that there are no cohort effects in saving rates the shape of the age profile obtained is much more in line with

the implications of the life cycle model, the estimated "hump" in the middle of the life cycle is not enough to generate sufficiently large increases in aggregate saving rates in Latin America in the next twenty years. As we stress, the simulations should be taken with great caution, as they are based on very strong identification assumptions, and they assume that the economic context in EA and LA will remain unchanged in the future. This is a rather pessimistic scenario for Mexico and Peru, and perhaps an optimistic one for Taiwan and Thailand.

So, with their limitations and caveats, our results suggest that the projected demographic trends are unlikely to generate, on their own, large increases in saving rates under current circumstances. Obviously this does not mean that they are unimportant. In particular, the projected demographic trends will play an important role in the ability of developing regions to receive capital flows from the northern regions of the world, where capital-labor ratios are projected to be much higher than in the south in the future (an issue discussed by Attanasio and Violante, 2000). Besides, it is quite possible that the estimated age profile for savings, whose shape is responsible for our results, will change as a consequence of the structural changes that Latin America is experiencing. Two of these changes are, in our opinion, particularly important and deserve mention. The first is changes in labor supply behavior and, in particular, female participation in the labor force. The other is the shift in pension arrangements from public to privately funded schemes that have occurred in many Latin American countries in recent years.

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Figure 1

Figure 1a

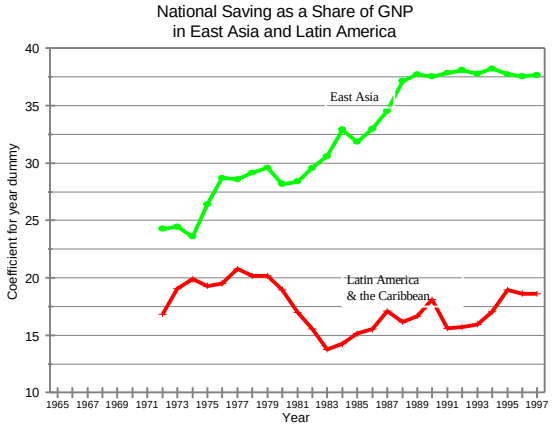
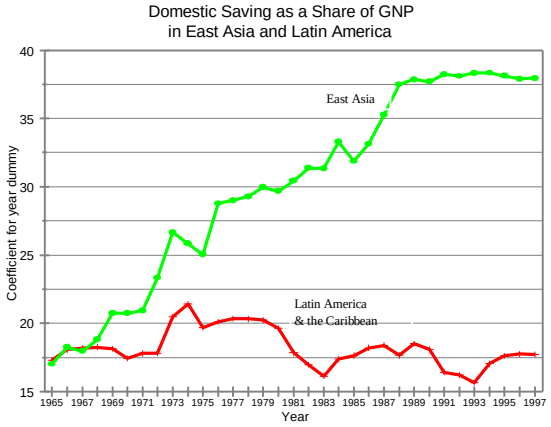


Figure 1b



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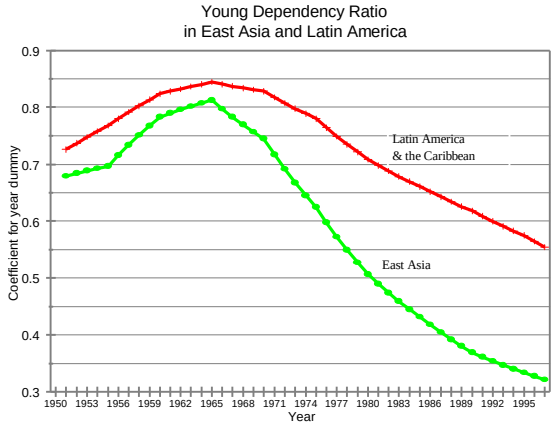

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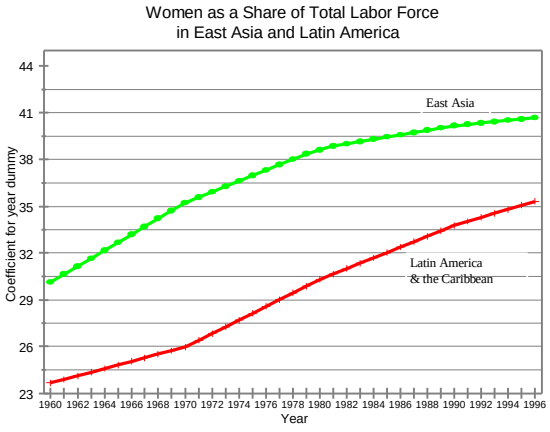

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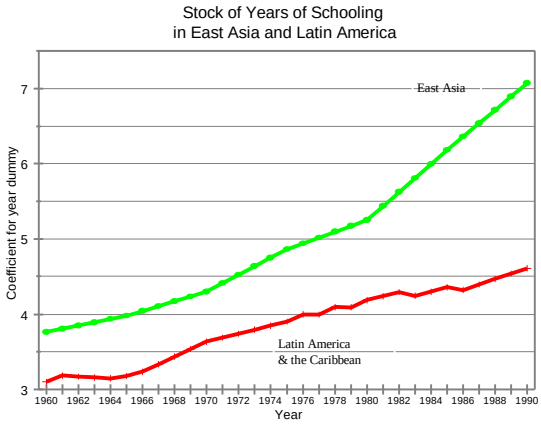

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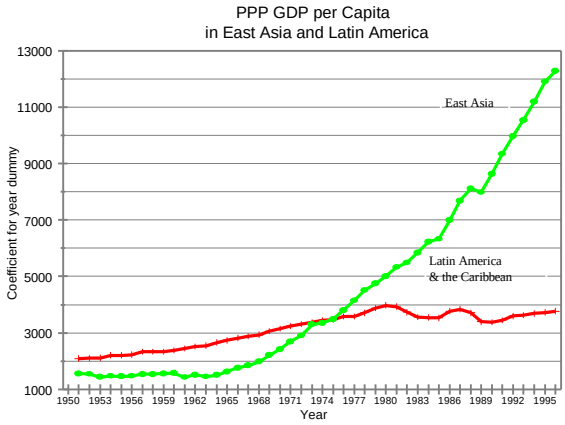
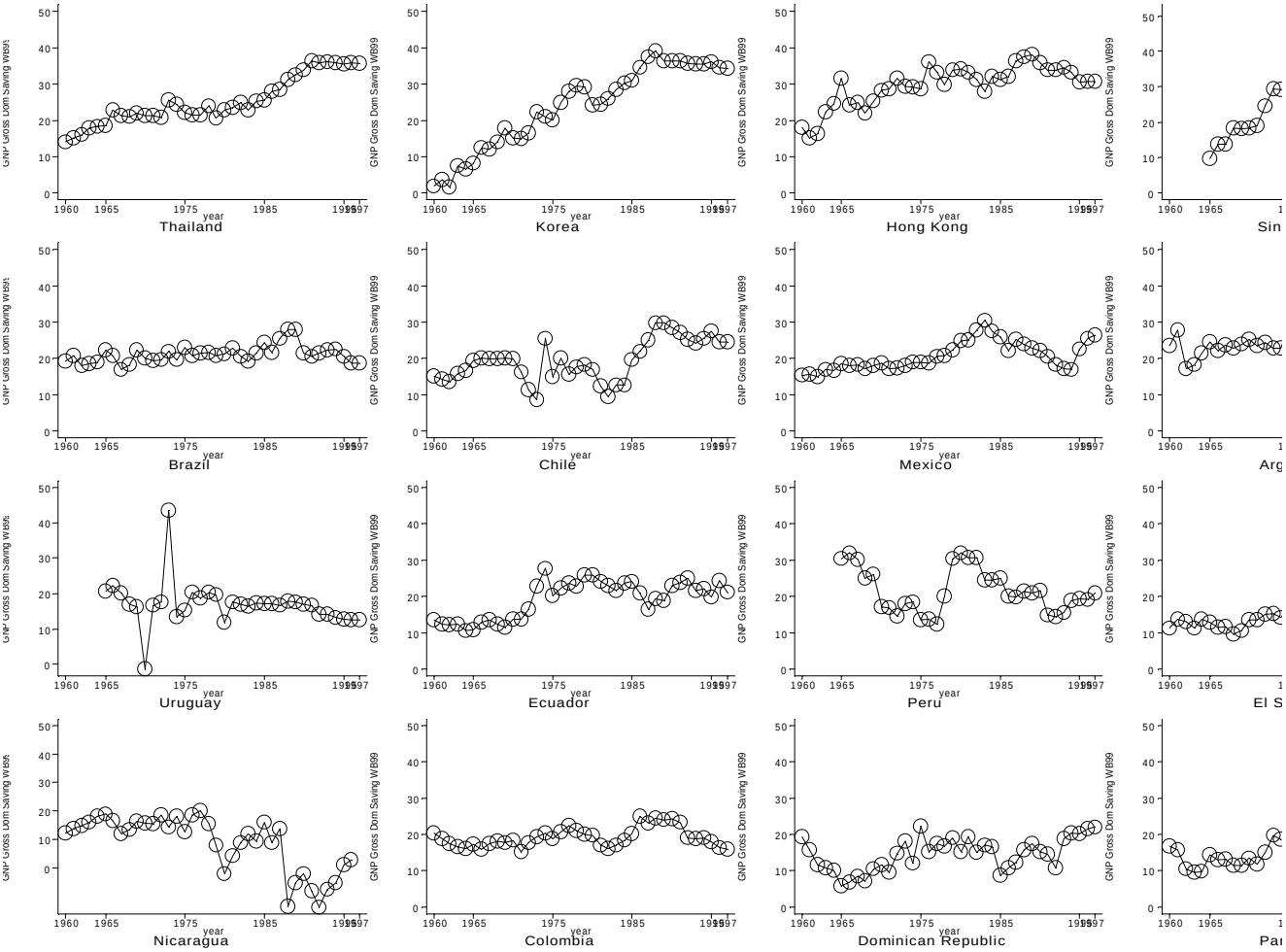


Figure 2


GNP Gross Dom Saving WB99
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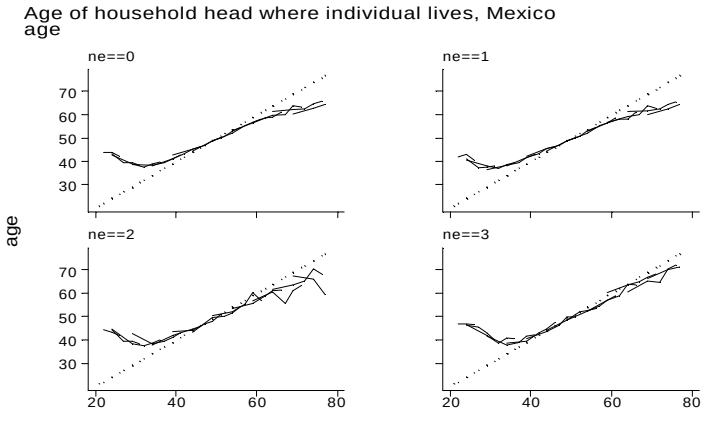


Figure 3.1 (Mexico)

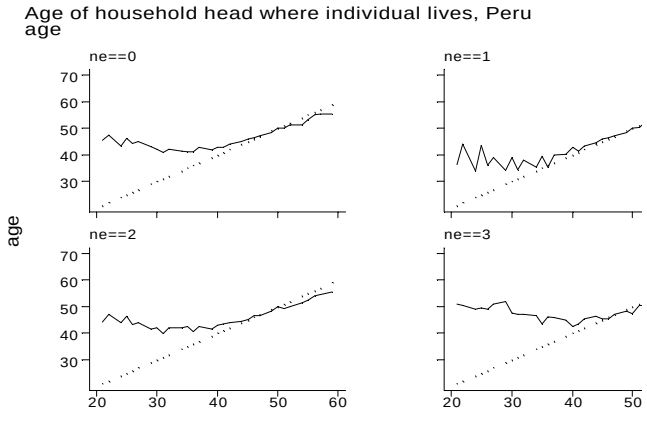
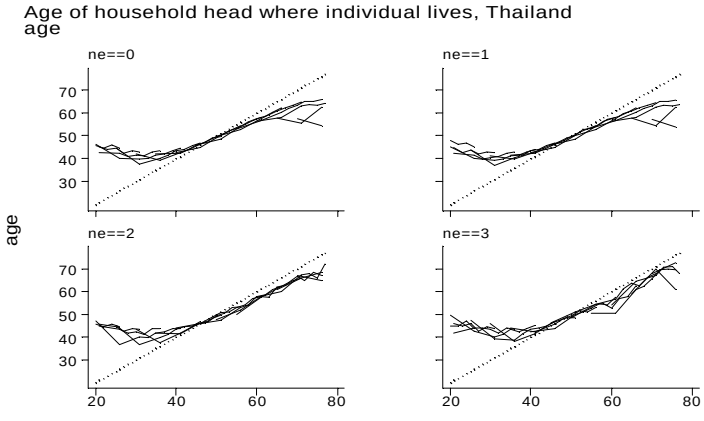


Figure 3.2 (Peru)



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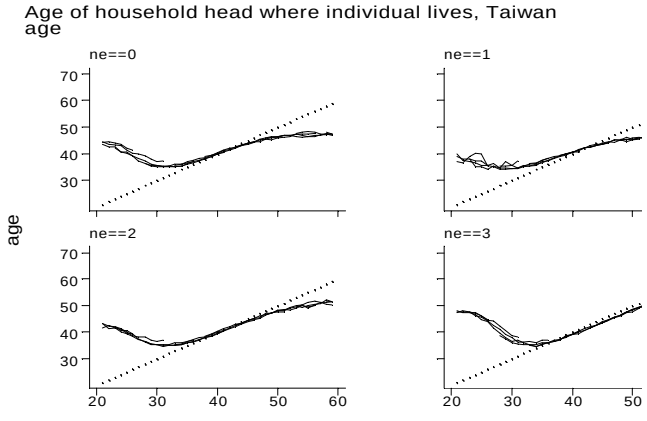
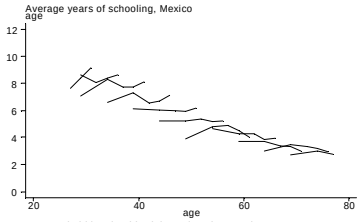
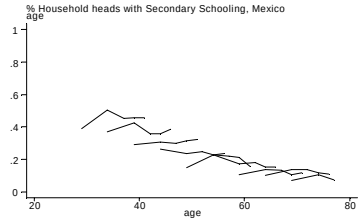
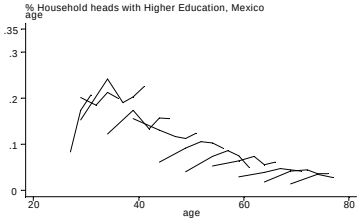


Figure 3.4 (Taiwan)

Figure 3







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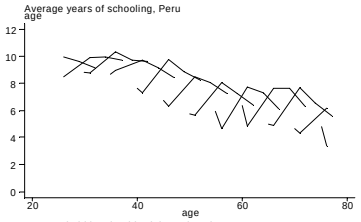

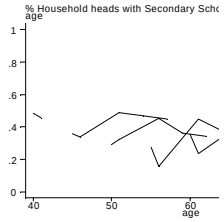

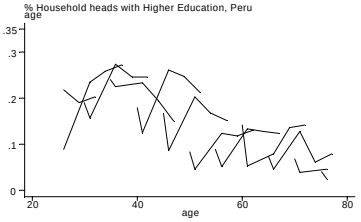

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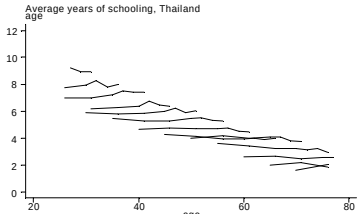

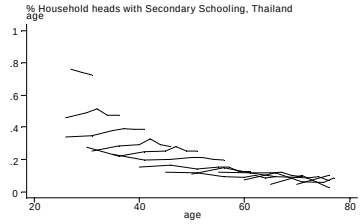

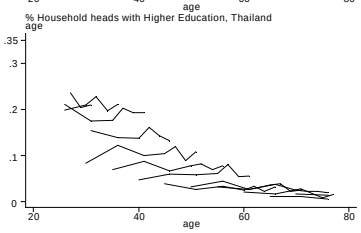

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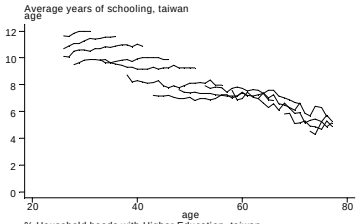

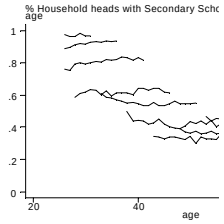

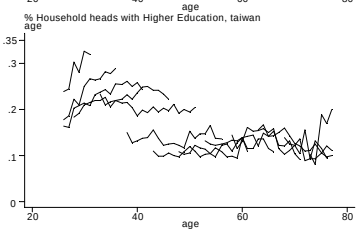

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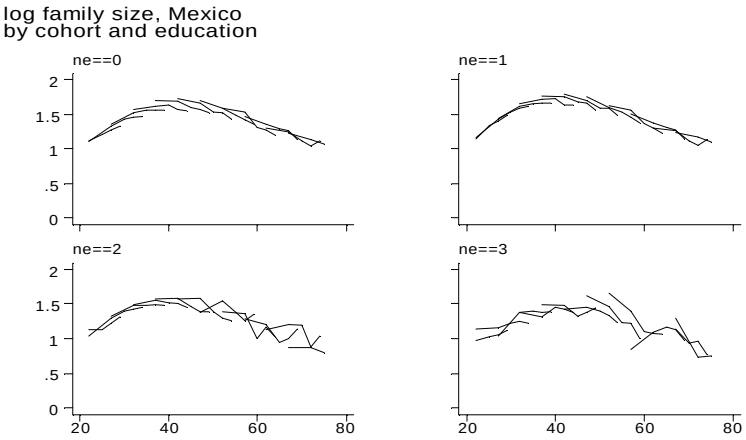
Figure 4



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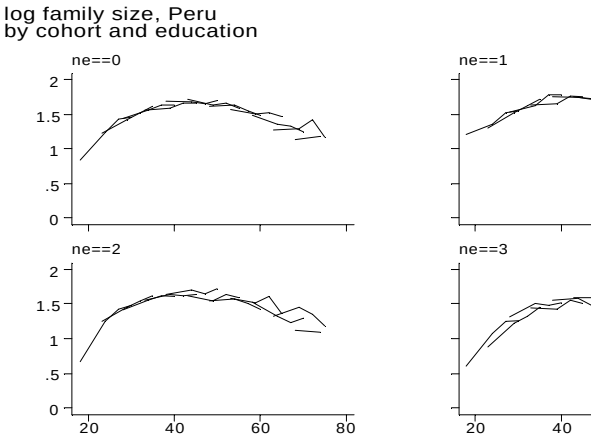

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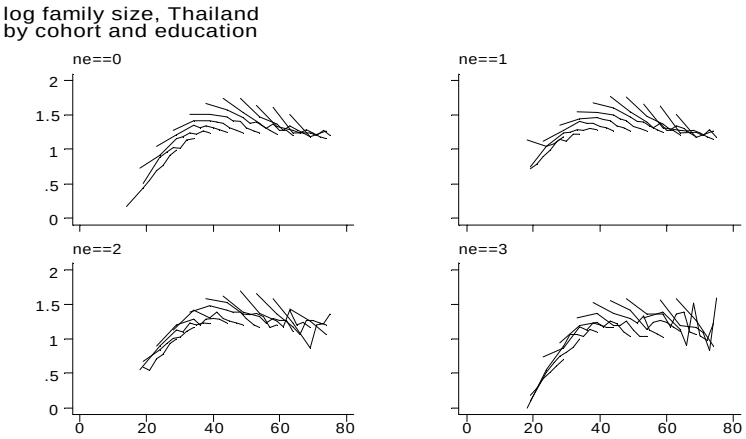

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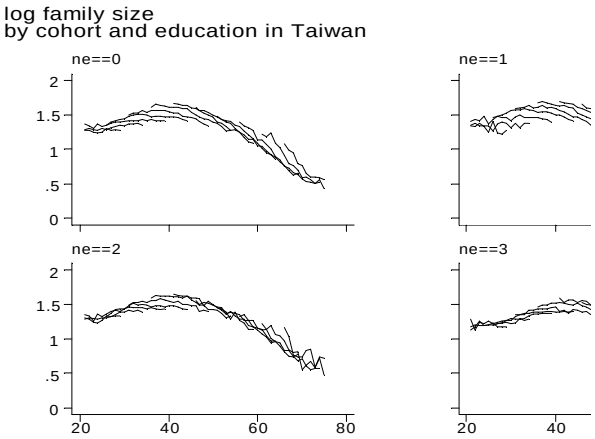

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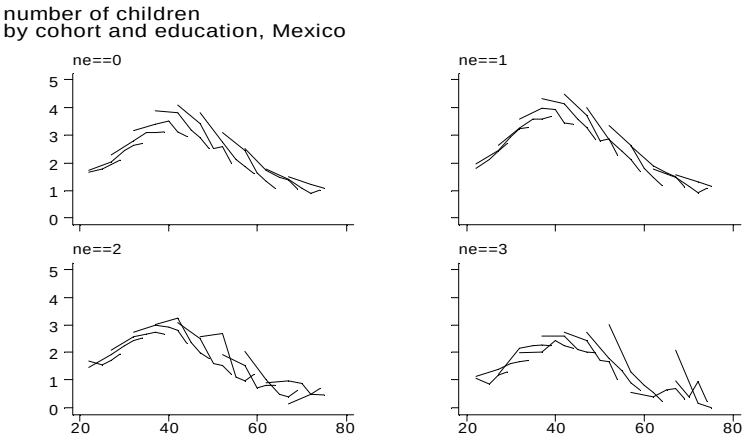

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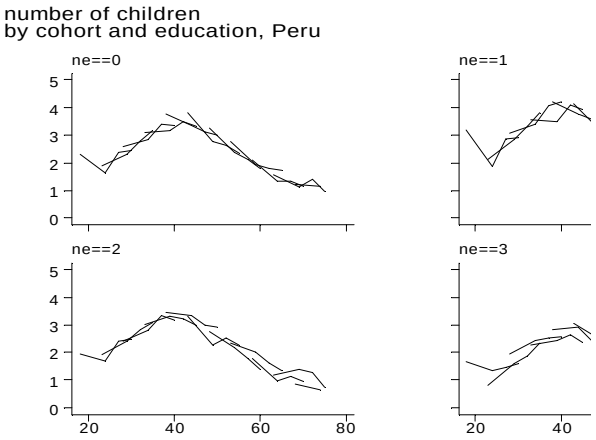

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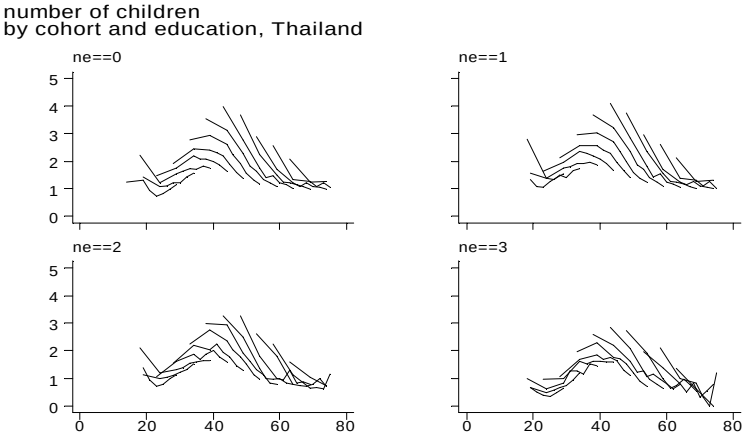

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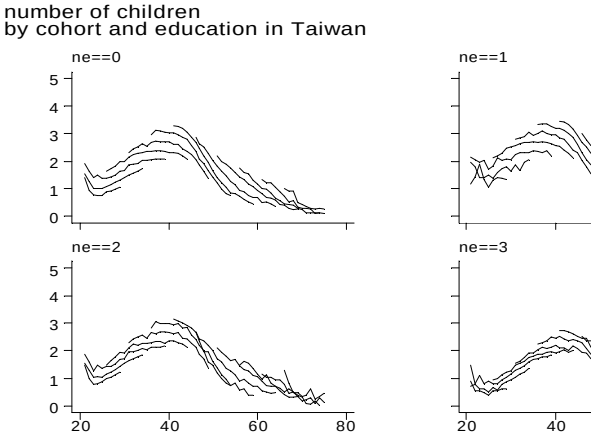

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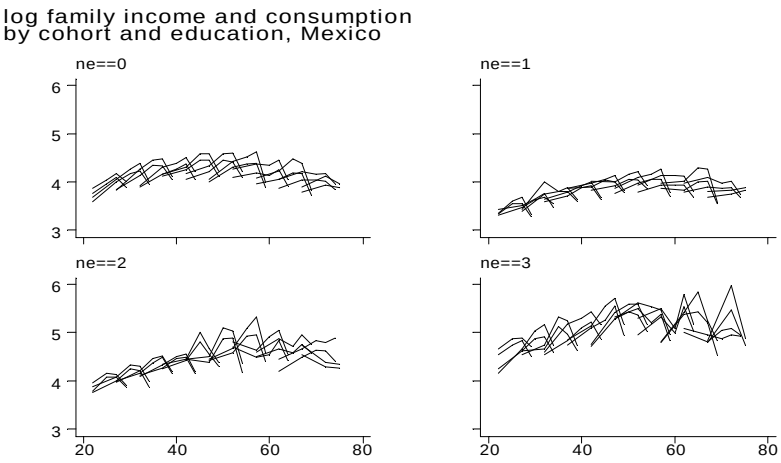

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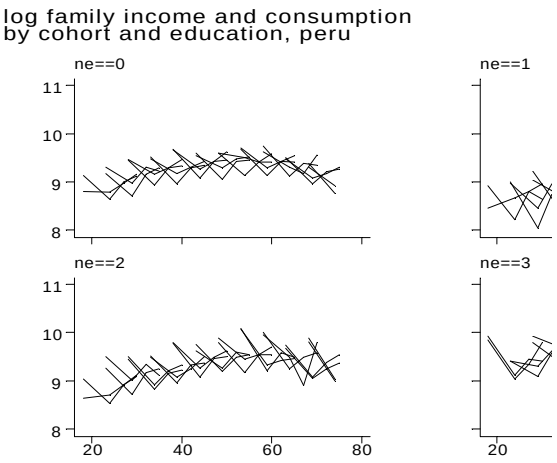

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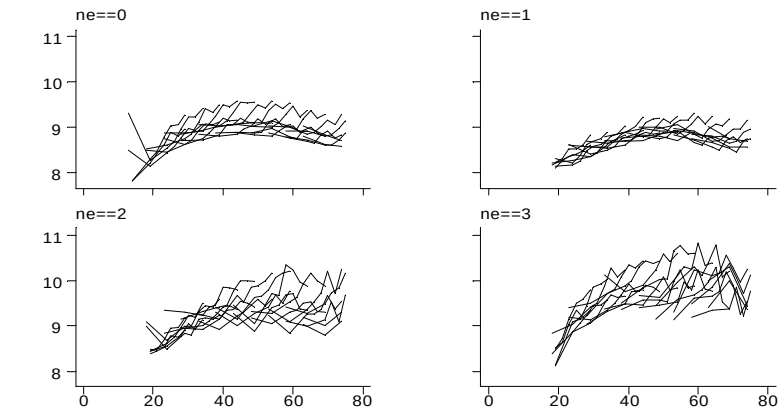

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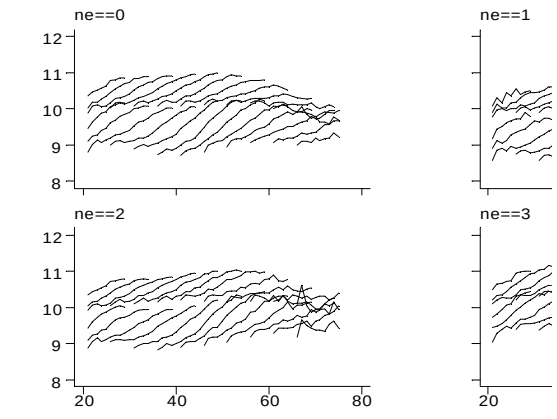

Figure 7.4 (Taiw

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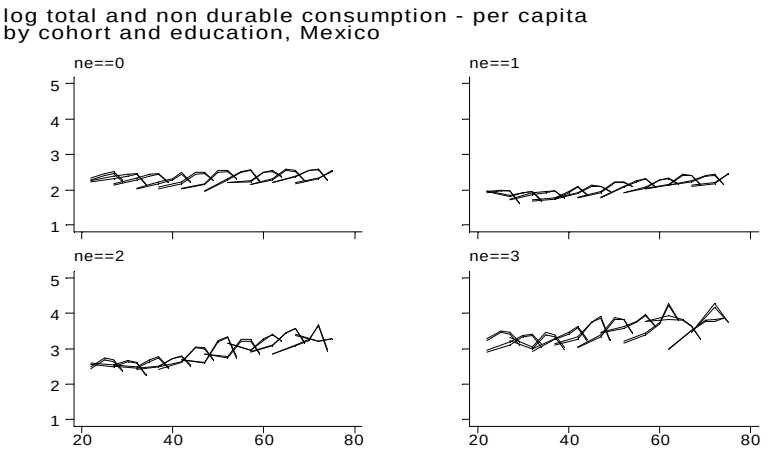

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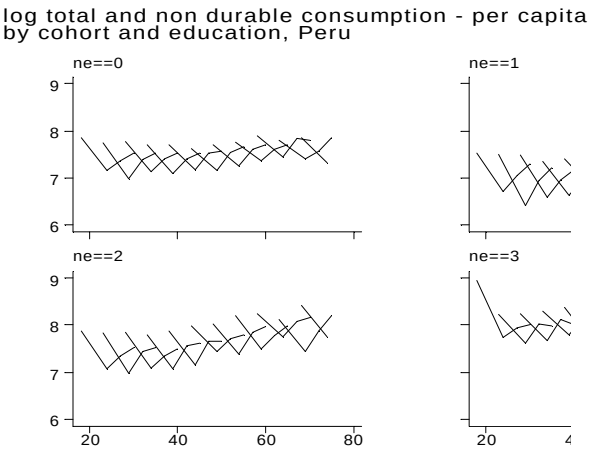

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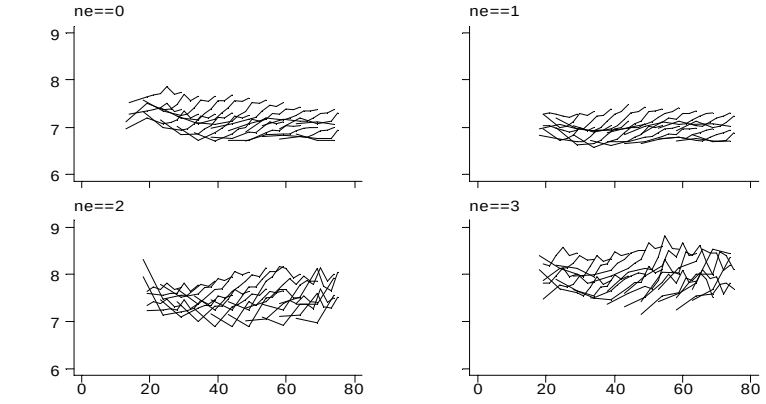

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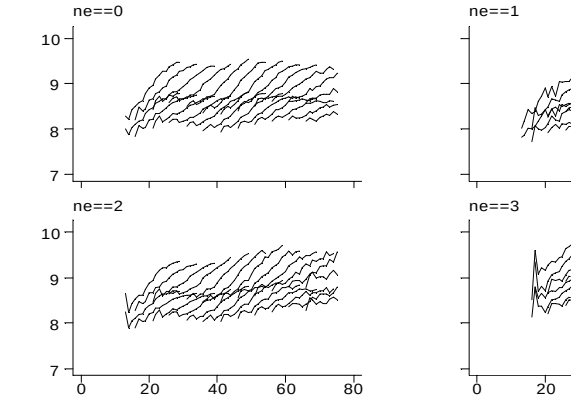

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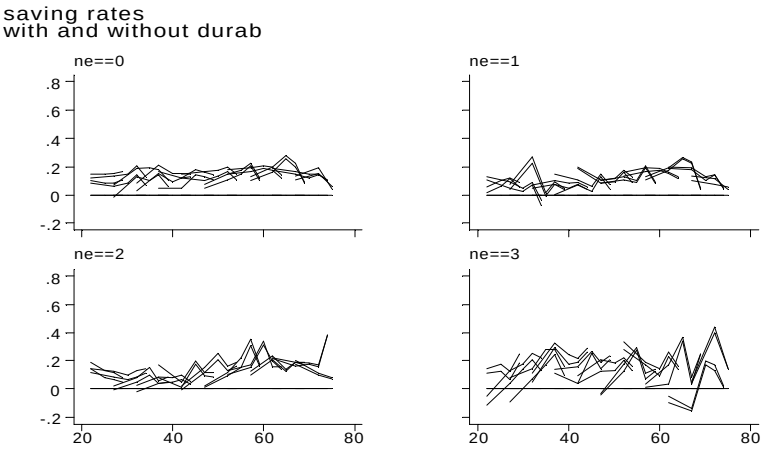

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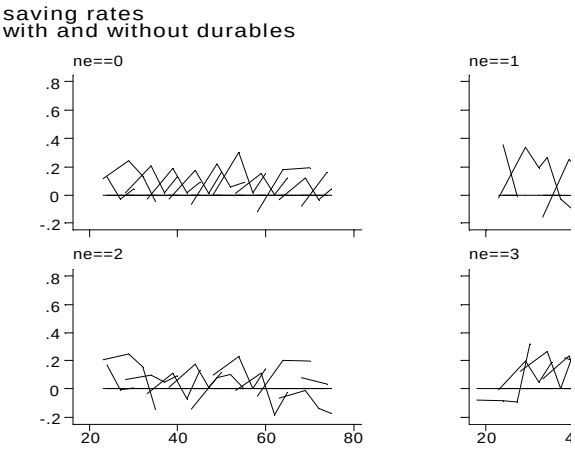

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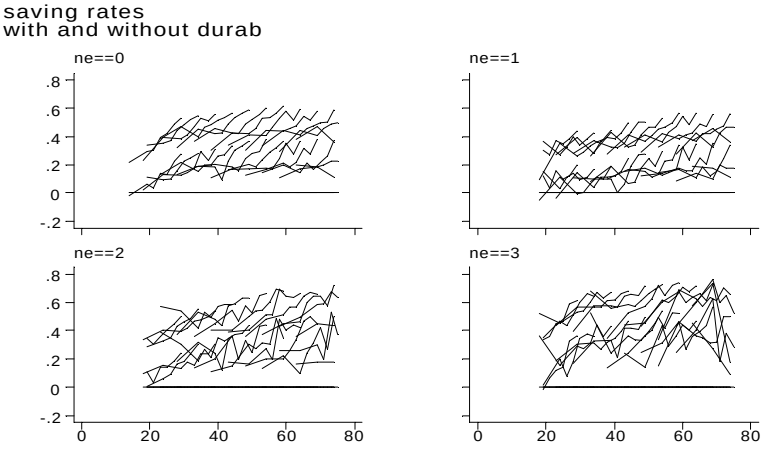

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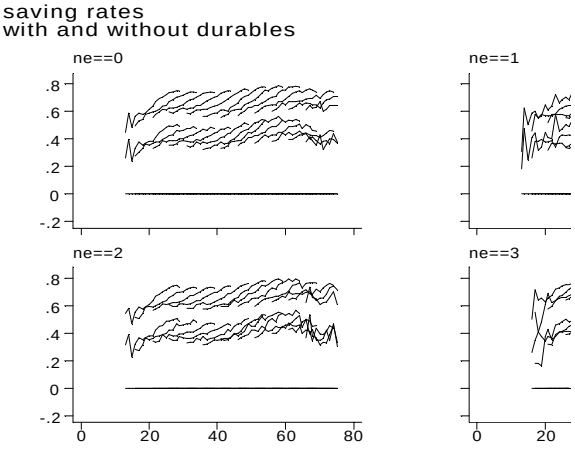

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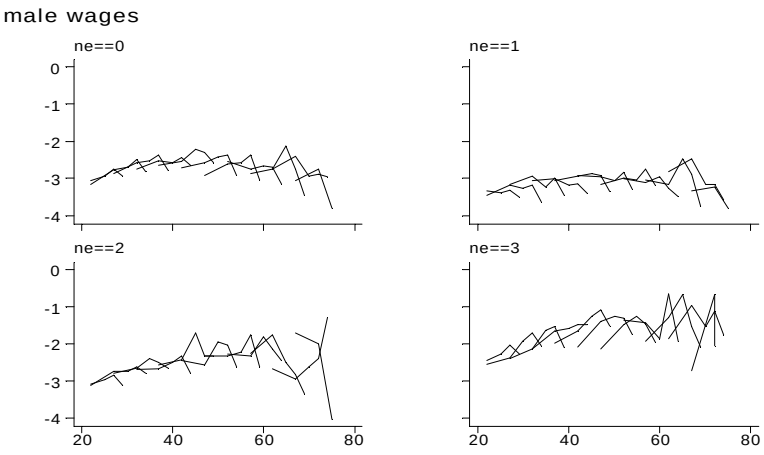

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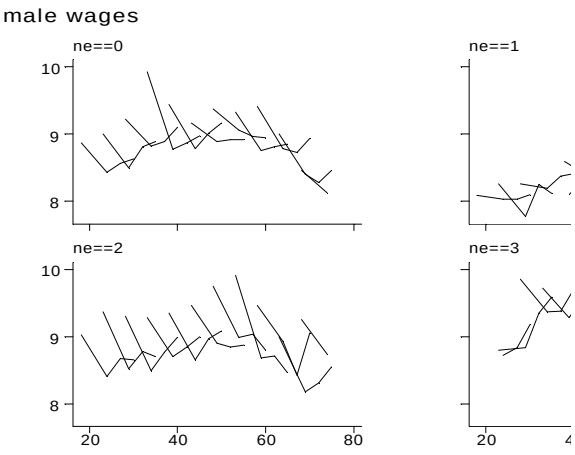

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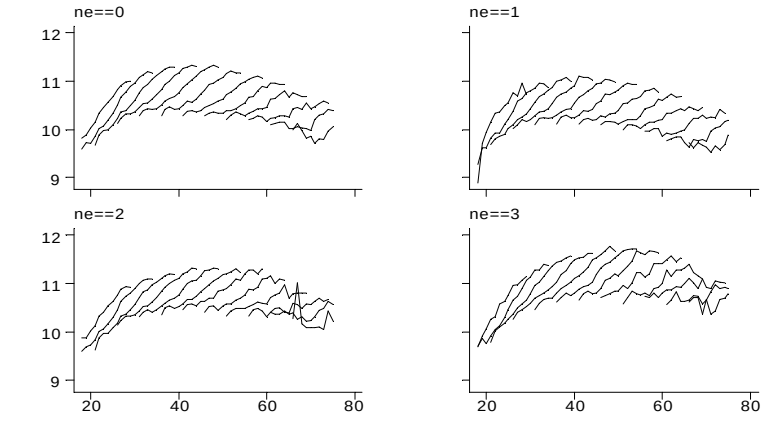

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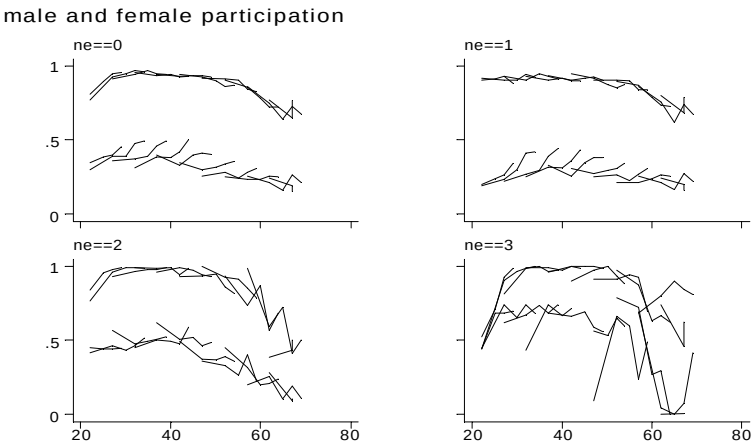
Figure 10



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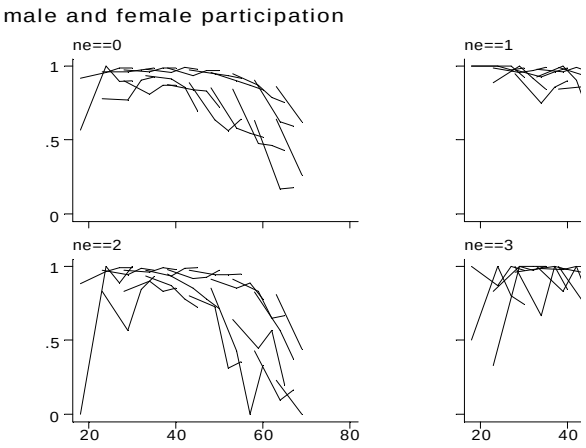

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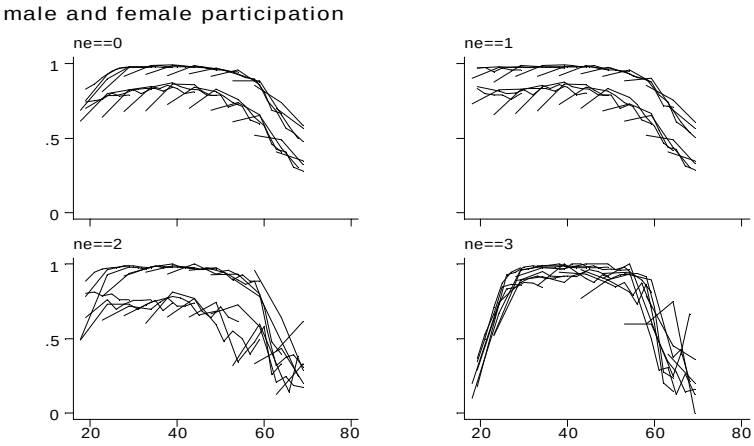

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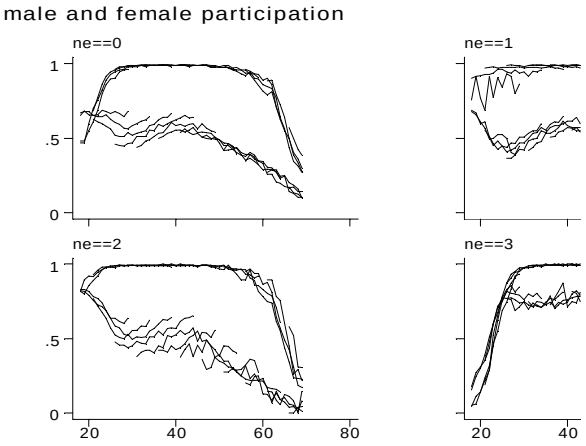
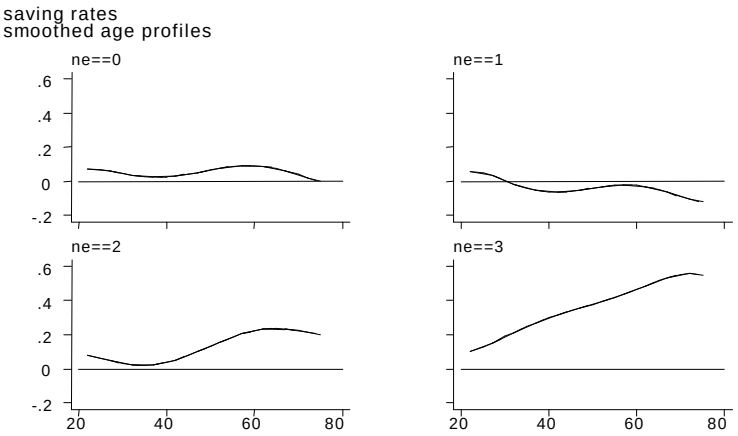


Figure 11.4 (Taiwan)

Figure 11



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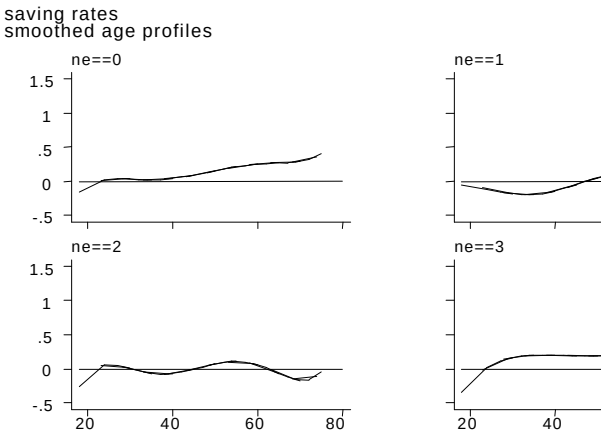

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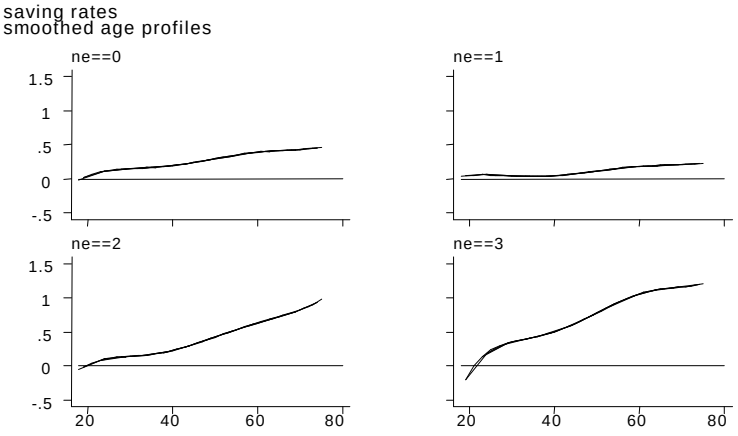

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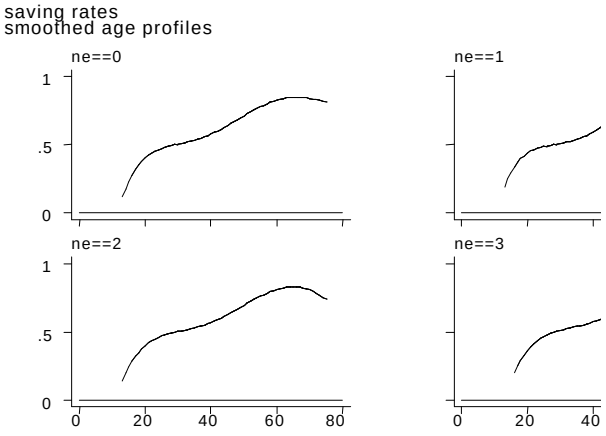

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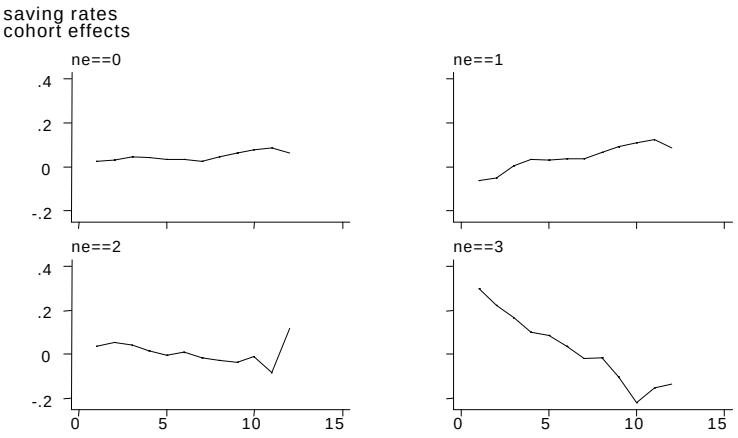

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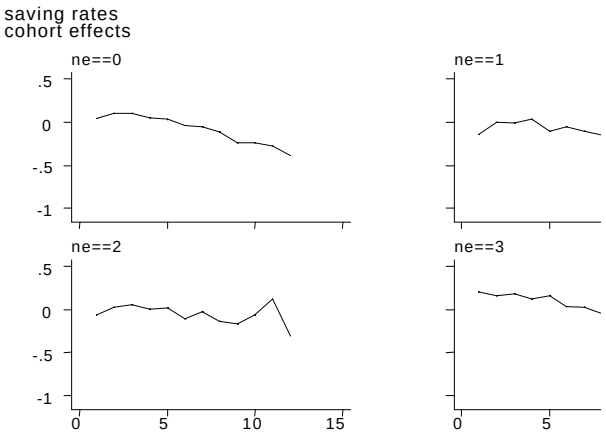

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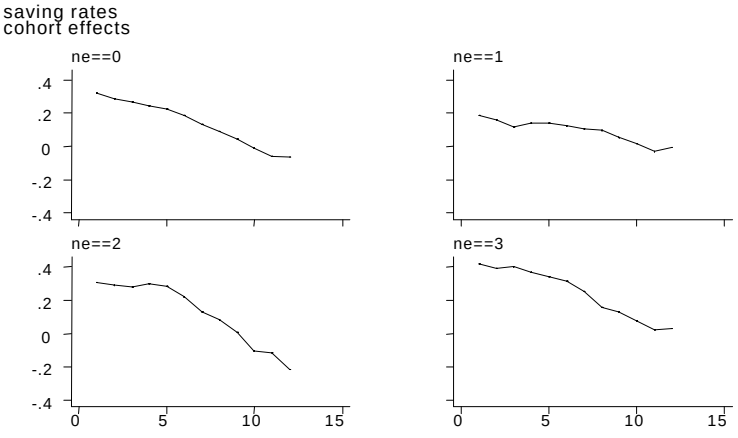

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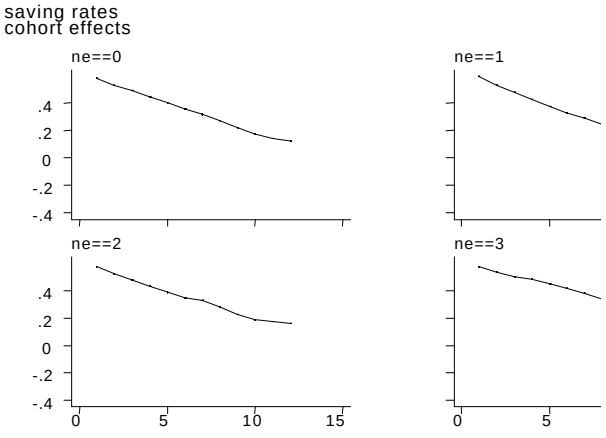

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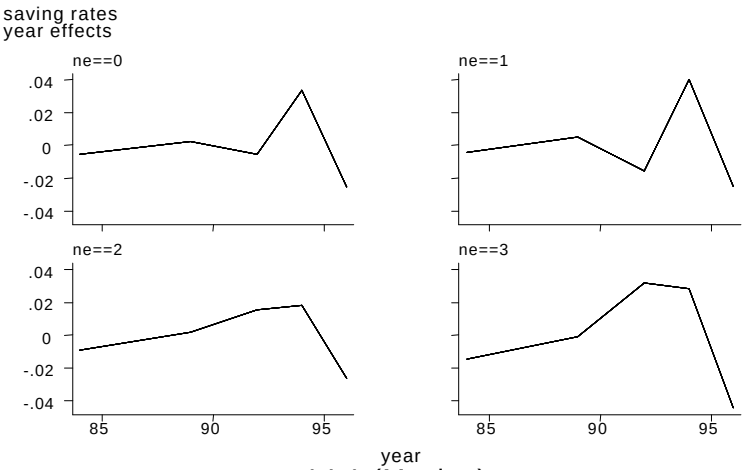

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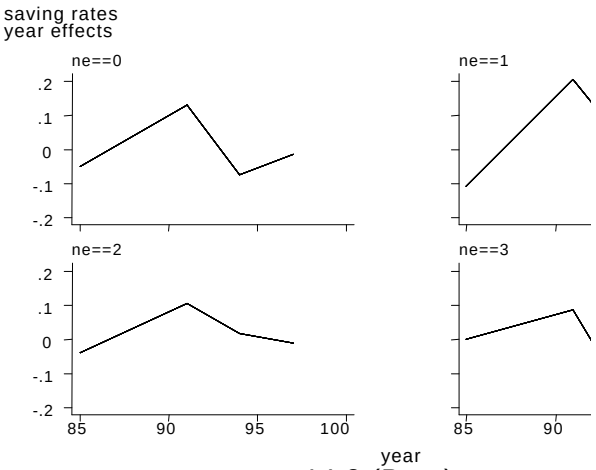

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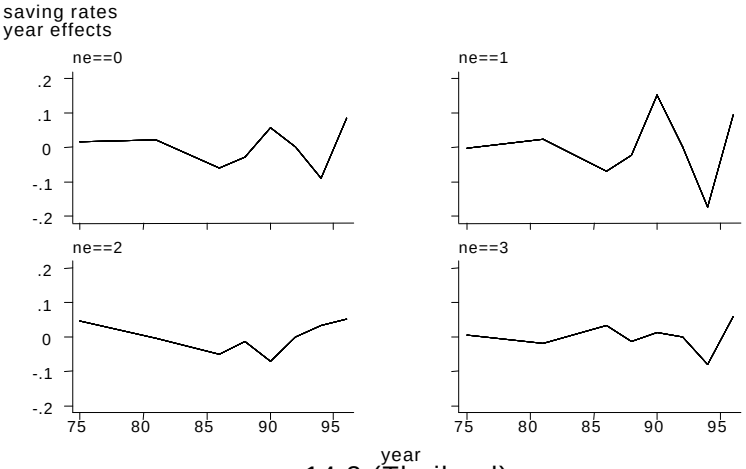

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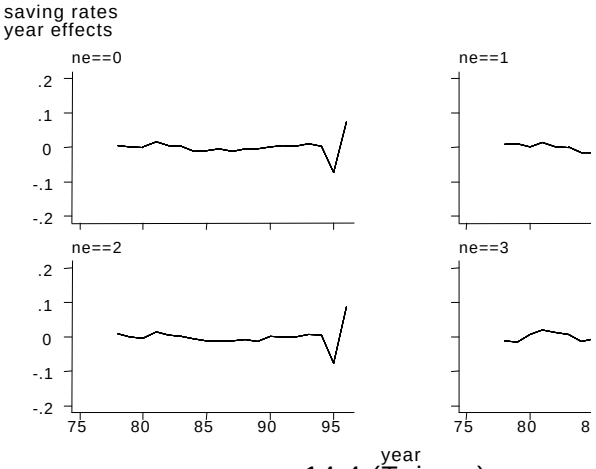

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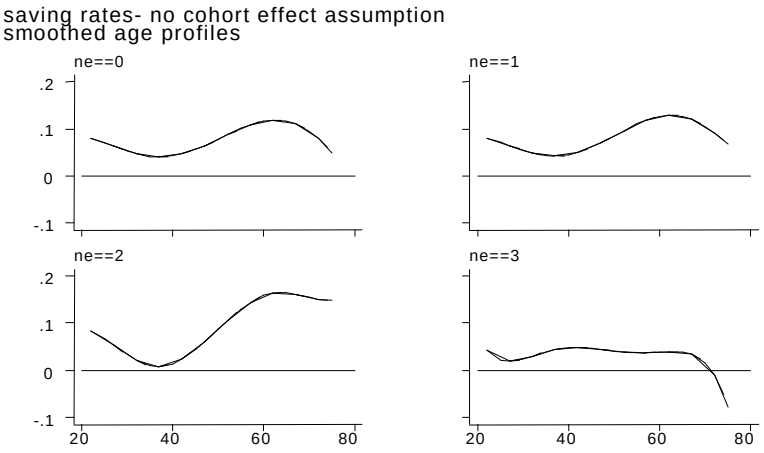

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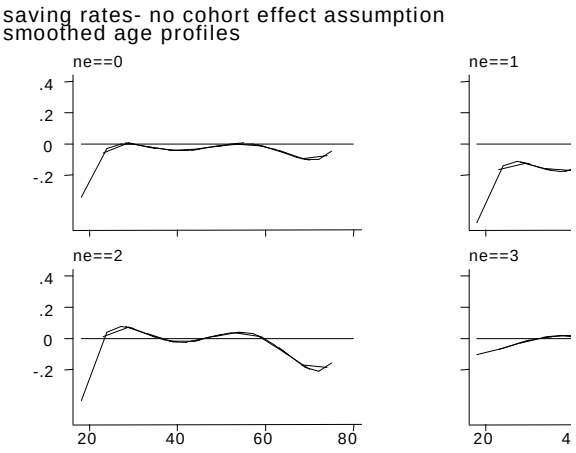

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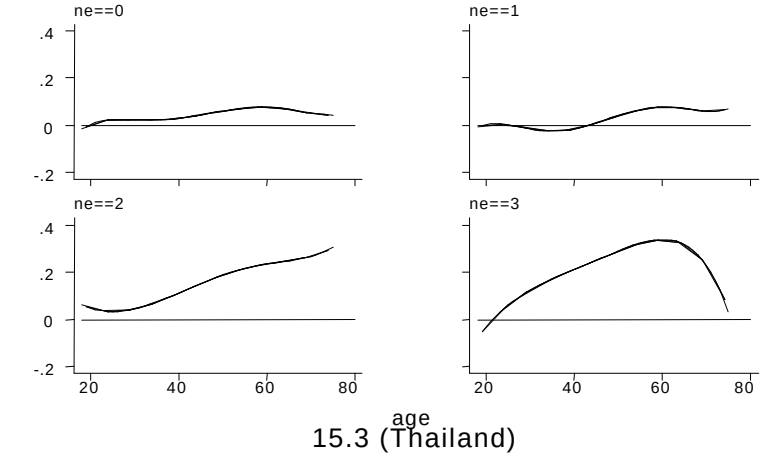

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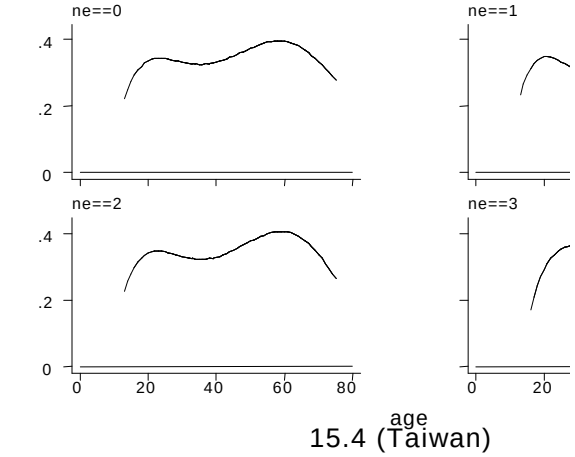

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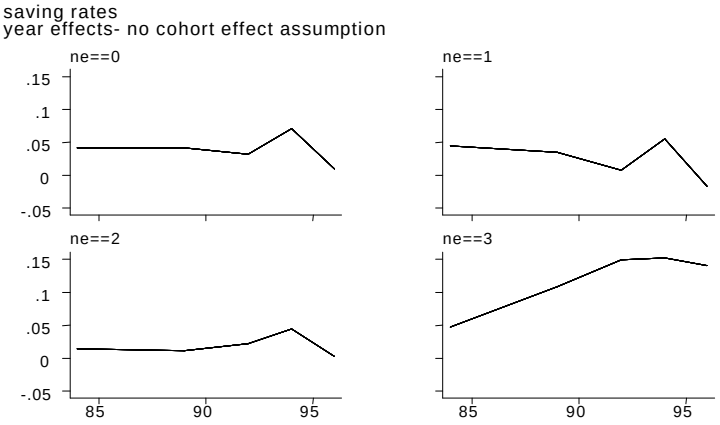

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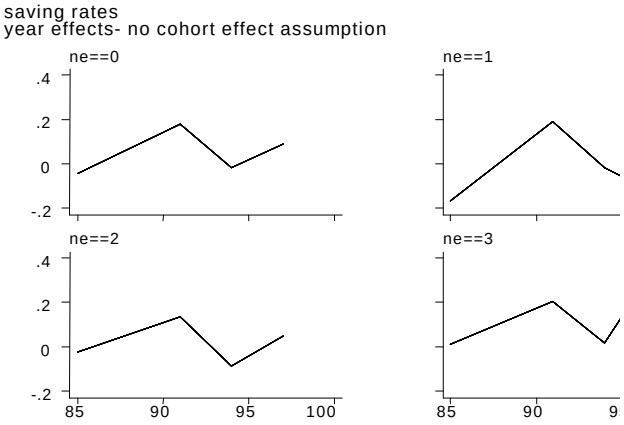

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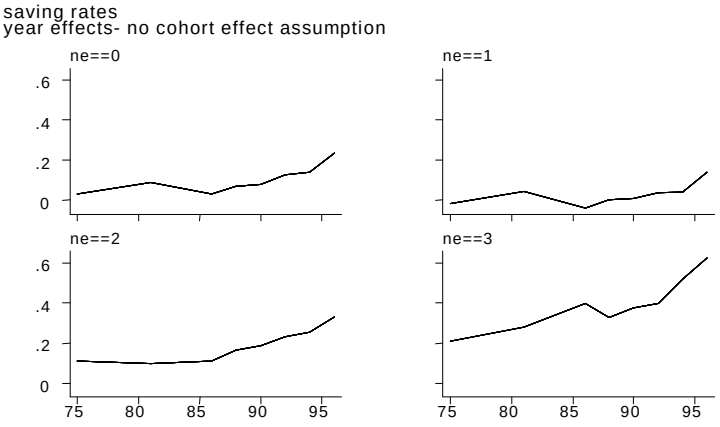

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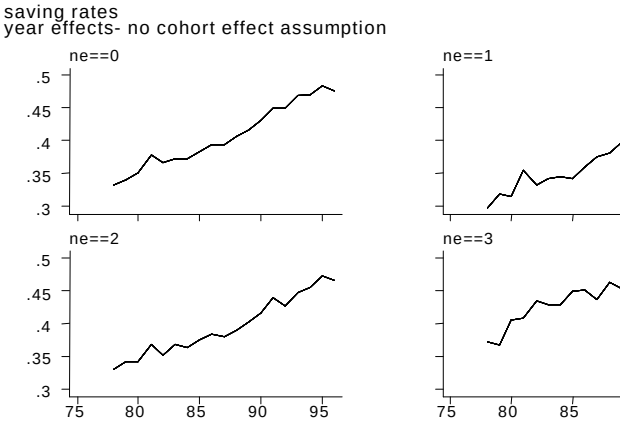

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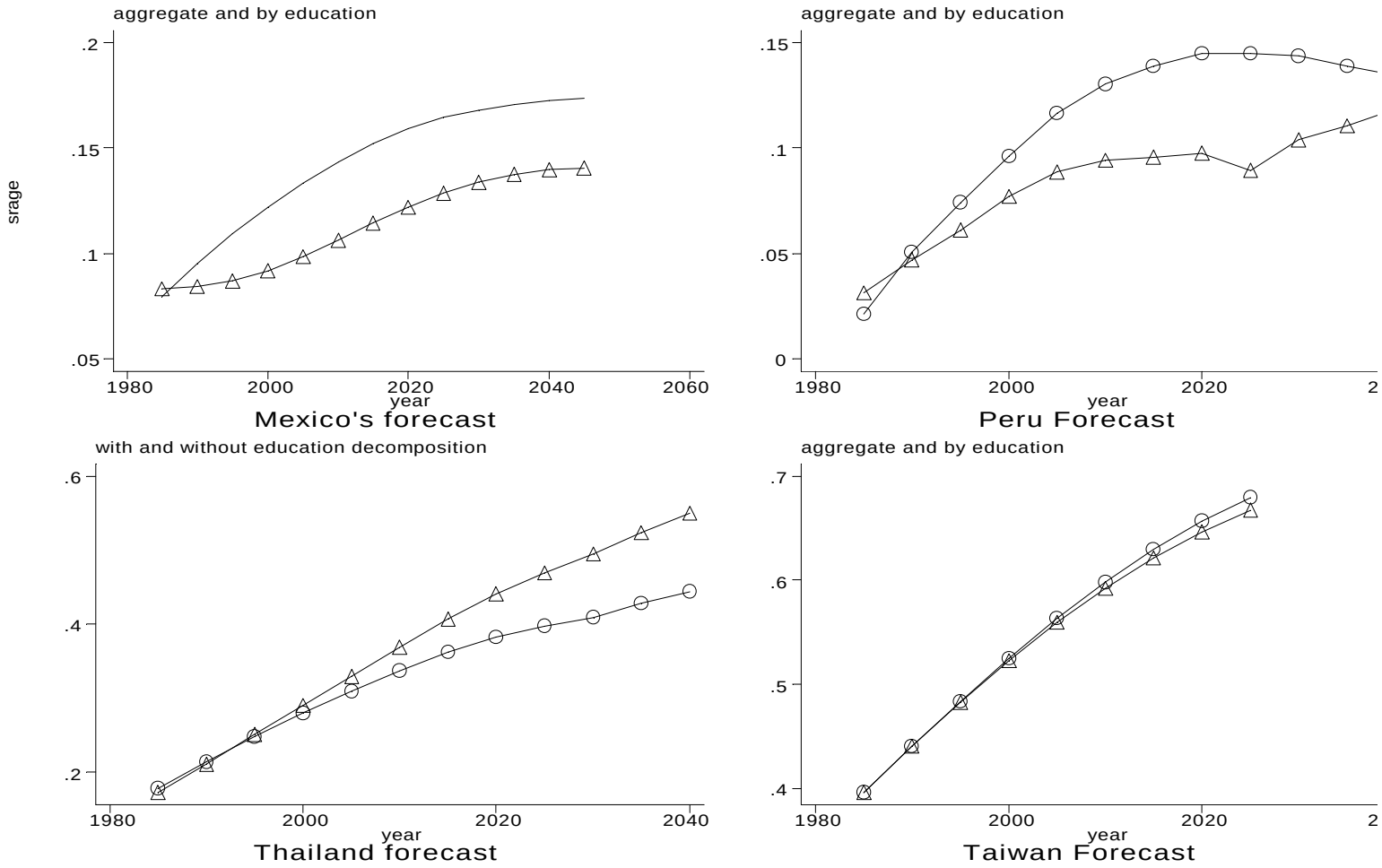
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Figure 17

Table 1

Average Cell size (number of households) per Country

Cohort	Year of Birth	Country			
		Mexico	Peru	Thailand	Taiwan
1	1965-69	1,146	404	1,034	521
2	1960-64	1,307	482	1,488	1,090
3	1955-59	1,375	518	1,841	1,924
4	1950-54	1,309	439	2,049	2,528
5	1945-49	1,106	390	1,857	1,957
6	1940-44	989	361	1,708	1,785
7	1935-39	844	298	1,687	1,516
8	1930-34	720	283	1,548	1,367
9	1925-29	555	220	1,264	1,194
10	1920-24	454	191	959	710
11	1915-19	264	137	698	364
12	1910-14	160	86	457	178
Overall sample size		10,230	3,809	16,591	15,132
Total population in country (000)		91,145	23,532	58,610	21,882
Sample/Population size		0.000112	0.000162	0.000283	0.000692

Source: Authors' calculations from household surveys.

Table 2

Household Saving, Demographics, Participation, Education and GDP
In Selected Countries

Country	Year	Aggregate Domestic Saving Rate*	Household Saving Rate (S1)	Young Dependency	Female Participation	Years of Schooling	PPP GDP Per capita*
Mexico	1996	25.4	9.5	0.59	44.4	7.1	5,757
Peru	1997	19.0	9.6	0.60	64.5	8.5	2,993
Thailand	1996	35.9	29.7	0.41	79.7	5.8	5,080
Taiwan	1996	26.8	49.1	0.31	57.4	9.3	14,634

Source: Authors' calculations from household survey data. *from WDI (1999) for Mexico, Peru
The data for Taiwan is from the National Statistics Office of Taiwan Republic of China. Savings rates for Taiwan refer to Gross National Savings and GDP per capita is not PPP adjusted.

Table 3

Simulations of switching population weights and holding Age-specific Saving Rates constant

Country		Total	Year of Birth 1965-69	1960-64	1955-59	1950-54	1945-49	1940-44	1935-39	1930-34	1925-29	1920-24	1915-19
Mexico	Average saving rate		0.107	0.070	0.065	0.127	0.107	0.111	0.102	0.123	0.095	0.108	0.081
	Weight household heads		0.12	0.14	0.13	0.12	0.10	0.08	0.07	0.06	0.04	0.03	0.02
	HH head Weighted saving rate	8.68	1.31	0.96	0.84	1.49	1.04	0.87	0.67	0.68	0.37	0.32	0.13
	Total population weight		0.078	0.070	0.058	0.047	0.038	0.030	0.024	0.020	0.014	0.011	0.006
Peru	Average saving rate		0.083	-0.004	0.138	0.113	0.160	0.094	0.161	0.123	0.175	0.014	-0.225
	Weight household heads		0.10	0.12	0.14	0.11	0.10	0.09	0.08	0.07	0.05	0.03	0.02
	HH head Weighted saving rate	8.94	0.83	-0.05	1.87	1.27	1.65	0.83	1.26	0.90	0.85	0.05	-0.51
	Total population weight		0.071	0.064	0.057	0.045	0.037	0.030	0.027	0.022	0.016	0.012	0.008
Thailand	Average saving rate		0.275	0.281	0.310	0.335	0.367	0.380	0.369	0.367	0.379	0.369	0.293
	Weight household heads		0.09	0.12	0.13	0.12	0.10	0.10	0.09	0.08	0.05	0.04	0.02
	HH head Weighted saving rate	31.09	2.38	3.26	3.99	4.02	3.72	3.62	3.16	2.96	2.01	1.45	0.53
	Total population weight		0.093	0.095	0.086	0.072	0.056	0.050	0.043	0.039	0.025	0.019	0.010
Taiwan	Average saving rate		0.493	0.478	0.476	0.477	0.503	0.534	0.534	0.530	0.454	0.458	0.463
	Weight household heads		0.10	0.16	0.17	0.16	0.10	0.07	0.06	0.04	0.04	0.03	0.01
	HH head Weighted saving rate	46.16	4.81	7.50	8.33	7.68	5.02	3.93	2.96	2.32	1.79	1.22	0.61
	Total population weight		0.075	0.086	0.086	0.076	0.050	0.045	0.041	0.036	0.034	0.022	0.012
Simulations													
Saving in Mexico with Taiwan HH head weight		9.1	1.04	1.10	1.14	2.04	1.07	0.81	0.57	0.54	0.37	0.29	0.11
Saving in Peru with Taiwan HH head weight		9.1	0.81	-0.07	2.41	1.81	1.60	0.69	0.89	0.54	0.69	0.04	-0.30
Saving in Thailand with HH head weight		30.9	2.69	4.41	5.43	5.38	3.67	2.80	2.04	1.60	1.49	0.99	0.39
Saving in Taiwan with Peru HH head weight		45.3	4.97	5.79	6.45	5.39	5.17	4.72	4.16	3.86	2.20	1.55	1.06
Saving in Mexico with Taiwan pop weight		5.5	0.80	0.61	0.56	0.97	0.53	0.49	0.42	0.45	0.32	0.23	0.10
Saving in Peru with Taiwan pop weight		5.3	0.62	-0.04	1.19	0.86	0.80	0.42	0.67	0.45	0.59	0.03	-0.27
Saving in Thailand with Taiwan pop weight		18.5	2.06	2.43	2.68	2.55	1.83	1.70	1.52	1.33	1.27	0.80	0.35
Saving in Taiwan with Peru pop weight		19.2	3.52	3.06	2.72	2.16	1.88	1.62	1.42	1.18	0.74	0.56	0.36

Source: Authors' calculations from household surveys.

Table 4

Simulations of switching population weights and holding Savings Rates of Education Groups Constant

Country		Total	Education Group Primary	Secondary	Higher
Mexico	Average saving rate		0.06	0.08	0.16
	Population weight		0.60	0.25	0.14
	Weighted saving rate	8.06	3.85	1.98	2.22
Peru	Average saving rate		0.00	0.06	0.24
	Population weight		0.47	0.35	0.18
	Weighted saving rate	6.31	-0.19	2.01	4.49
Thailand	Average saving rate		0.28	0.34	0.43
	Population weight		0.67	0.20	0.13
	Weighted saving rate	31.14	18.79	6.87	5.48
Taiwan	Average saving rate		0.49	0.48	0.50
	Population weight		0.32	0.46	0.22
	Weighted saving rate	48.99	15.69	22.31	11.00
Saving in Mexico with Taiwan weight		9.05	2.03	3.62	3.40
Saving in Peru with Taiwan weight		7.89	-0.13	2.66	5.36
Saving in Thailand with Taiwan weight		34.03	8.93	15.61	9.48
Saving in Taiwan with Mexico weight		49.14	29.72	12.22	7.19

Source: Authors' calculations from household surveys.

Table 5

Saving Rates by Quintile

Country	Total	Quintile 1	2	3	4	5	Gini
Mexico	9.5	-0.17	-0.05	-0.01	0.05	0.21	0.53
Peru	9.6	-1.81	-0.52	-0.18	0.07	0.40	0.51
Thailand	29.7	-0.32	0.00	0.15	0.29	0.49	0.53
Taiwan	49.1	0.39	0.43	0.46	0.48	0.54	0.30
Difference Taiwan-Mex		0.55	0.48	0.46	0.43	0.33	
Difference Taiwan-Peru		2.20	0.95	0.63	0.41	0.15	
Difference Taiwan-Thai		0.71	0.43	0.30	0.19	0.05	

Source: Authors' calculations from household surveys.

Table 6

Evolution of Saving Rates

Country	Year	Total Household Saving Rate				Median Household Saving Rate				Saving as (%) of GDP	
		s1 (dur+ndur)	s2 (ndur-edu-h)	s3 (ndur)	s4 (s1-edu-h)	s1 (dur+ndur)	s2 (ndur-edu-h)	s3 (ndur)	s4 (s1-edu-h)	Domestic Saving*	Household Saving
Mexico	1984	8.5	19.0	12.4	14.4	6.4	4.1	7.8	1.7	26.3	3.0
	1989	11.1	22.7	15.4	17.4	7.0	-0.4	9.5	-4.2	22.0	4.5
	1992	12.0	25.2	16.3	19.3	4.5	-1.9	6.9	-6.5	17.7	5.3
	1994	14.1	21.3	17.5	16.4	7.3	-0.9	9.1	-4.4	16.5	6.5
	1996	9.5	24.1	13.7	19.3	2.2	-5.0	3.9	-7.7	26.1	3.5
Peru	1985	-4.5				-18.0				26.0	-1.1
	1991	18.5				18.2				13.9	16.9
	1994	-1.0				-8.0				18.2	-0.4
	1997	9.6				-9.4				20.4	3.2
Thailand	1975	14.3	40.1	33.0	21.4	6.0	29.7	23.6	12.0	22.1	1.0
	1986	16.7	46.5	40.4	22.8	5.4	33.9	28.2	11.4	27.4	1.0
	1990	21.3	54.3	48.6	27.0	10.4	39.6	34.3	15.8	33.4	1.1
	1992	27.1	57.5	51.9	32.7	13.5	42.5	37.5	19.0	35.2	1.6
	1994	27.4	58.8	53.0	33.2	15.6	45.5	40.0	21.1	35.2	1.3
	1996	33.3	62.3	56.9	38.8	21.4	50.5	45.5	26.3	34.9	1.7
Taiwan	1976	29.5		52.8		24.5		48.8		32.3	
	1978	35.0	63.8	57.7	41.1	32.0	46.3	54.9	23.3	34.4	24.7
	1985	39.7	69.9	63.4	46.2	35.6	51.5	60.2	26.3	33.6	29.8
	1990	45.1	76.3	70.2	51.2	42.2	59.3	67.9	33.1	29.3	37.8
	1992	47.0	78.7	72.3	53.4	44.3	61.3	70.1	34.8	29.0	41.4
	1994	48.7	83.3	74.7	57.3	46.7	61.6	73.2	34.3	27.7	45.5
	1996	49.1	84.3	74.8	58.5	48.1	61.2	73.8	34.6	26.8	45.7

Source: Authors' calculations from household survey data. Domestic saving rates and GDP for Mexico, Peru and Thailand are taken from the World Development Indicators, 1999 version. The data for Taiwan is from the National Statistics Office of Taiwan Republic of China.
* The savings ratio for Taiwan refers to Gross National Savings as a share of GDP.
Codes: dur=expenditures in durable goods; ndur=expenditures in non-durables; educ=expenditures in education; h=expenditures in health
Note: The estimates for 1984, 1989 and 1992 for mexico do not coincide exactly with those reported in Table 1 in Székely (1998), who uses the same data. The difference is that Székely adjusts consumption for interest payments from debt. .

Table 7

Decomposition of the Change in Household Saving

Country	Years	Total Change (points)	Age Profile Effect	Effect of Change in weights	Effect of Change in Weight	
					demographic	income
Mexico	1984-1996	1.0	1.3	-0.2	-1.7	1.5
Peru	1985-1997	12.7	14.3	-1.7	-1.8	0.1
Thailand	1975-1996	19.5	9.03	10.4	4.6	5.8
Taiwan	1976-1996	20.0	3.74	16.3	7.6	8.6

Source: Authors' calculations from household survey data.