Asymmetric demographic pressure in South-Mediterranean versus North-Mediterranean economies and its impact on international gross capital flows

Peeters, Marga

NIAS

24 June 2012

Asymmetric Demographic Pressure in South-Mediterranean versus North-Mediterranean Economies and its Impact on International Gross Capital Flows

Marga Peeters[1]

Netherlands Institute for Advanced Study,
Royal Netherlands Academy of Arts and Sciences, Wassenaar, The Netherlands
24 June 2012

Abstract

According to the life-cycle theory, countries with high and rising youth ratios or high and rising old-age ratios tend to have low savings relative to investment, which depresses their capital outflows. This paper puts life-cycle theory to the test and studies the impact of demographic change on international capital flows in the Middle East and North Africa (MENA) and the Southern European countries Greece, Italy, Spain and Portugal (GISP). These two regions are asymmetric in that MENA has a young population whereas the population of GISP has been ageing rapidly. Moreover, MENA has a lower standard of living an is a much more closed economy, which may effect the ability to save and its impact on cross-border capital flows. The empirical analyses in this paper cover the period 1980-2011 and partly support the life-cycle theory for these two regions. Youth rates depressed domestic savings significantly in both the MENA and GISP regions, while ageing as well as population growth had a positive impact in the GISP region. Also, domestic savings significantly caused international capital flows.

Key words: Demography, international capital flows, savings, ageing.

JEL-code: B31, D91, C3, E21, F2, F3, F4, J11.

[1] Corresponding address: huber@TinaMargaPeeters.eu. Without implicating them, I thank my colleagues and in particular the participants at the workshop of the Mediterranean Research Meeting organised by the Robert Schuman Centre for Advanced Studies at the European University Institute for helpful remarks. All calculations in this paper are available upon request.

Some theory on domestic savings and international capital flows

According to the life-cycle theory, young and old generations consume more than they save, while working-age generations save more than they consume. People of working age save for their retirement or, in cases of pay-as-you-go pension systems, for the currently retired generation. In contrast, retired people consume more than they save because they no longer have an incentive to save. This theory has been shown to apply to developed economies (see for instance Modigliani and Brumberg, 1954, and Lee *et al.*, 2006), but far less information is available for emerging economies.

According to other studies in the literature, population ageing is expected to have a profound effect on international capital markets (see for instance Börsch-Supan *et al.* (2006) and Bryant (2005) or Taylor and Williamson (1994)). The reasoning is that demographic change alters the time path of aggregate savings within each country and, in return, in open economies, impact international capital flows. This process may be amplified if pension reform shifts old-age provision towards more pre-funding, as is the case in many developed economies. While the patterns of population ageing are similar in most countries, timing and initial conditions differ substantially across countries.

Hence, because capital is internationally mobile, population ageing will effect capital flows between countries. These effects influence the rate of return to capital and interact with the demand for capital in production and labour supply. Börsch-Supan *et al.* (2006) show, by means of an overlapping generations model, that capital flows shifting from fast-ageing regions to other countries can be substantial but the trend is likely to reverse when households start dis-saving.

In theory, what matters for the rate of saving is actually the rate of *growth* of incomes (Deaton, 2005) not the *level* of income, as long as the population of poorer countries save the same share of their income as those in rich countries. If populations and incomes increase, young people will save more than older people dis-save. If populations shrink, aggregate savings will de-

cumulate and countries even need to attract money from abroad via international markets. In an open economy, either a saving economy or a dissaving economy will effect the country's international capital flows.

To what extent does this hold for developed or emerging economies? Countries with developing economies still have relatively young populations. Although the working-age populations are large, savings ratios may be low due to a lower standard of living. Moreover, people are more likely to spend and invest money domestically than abroad because these economies are more closed. Developed economies that are more likely to have ageing populations will have saved more but are life-cycle hypothesis expects they will start dis-saving once the baby-boom generations retire. As Bryant (2005) discussed, the optimistic view was that capital will flow from the North to the South, in other words, from the developed economies to the developing economies, or from the ageing to the young populations. There are thus strong asymmetries in demographic structure, in terms of economies' openness as well as the destiny of domestic savings. Because these factors strengthen each other, the expectation is that relatively more capital has been flowing from the North to the South until the baby boom generations retire.

So how well does theory translate into practice? There are many assumptions in these theories that may not hold in practice. For instance, the working-age generations in developed economies may have saved very little. Or, they may be saving but investing these fund domestically instead of abroad. Also, the working-age population in developed economies may be able to save a lot more because of an unequal distribution of wealth, possibly by being in possession of natural resources or due to corruption. .

This paper takes an empirical approach and looks at the empirical evidence at hand to test the impact of demographic change on domestic saving and on gross capital flows. I study the MENA-region and the GISP-region around the Mediterranean, i.e. the South of Europe. The MENA region's population is growing and thus relatively young. In sharp contrast, South-Europe (GISP) has been ageing rapidly, due to relatively low fertility rates and long longevity. The first

baby boom generations started retiring in 2010. The approach adopted in this paper is based directly on data about cross-border bank assets and tests for the impact of young- and old-age dependency rates. This approach is similar to the approach adopted by Narciso (2010) who studies OECD-countries and the analyses of Horioka and Terada-Hagiwara (2012) on Asian countries. The merit of this approach is in estimating instead of imposing impact factors, which is implicitly the case in calibrated overlapping generation models (see Börsch-Supan *et al.* (2006) or Marchiori (2011)). Data-driven models in combination with more theory-driven models can study the impact of demographic changes from different angles and thus complement each other.

The main aim of this study is to find out whether or not the demographic structural changes that differ widely between the two regions (MENA and GISP) effect the regions' international capital flows significantly and, if so, to what extent. This can provide us with a valuable piece of information in order to understand better the present and the future international capital flows. It also sheds light on the issue of money flowing between rich and poor countries (Lucas, 1990).

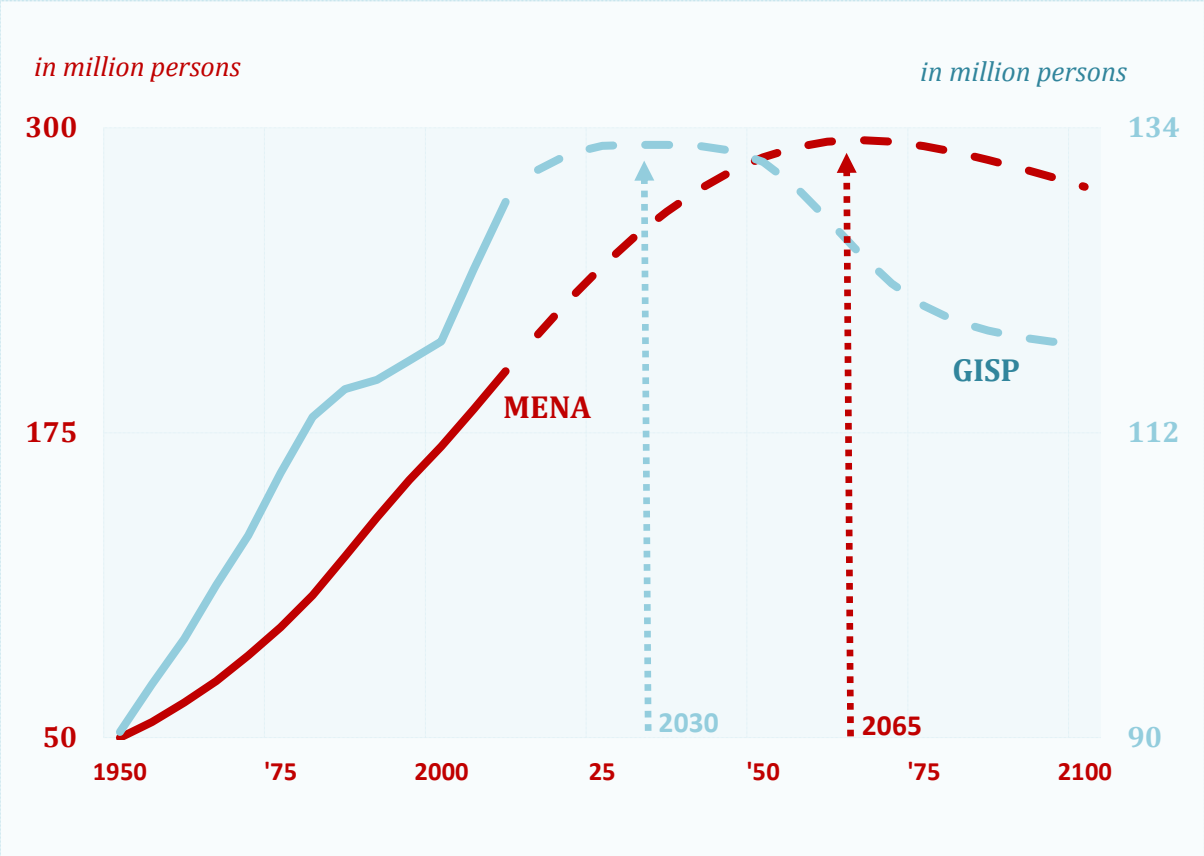
Stylized facts

As explained before, this study distinguishes between the South- and North-Mediterranean region, referred to as the MENA and the GISP respectively. MENA includes here the northwest to the northeast Africa and the Middle East: Morocco, Algeria, Tunisia, Libya, Egypt, the occupied Palestinian territory, Jordan, Lebanon and Syria. GISP includes the southeast to the southwest of Europe: Greece, Italy, Spain and Portugal.

I first study the population size of these two regions. The population of the MENA was about 50 million in 1950 and quadrupled in 2010 to 200 million. According to United Nations projections (see **Figure 1**) expectations are that the population will grow further to almost 300 million people by the year 2065. *Ceteris paribus*, the population is expected to decrease because of lower fertility rates. The GISP economies, which already have lower fertility and higher

longevity rates due to their higher welfare levels, are expected to reach their peak in population size sooner, in 2030, after which the population will shrink steadily to 118 million by 2100. After the baby boom generations, those born in two to three decades just after the second World War, far less children were born. By consequence, replacement rates were not met for which reason the current new born generations is not as numerous as the old age generations.

Figure 1 Evolution of population size in GISP and MENA countries



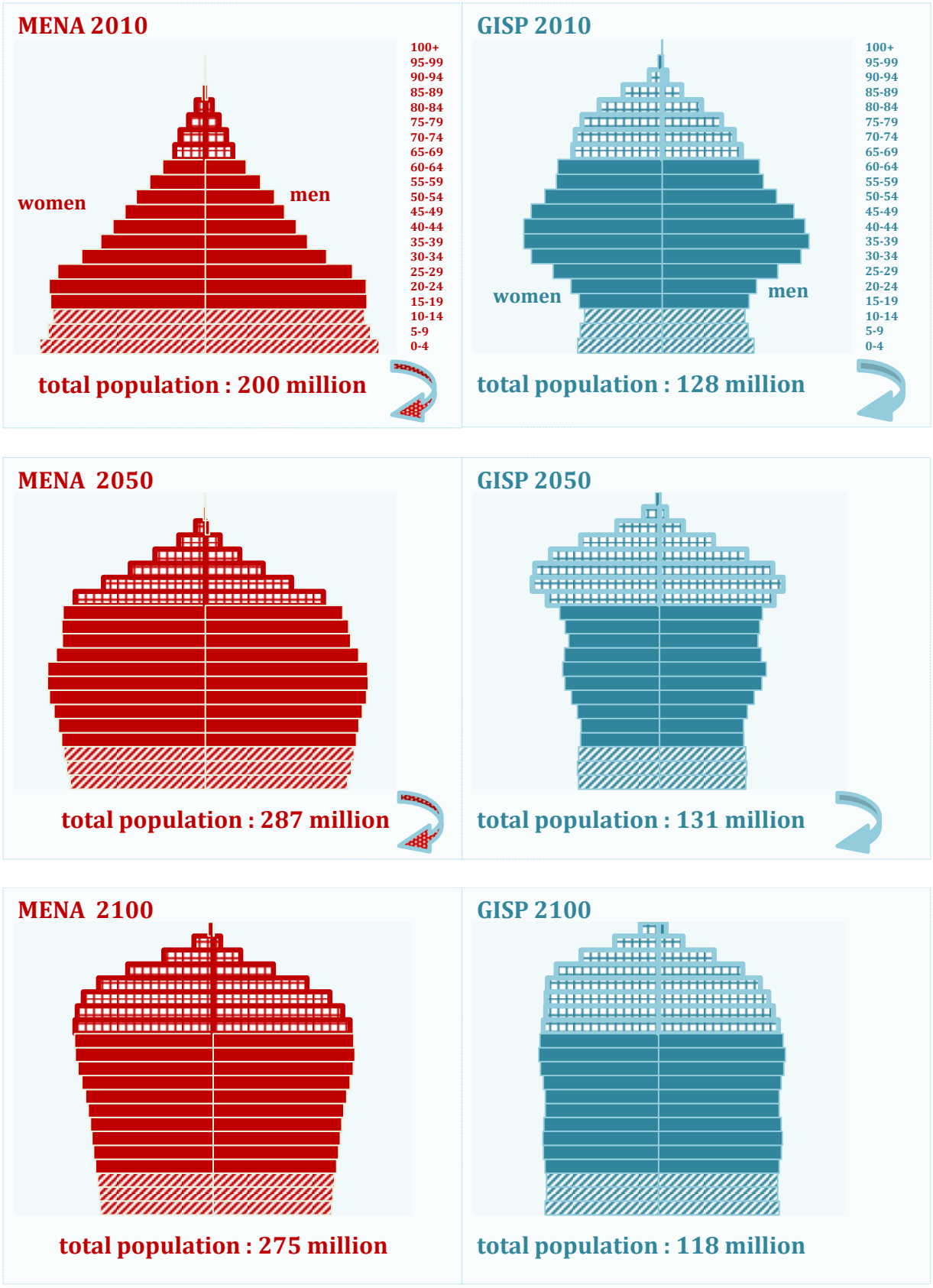
Source: Author based on the United Nations population statistics.

Note: MENA includes Morocco, Algeria, Tunisia, Libya, Egypt, Occupied Palestinian Territory, Jordan, Lebanon and Syria. GISP includes Greece, Italy, Spain and Portugal.

However, the structure of these populations is more relevant to our analyses. Life-cycle theory differentiates between young and old generations that, according to this theory, consume more than they save, while the working-age population saves more than it consumes. A division of the population into these three groups provides more insight. Let us assume that the young are defined as those below 15 years of age, working-age group are those between 15 and 65 and the old generation are those above 65. **Figure 2** shows the distribution for three points in time: 2010, 2050 and 2100. The panels on the left show the aggregate population of the MENA in comparison to GISP on the right and changes in of the population structure over time are shown in the panels going down.

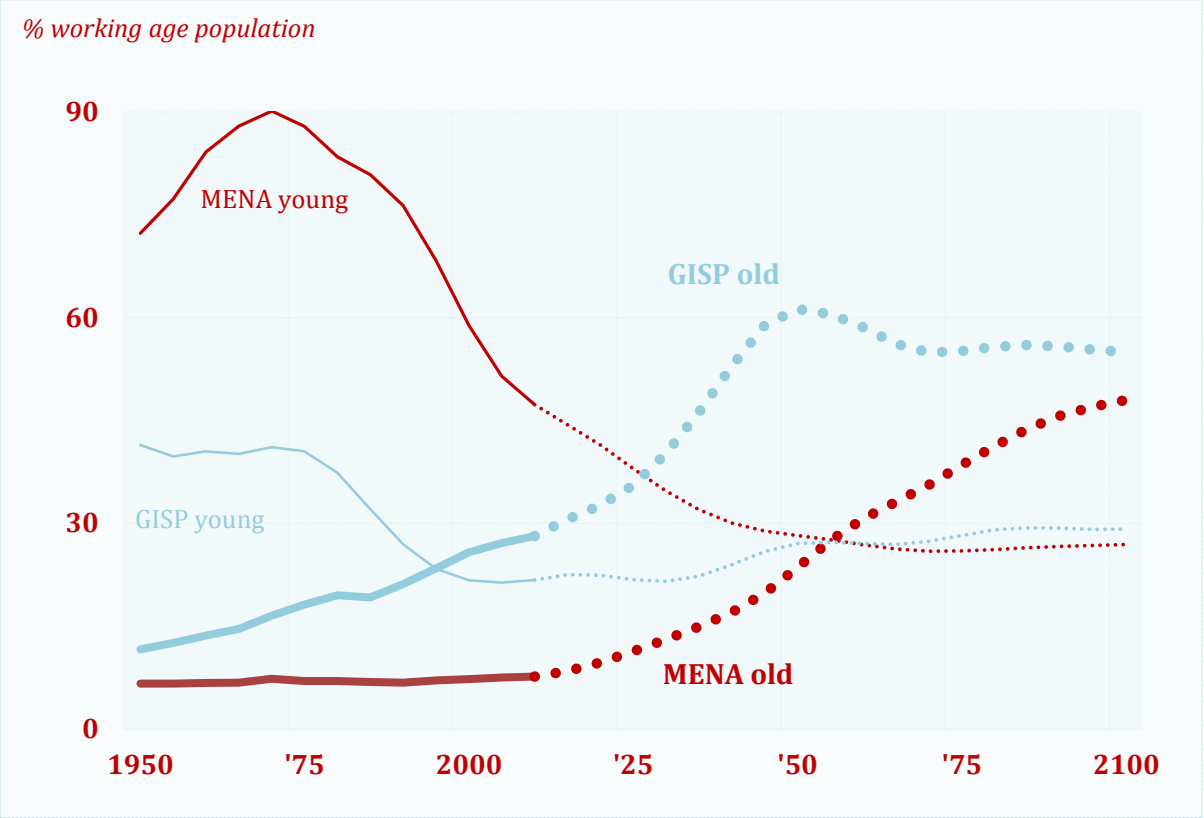
This figure shows, that because the MENA previously had far more numerous young than old generations for decades in a row, it had a high working-age population, by 2010 (see also Peeters, 2011, on the specific case of Egypt). This gradually changes over the years and the pyramid structure changes to a bulb structure by 2100, indicating that the MENA region is facing an ageing problem even though it may take several decades. In contrast, the GISP region has a kite population structure in 2010. The numerous people in the cohorts between the age of 35 and 65 reflect the baby boom when fertility rates were relatively higher than the years during and before World War II and the three decades thereafter. This baby boom is causing the population bulb structure in 2050, with relatively larger old-age than working-age populations. In the year 2100, as the last figure in **Figure 2** shows, the GISP population is stable as there are no cohorts much larger or smaller in size than average, apart from the oldest generations (at the top).

Figure 2 Population structure from a pyramid or a kite towards a bulb



Source: Author based on the United Nations population statistics.

Figure 3 Old-age and young-age dependency rates



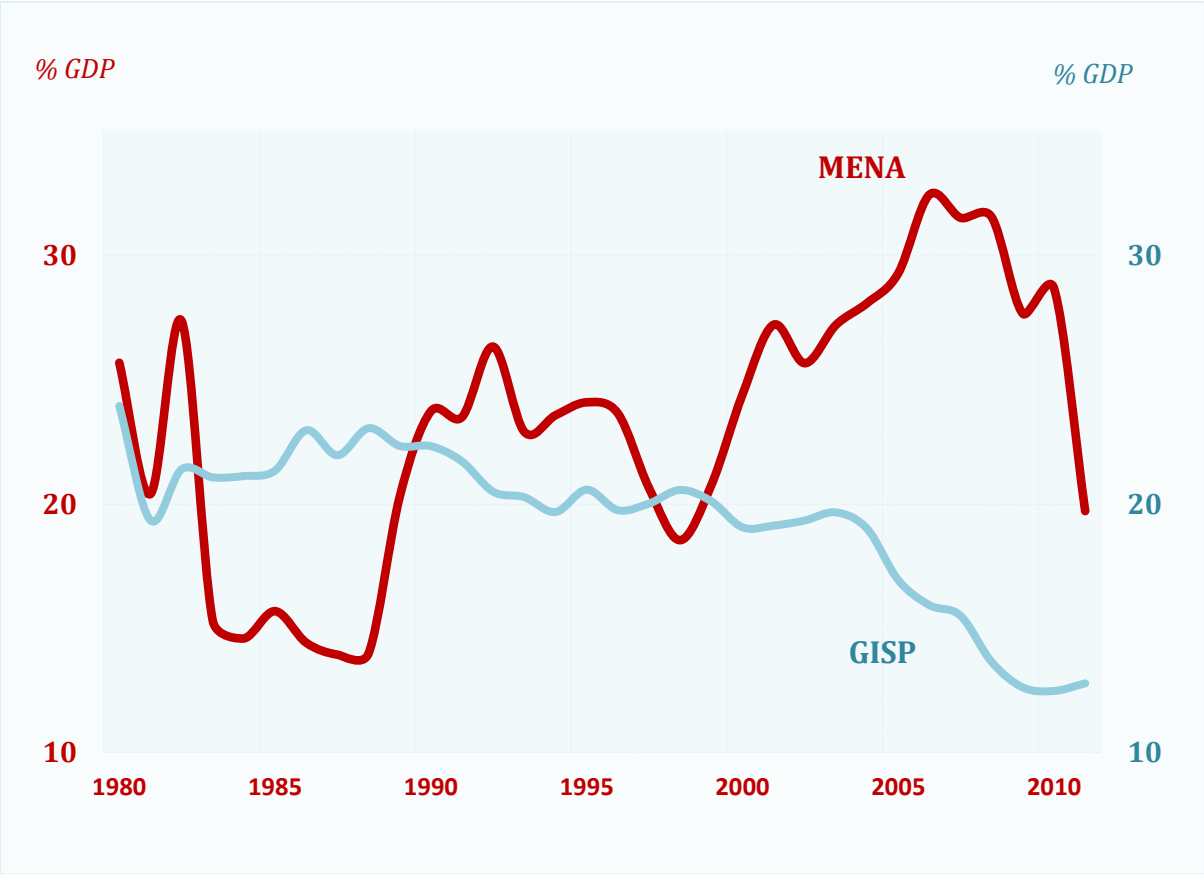
Source: Author based on the United Nations population statistics.

Note: The young-age dependency rate is calculated as the number of persons aged from 0 to 15 as a percentage of the working-age population, which is defined as persons aged 15 to 65. The old-age dependency rate is the number of persons above 65 as a percentage of the working age population.

Ageing in the MENA region is striking. As **Figure 3** shows, the old-age dependency rates, defined as old-age generations as a percentage of working-age populations, rises from almost 8% in 2010 to 48% in 2100. This is thus an enormous rise, although it will be a gradual development. Ageing in the GISP region peaks at 61% in 2050. This implies that there will be more than 3 persons older than 65 for every 5 persons that are of working age in 2050, instead of 3 to 10 in 2010. After 2050 the old-age dependency rates are expected to stabilise.

The young-age dependency rates - defined as the young generations as a percentage of the working age population - peaked at 90% in 1975 in the MENA and 41% in 1970 for the GISP region. Both young-age dependency rates are expected to converge to around 30% in the course of time between 2050 and 2100.

Figure 4 Domestic savings ratios



Source: Author's calculations based on the IMF World Economic Outlook Spring 2012.

Note: These are averages across the countries. The occupied Palestinian territory is not included in the MENA-group due to the lack of data.

Domestic savings are a relevant factor according to life-cycle theory. Young and old people tend to save far less than working-age populations, or even dis-save. As **Figure 4** confirms, one can observe a positive trend in domestic savings in the MENA countries, up until the aftermath of the global financial crisis and the Arab revolution that started at the end of 2010. In contrast, savings in the GISP countries declined strongly in the period 1990 until 2010. This refers to gross savings, comprising public and private savings, expressed as a percentage of GDP. The life-cycle theory supports these trends. Falling young-age dependency rates in the MENA region leads to higher savings as the working-age population increases in relative terms. The GISP region, with strongly rising old-age dependency rates dis-saves more and more over the years. These are thus stylized facts, seemingly in support of the theory.

Several studies could be mentioned here, to interpret the facts. Mason (1987), for instance, showed for 79 countries during the period 1960-80 a significant positive impact of declining young age dependency rates on domestic savings. At the same time, slowly rising longevity raises domestic savings rates according to Bloom, Canning and Graham, (2003), tested for Asian and African countries. These factors could explain the rise in MENA savings. An explanation for the declining GISP savings rates could be found in the predominantly rising old age dependency rates.

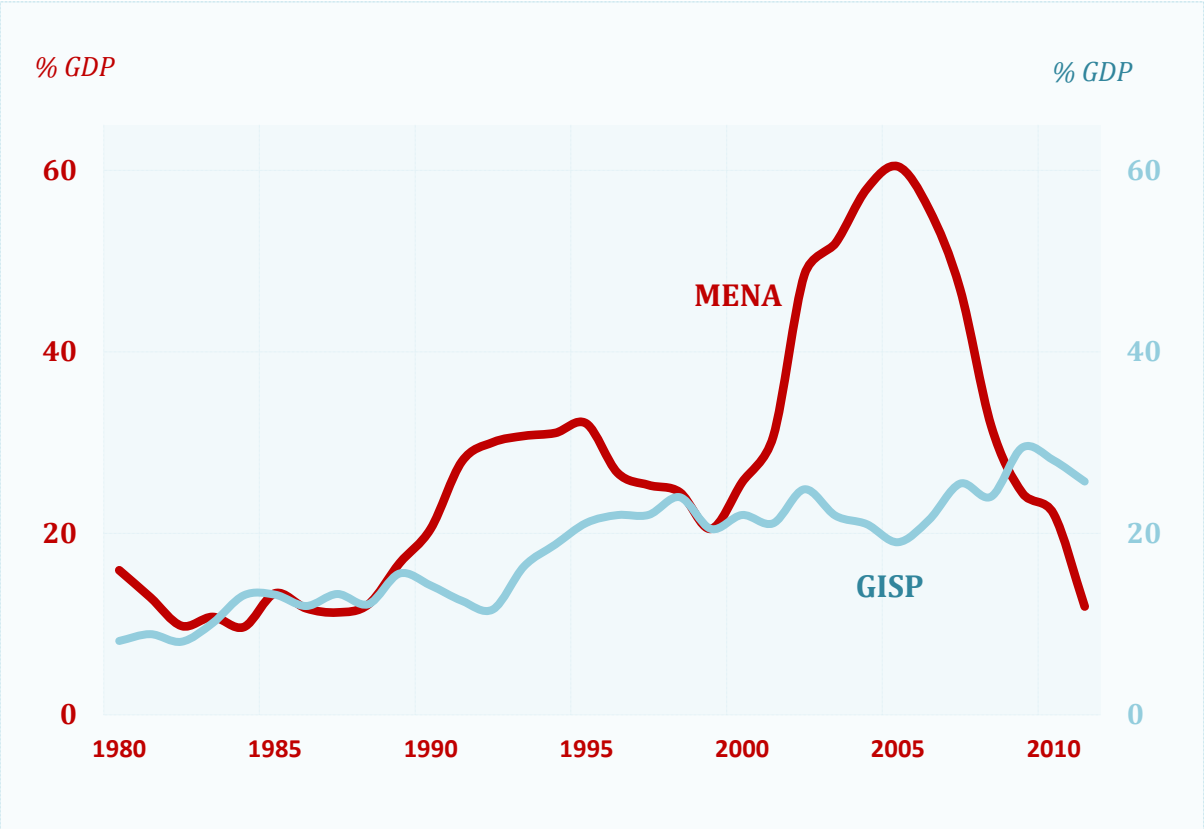
However, several non-demographic factors will be at play here, such as also the consequences of the global financial crisis in 2009 and likewise the sovereign debt crisis are likely to have influenced the outcomes.

According to the life-cycle theory domestic savings impacts international capital flows. The term *international capital flows* is rather broad as it encompasses a variety of different money flows that cross country borders, such as foreign direct investment, portfolio investment, remittances, bank loans and bank deposits among others. The majority of these flows go through the banking system. For this reason I focus here in this study on cross-border bank assets from the MENA and the GISP vis-à-vis other countries in the world.

Using BIS-data, **Figure 5** shows the cross-border aggregate assets for the full period 1980-2011 for both regions. As follows, both regions show increasing cross-border assets, though for the GISP steadily during the whole period while for the MENA region more explosive up to the global crisis in 2008-09. After the global crisis the savings of MENA sharply contract from 60% of GDP to around 20%.

For the MENA region the alignment of domestic savings (**Figure 4**) and cross-border assets (**Figure 5**) seems more in line with theory than the developments in the GISP region. Despite the fact that domestic savings dropped in the latter, cross-border assets rose. However, these graphs only show the regions' averages and no causality. Other factors will also have influenced cross-border capital flows, such as the higher degree of globalisation.

Figure 5 Cross-border capital flows



Source: Author's calculations based on Bank for International Settlements December 2011.

Note: These are simple averages across the countries. The occupied Palestinian territory is not included in the MENA-group due to the lack of data.

Empirical analyses

In using the individual country information, by estimating panel regressions, and hence econometric causality testing, we obtain more information. To analyse the determinants of savings and cross-border assets, the subsequent econometric model is estimated for both regions:

$$s_{j,t} = \tau_1 + \alpha_{1,j} + \theta\, s_{j,t-1} + \vartheta_1\, oadr_{j,t} + \vartheta_2\, yadr_{j,t} + \vartheta_3\, \Delta \log pop_{j,t} + \omega\, GDP_{j,t-1} + \varepsilon_{1,j,t}$$

$$cf_{j,t} = \tau_2 + \alpha_{2,j} + \beta\, cf_{j,t-1} + \gamma\, openness_{j,t} + \delta\, s_{j,t-1} + \varepsilon_{2,j,t}$$

(Equation 1-2)

)

The first equation explains the domestic savings as a percentage of *GDP* (denoted as *s*) by the savings ratio in the past, demographic variables and GDP per capita (*GDP*). Demographic variables are the old-age dependency ratio (*oadr*) and the young-age dependency ratio (*yadr*), as presented in **Figure 3**. Also the growth of the population ($\Delta \log pop$, see **Figure 1**) is included. Higher population growth may lead to higher savings, as it is likely that it implies the presence of relatively more young or more workers (due to immigration). The second equation explains the cross-border capital flows as a percentage of nominal *GDP* (*cf*), by the cross-border capital flows in the past, a country's degree of openness (*openness*) and domestic savings.

Subscript t represents the year and subscript j represents the country. For the MENA-regressions this implies that *j=Morocco, Algeria, Tunisia, Libya, Egypt, Jordan, Lebanon or Syria* and for the GISP *j=Greece, Italy, Spain or Portugal*. For both the MENA and GISP countries there are thus each two panel regressions: one for domestic savings and one for the cross-border capital flows. The panel contains the cross-section of countries (eight for MENA and four for GISP), along with a time dimension that can cover up to 30 years (from 1980 to 2011).

The econometric model specifies further that the domestic savings and cross-border capital flows are explained by a common constant (τ) and a country-specific constant (α_j) for each region. The symbols $\alpha, \beta, \gamma, \delta, \theta, \vartheta$ and ω represent parameters to be estimated. Apart from the fixed effects ($\alpha_{1,j}$ and $\alpha_{2,j}$), the parameters are not country or time specific because of the lack of degrees of freedom in running recursive regressions that we use to track the changes in estimated reaction coefficients (see **Figure 6**).

Most relevant to our analyses is the impact of the demographic variables on domestic savings. Estimates for the ϑ's provide us information on these reaction coefficients. Higher old- and young-age dependency rates are expected to affect domestic savings, for instance, according to the life-cycle theory. In addition, the impact of domestic savings on cross-border capital flows

(parameter δ) is of high relevance. A significant positive parameter is expected according to the theory, as in this case domestic savings push up cross-border capital flows.

Each equation has a disturbance term, indicated by ε. We will assume these terms to be normally distributed with a zero mean and constant variance. The estimation method used is Ordinary Least Squares where period weights are used for the covariance matrix. This method also allows us to test for fixed or random effects, and some testing for country-specific reaction parameter estimates.

In order not to run into endogeneity problems, i.e. causality running from the endogenous variable to the exogenous variables which could bias our estimates, I include - apart from the demographic variables - the explanatory variables with one year's lag. For instance, domestic savings of country j in year t may effect domestic GDP per capita in year t, but cannot effect $GDP_{j,t-1}$. The same holds for the cross-border capital flows and domestic savings in the second equation. In this way the exogenous variables are independent of the error term. The demographic variables are determined by other factors (culture, religion, history, genetics) and thus measured at time t, without a risk of running into endogeneity problems.

The sources for the data are the Bank for International Settlements (BIS), the United Nations (UN) and the International Monetary Fund World Economic Outlook of Spring 2012 (IMF WEO). The BIS provides quarterly information on the international exposure per country of international banks that report to the BIS. In order to measure the cross-border bank assets of the MENA and GISP countries, I use the exposure of these BIS reporting banks on each of the MENA and GISP countries (see also Peeters and Sabri, 2012b). Demographic information per 5-year cohort is available from the UN for each fifth year and split into the working-age, young and the old generations (see also **Figure 1** until **Figure 3** in this study and Peeters and Groot, 2012a, or Groot and Peeters, 2011). The data on GDP, GDP per capital and domestic savings come from the IMF and are annual. As the frequency of the original series differ, I use the data at the annual level, therefore the end-of-the-year figures from the BIS until 2011. December 2011 is the last

available and thus the cut-off date of this paper. I interpolate the UN demographic figures from 5-year to annual series without loss of information as demographic developments evolve relatively slowly and smoothly. Our dataset, thus, consists of annual time series for each country, the exception being the occupied Palestinian territory, which is not included in the IMF WEO. Our measure of openness is the overall KOF-index that is available for each country in our dataset. The full sample period is 1980-2011. **Table 2** in Appendix 1 reports summary statistics of the data. **Table 1** presents the estimation results for the four panels for the period 1990-2011. It follows that the goodness-of-fit is overall high, ranging from 0.80 for the domestic savings equation of the MENA region to even 0.94 for the domestic savings equations for the GISP region. The fixed effects are highly significant in each of the four panels. The same holds for the lagged dependent variables. Interestingly, the lagged domestic savings have a high point estimate (0.68 and 0.80 for the MENA and GISP region, respectively) in the domestic savings equations. The same holds for the lagged cross-border capital flows (0.75 and 0.62 for the MENA and GISP region, respectively) in the cross-border capital flows equations. This indicates that domestic savings and cross-border capital flows are highly persistent.

As emphasized before, most relevant for our analyses is the impact of the demographic variables on domestic savings and the impact of domestic savings on cross-border capital flows. As follows, the old-age dependency rates were not significant during this sample period, in contrast to the young-age dependency rates, even in both regions. The young-age dependency rates depressed domestic savings, in agreement with the life-cycle theory. As we have a specific and rather long sample here, from 1990 to 2011, we also ran recursive regressions on these reaction coefficients. As ageing set in more slowly than the fall of fertility rates, the estimates from subsamples can give us more reliable information. After all, the baby boom generations started retiring only in 2010, so at the end of our sample, and up until that period more money will have been saved in the more developed GISP region where old-age retirement provisions are in place.

Table 1 Estimation results from panel regressions

	MENA		*GISP*	
	Domestic savings	*Cross-border capital flows*	*Domestic savings*	*Cross-border capital flows*
s_{t-1}	*0.68***	*0.42**	*0.80***	*-0.52***
$oadr_t$	*-1.52*		*-0.11*	
$yadr_t$	*-0.40***		*-0.26**	
$\Delta \log pop_t$	*1.94**		*1.00**	
$\log GDP_{t-1}$	*-0.10***		*-0.06***	
cf_{t-1}		*0.75***		*0.62***
$openness_t$		*-0.27*		*-0.01*
constant	*1.2***	*0.1*	*0.7***	*0.2***
fixed effects	*significant*	*significant*	*significant*	*significant*
adusted R^2	*0.80*	*0.91*	*0.94*	*0.88*
sample period	*1990-2011*	*1990-2011*	*1990-2011*	*1990-2011*

Note: The endogenous variable is either domestic savings as percentage of GDP (*s*) or cross-border capital flows (*cf*). The exogenous variables, as presented in the first column, are domestic savings (*s*), the old- and the young-age dependency rate (*oadr* and *yadr*), the growth rate of the population ($\Delta \log pop$), GDP per capita (*GDP*), cross-border capital flows (*cf*) and the country's openness (see ***(Equation 1-2)***). The estimation strategy is explained in the text. * indicates that the parameter is significant at the 5%-level and ** at the 1%-level. All statistical details are available upon request.

Figure 6 gives the results of the recursive regressions, with a window of 17 observations shifting over the full sample 1980-2011. The first graph shows that the estimated reaction coefficient of the old-age dependency rate on domestic savings was not significant for the MENA. For the GISP, however, old-age dependency rates were positively effecting domestic savings until the most recent subsamples (see first graph on the right). This is in full agreement with the theory. Before retirement the working age baby boom generations saved significantly in the GISP region. The middle graphs show the estimated reaction coefficients of the young-age dependency rates for both regions. According to the theory, these rates depressed domestic savings significantly, for the full period.

Apart from the dependency rates, we also included the population growth. As follows from the estimations as presented in **Table 1** and the recursive regressions in **Figure 6**, population growth impacts domestic savings positively in the GISP region, and to a lesser extent, in the MENA region for some periods. In sum, therefore, the demographic variables are relevant to explain domestic savings.

Like Horioka and Hagiwara (2012), who estimate the determinants of domestic savings for developing Asian countries, we took into account the income level. This term is highly significant for both regions (see **Table 1**), as also found by Park and Shin (2009) and Bosworth and Chodorow-Reich (2007). High growth creates higher saving that will feed back through capital accumulation. However, experimenting with Horioka and Hagiwara's convex combination that models that higher income levels after a certain point contribute positively to domestic savings is not supported by our empirical data on the MENA and GISP region for the sample that we have under investigation here.

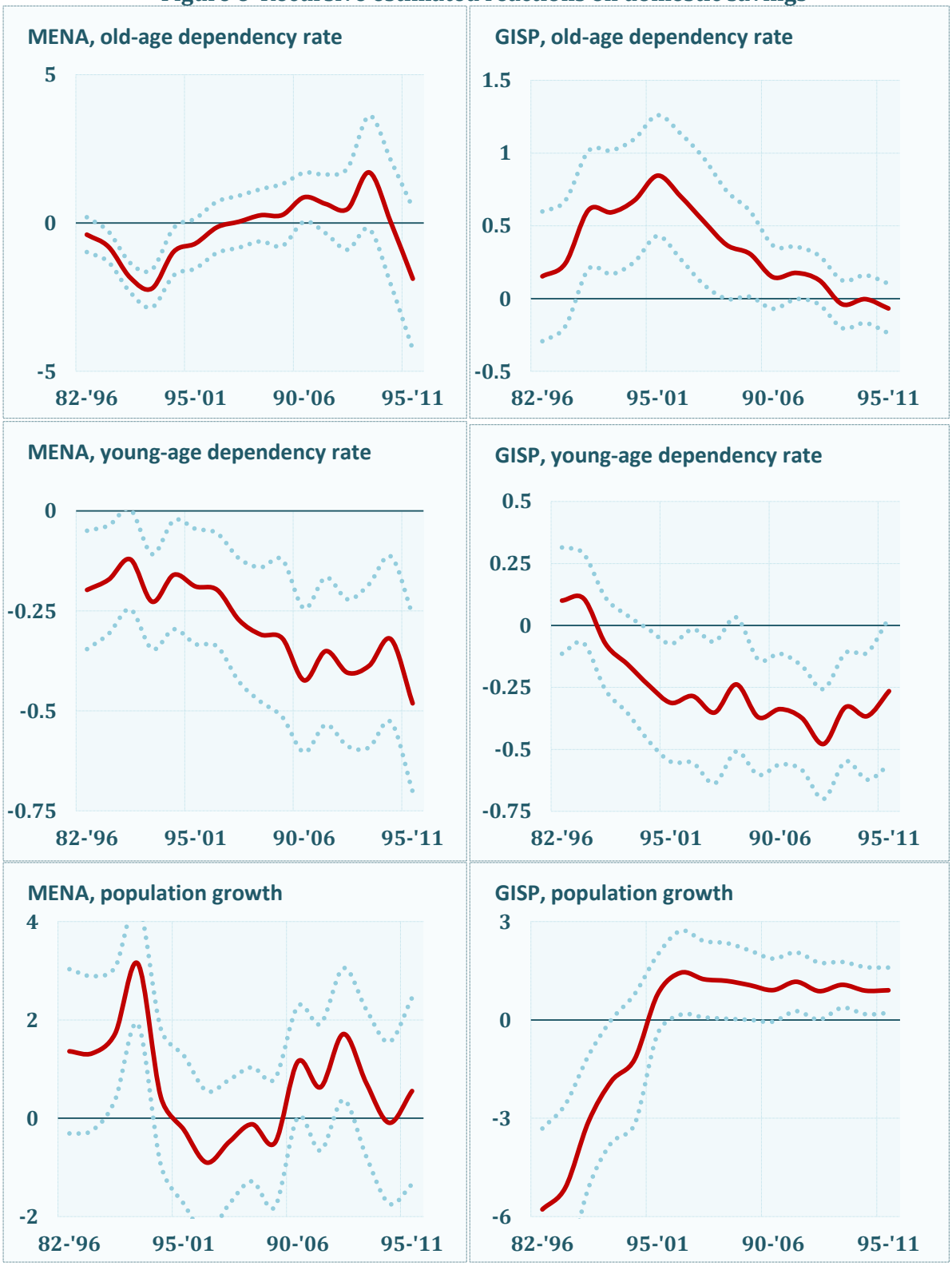
Along with our evidence that young-age dependency rates depressed domestic savings in both regions, that population growth stimulated domestic savings in the GISP region, and that old-age dependency rates positively affected domestic savings in this region in the further past but

are fading out at the end of our sample (2011), domestic savings impact cross-border capital flows also significantly. This follows from the cross-border capital flows equations in **Table 1**.

For the MENA region domestic savings push up these capital flows, according to the theory. The estimated coefficient is 0.42. However, for the GISP region we find a peculiar, negative impact (of -0.52).

This latter result is hard to understand and certainly not according to our expectations. Moreover, it is quite robust as it holds for subsamples. Regressions with country-specific reaction coefficients for this effect of domestic savings on cross-border capital flows point out that these highly negative significant effects hold for both Greece and Portugal. During the full period 1980-2011 their domestic savings as a percentage of GDP has been falling (see also **Figure 4**). Despite this drop, cross-border capital flows increased (**Figure 5**). Government savings dropped sharply, probably partly because of ageing, worsened after 2008 because of the sovereign debt crisis. To what extent private savings dropped, and which cross-border transactions (assets) increased because of these domestic developments cannot be determined on the basis of our information here. More detailed information is needed to investigate this causality in-depth. To the best of my knowledge the literature on domestic savings, so far, provides little to no information on the direct empirical link of domestic savings on international capital flows.

Figure 6 Recursive estimated reactions on domestic savings



Note: The graphs contain the estimates of the reactions coefficients obtained by estimating the panels as specified in (1-2) for MENA and GISP respectively, by using the windows of observations as indicated on the x-axis. As indicated, each window contains 17 observations, apart from the first (due to lagged variables) that ranged from 1982 to 1996. The last window is from 1995 to 2011. The bands are 95% confidence intervals.

Summary, policy reflections and conclusions

This paper identifies the demographic differences between the South-Mediterranean countries (MENA) and the North-Mediterranean countries (GISP). While the North ages rapidly after 2010 and is facing a decreasing population size in 2035, the South still has a relatively young population. However, it is important to realize that the South-Mediterranean region is also ageing and population decline is expected to kick in around 2065. According to the life-cycle theory and studies on ageing, these population structure changes are likely to have an impact on international capital flows.

The results in this paper partly support this hypothesis, for both regions. In the empirical analyses we test for the significance of young- and old-age dependency rates, as well as population growth on domestic savings during the period 1980-2011. The results strongly point out that young-age dependency rates negatively affected domestic savings for both the MENA and the GISP region. The old-age dependency rate hardly impacted domestic savings in the MENA region, while it significantly positively affected domestic savings in the GISP region, though the impact decreased at the end of the sample where the baby boom generations started to retire. Extrapolating this result for the next decades could imply that ageing in the GISP region depresses domestic savings, which would be in line with the life-cycle theory. We need a longer sample of retired baby boom generations to proof this. The study further points out that population growth also impacted domestic savings in the GISP region during 1995-2011, positively and robustly.

Demographic structure has thus evidently been causal to domestic savings in the MENA and GISP regions. The direct influence of domestic savings on international capital flows is harder to determine. Measuring international capital flows as cross-border bank assets, we find a significant pass-through. According to these results, the ageing and de-juvenating of the MENA and GISP regions, though at different speeds and in a different timing, may thus be expected to further impact domestic savings and hence international capital flows.

Appendix

Table 2 Descriptive statistics

	MENA	GISP
Domestic savings, % GDP	23.3	19.4
	(11.8 ; 35.0)	(15.6 ; 21.2)
Cross-border bank assets, % GDP	27.5	15.0
	(3.9 ; 153.7)	(12.8 ; 29.0)
Cross-border bank asset, per capita	42	233
	(3 ; 205)	(218 ; 318)
Old-age dependency rate, %	7.3	22.7
	(5.0 ; 9.9)	(21.7 ; 24.3)
Young-age dependency rate, %	68.9	27.7
	(55.7 ; 84.7)	(25.0 ; 30.0)
Population growth, %	2.4	0.5
	(1.3 ; 3.5)	(0.2 ; 0.8)
Income per capita, purchasing	17,900	5,000
power parity	(14,600 ; 20,800)	(2,500 ; 10,700)

Source: Author based on BIS, IMF and UN data sources.

Note: The statistics are averages across samples and over the full sample 1980-2011, where the figures in brackets list the minimum and maximum sample average across the countries. Ratios are calculated as the simple average across the countries.

List of references

Bloom, David, David Canning and Bryan S. Graham, 2003, Longevity and life cycle savings, *Scandinavian Journal of Economics* 105(3):319-338.

Börsch-Supan, Axel, Alexander Ludwig and Joachim Winter, 2006, Ageing, pension reform and capital flows: A multi-country simulation model, *Economic*a 7(392):625-658.

Bosworth, Barry and Gabriel Chodorow-Reich, 2007, Saving and demographic change: The global dimension, Working Paper 2007-02, Boston College, Boston, MA.

Bryant, Ralph C., 2005, Demographic interactions between North and South and the implications for North-South capital flows, Center for Retirement Research Working Paper 2005-16.

Deaton, Angus, 2005, Franco Modigliani and the life cycle theory of consumption, Banca Nazionale del Lavoro Quarterly Review 58(233-234):91-107.

Groot, Loek and Marga Peeters, 2011, A global view on demographic pressure and labour market participation, MPRA 32057.

Horioka, Charles Yuji and Akiko Terada-Hagiwara, 2012, The determinants and long-term projections of saving rates in Developing Asia, *Japan and the World Economy* 14:128-137.

Lee, Ronald, Sang-Hyop Lee and Andrew Mason, 2006, Charting the economic life cycle, NBER Working Paper Series 12379.

Lucas, Robert, 1990, Why doesn't capital flow from rich to poor countries?, *American Economic Review* 80(2):92-96.

Marchiori, Luca, 2011, Demographic trends and international capital flows in an integrated world, CREA Discussion Paper 2011-05.

Mason, Andrew, 1987, National saving rates and population growth: A new model and new evidence, Chapter 13 in *Population Growth and Economic Development: Issues and Evidence*, edited by D. Gale Johnson and Ronald D. Lee.

Modigliani, Franco and Richard H. Brumberg, 1954, Utility analysis and the consumption function: An interpretation of cross-section data, in Kenneth K. Kurihara, eds. *Post-Keynesian Economics*, 338-436.

Narciso, Alexandre, 2010, The impact of population ageing on international capital flows, MPRA 26457.

Park, Donghyun and Kwanho Shin, 2009, Saving, investment and current account surplus in developing Asia, ADB Economic Working Paper Series 158, Asian Development Bank.

Peeters, Marga, 2011, Modelling unemployment in the presence of excess labour supply: An application to Egypt, *Journal of Economics and Econometrics* 2011 54(2):58-92.

Peeters, Marga and Loek Groot, 2012a, Demographic change across the globe – Maintaining social security in ageing economies, *World Economics 13(2):75-97*.

Peeters, Marga and Nidal R. Sabri, 2012b, International financial integration of South-Mediterranean economies: A bird's-eye view, MPRA 38081.

Taylor, Allan M. and Jeffrey G. Williamson, 1994, Capital flows to the new world as an intergenerational transfer, *Journal of Political Economics* 102(2):348-371.

United Nations Population Division, 2011, World Population Prospects.