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ABSTRACT

Demographic Divide and Labor Migration in the Euro-Mediterranean Region*

This paper provides a demographic outlook of the Euro-Mediterranean region and then shows the economic and fiscal consequences of such demographic differences within a two-region model with international labor mobility. International labor mobility is also examined through an externalities framework where brain drain from migration could be taxed by the home countries. Taxing the brain drain has a substantial limiting effect on labor migration and a small negative effect on per worker growth. On the other hand, it could be a solution to the negative externality problem associated with brain drain. It is also found that such tax can raise substantial tax revenue for the SMCs which could be used to enhance human capital in the region.

JEL Classification: E62, F22, H23, H24, H41

Keywords: demographic divide, demographic deficit, population aging, youth bulge, labor mobility, brain drain, overlapping generations, endogenous tax policy, Mediterranean region

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1. Introduction

There is a significant demographic divide in the Euro-Mediterranean Region between European countries in the North and the Southern Mediterranean Countries (SMCs) in the South. The SMCs have higher fertility and population growth rates and a significantly younger age structure than the Northern Mediterranean countries and most other countries and regions. The 2002 Arab Human Development Report notes that this can present a "demographic gift or a demographic curse" depending on whether the high population growth and fertility can be transformed into human wealth through capital investments and technological progress. Similarly, Dhonte, Bhattacharya and Yousef (2000) and Dhillon and Yousef (2009) argued that "explosion" in the working-age population in the Middle East present challenges as well as opportunities for those countries. The similarly unique demographic characteristics of the SMCs show stark contrast to the European counterparts where countries are experiencing a serious demographic deficit through population aging.[1]

An important outcome of the demographic differences mentioned above has been substantial labor migration from the Southern Mediterranean to the European countries in the North.[2] According to the United Nations' 2005 revision of international migration trends, Europe has been host to about 34 per cent of all migrants in 2005. Fargues (2006) showed that "Europe is the single largest destination of first-generation Arab emigrants, and hosts 59% of all such emigrants worldwide" (Fargues, 2006: 8, 25). While such

[1] In an entry in the forthcoming *Encyclopedia of Global Human Migration*, Tosun (forthcoming) defines demographic deficit as "an imbalance or shortage in the human population of a country, province or any other regional or local jurisdiction that arises mainly from differences in age, sexes, and geographic concentration of that population, such as rural-urban or suburban population differences."

[2] These demographic differences can also lead to capital flows between regions. See Börsch-Supan, Ludwig and Winter (2005), Tosun (2003) and Tosun (2007) for studies on examining the link between population aging and capital flows.

labor migration has been driven mainly by economic and demographic differences between these two regions, it has created important externalities. These externalities took the form of negative externalities through brain drain in the SMCs and both positive externalities through brain gain and negative externalities through congestion and social problems for the European countries. Bhagwati (1972, 1976a, 1976b) argued that taxing this brain drain could be a solution to the negative externality problem. He also argued that the current system of income taxation based on residence instead of citizenship leads to representation of immigrant workers in home countries without taxation. This brain-drain tax idea is resurfacing again in the recent literature where several papers have argued the virtues of such a tax for developing countries (Desai, Kapur and McHale, 2004; Straubhaar, 2000).

This paper describes the demographic and migration trends in the Euro-Mediterranean region and then shows the economic and fiscal consequences of such demographic differences within a two-region model with international labor mobility. International labor migration is examined also through an international externalities framework that has recently been popularized by Kaul *et al*. (1999, 2006). At the same time, the paper contributes to the literature on brain drain and taxation that dates back to Bhagwati's original proposal in mid-1970s.

The paper is structured as follows. The next section provides a demographic outlook of the region. This is followed by a numerical simulation exercise based on a stylized two-region, two-period overlapping generations model with international labor mobility in section 3. Section 4 shows budgetary implications of a brain drain tax and discusses issues related to the administration of such a tax. The last section presents summary and concluding remarks.

2. Demographic Outlook of the Mediterranean Region

Mediterranean region has gone through a significant demographic change in the past fifty years and is also expected to go through more changes in coming decades. Table 1 shows the basic demographic statistics for the Mediterranean region for the years 1960, 2010 and 2050.[3] This shows the magnitude of the aging of the populations in the region. While the population is expected to reach about 590 million by 2050, population growth rate decreases almost to zero for the region. This is explained by the decrease in the total fertility rate to well below replacement rate of 2.1. Substantial increases in the median age, share of population 65 and older, and the old-age dependency ratio are clear evidence on the demographic deficit through population aging. The demographic change in the region is also shown in the population pyramids in Figure 1.

<Insert Table 1 here>

<Insert Figure 1 here>

As shown in Figures 2 and 3, Southern Mediterranean Countries (SMCs), however, have and will continue to have significantly younger populations than the European countries while this gap between these countries is expected to close to some extent by 2050. For those countries the key age group in terms of size is the 15-29 age groups indicating the youth bulge. For the European counterparts, population pyramid in Figure 3 looks already different in 2010 with 35-39 as the largest age group. By 2050 we expect 65-69 and 70-74 age groups to be the biggest groups together with the 40-44 age group. This variation between regions can also be illustrated in Figures 4 and 5 where the two opposite extreme cases are shown for Palestinian Territories, and Spain, respectively. It is interesting that the region will continue to have these vast demographic differences

[3] This table shows data for countries that have Mediterranean Sea coast. Figures shown for 2050 are UN projections based on medium-fertility scenario.

where West Bank Gaza will continue to have a population pyramid that is typical for a developing country and Spain will have a population that looks almost nothing like an actual pyramid. For Spain, the projections in Figure 5 show that 70-74 age group will become the largest population age group.

<Insert Figures 2-5 here>

The demographic divide between the two sub-regions can also be seen in the maps in Figures 6 and 7. Figure 6 shows that the fertility rate is higher in the SMCs with an average total fertility rate of 2.1 for the Mediterranean region, which also happens to be the replacement rate of a population. Among the Mediterranean countries Turkey has a total fertility rate that is roughly equal to the region average. We also see that while the average total fertility rate in the region is significantly smaller than the one for the Middle East and North Africa (MENA) region or the Arab world, it is still higher than the one for the OECD countries or the European Union (EU) countries. When we look at the old-age dependency ratio, it is now the European countries in the North of the Mediterranean that have significantly higher old-age dependency ratio. Most of the SMCs have a ration less than 10%. Mediterranean countries on average have a higher old-age dependency ratio than the Arab world and the MENA region but still a lower ratio than the OECD countries and the EU countries.

<Insert Figures 6 and 7 here>

The flow and stock of migrants in the region are shown in Figures 8 and 9, respectively. While the Southern European (or the Northern Mediterranean) countries were home countries during the “guest worker” migration in the 1950s and 1970s, they became mainly host countries for migration starting 1980s. Among the original guest worker home countries, Greece, Italy, Portugal and Spain now have positive net

migration rates and Turkey's net migration rate is very close to zero. On the other hand, most of the SMCs have negative net migration rates, which indicates that they are net senders of migrants. Countries like Jordan, Libya, Syria and Palestinian Territories are exceptions due to large Palestinian refugee populations in those countries. Figure 9 shows that Southern European (or Northern Mediterranean) countries now have a large stock of migrants compared to most of the SMCs. The Mediterranean region as a whole is a net recipient of migrants, with an average rate less than the averages for the OECD countries and the EU countries, but the region has a higher stock of migrant population as a share of total country population than all other regions compared in Figure 9.

<Insert Figures 8 and 9 here>

In the next section, the economic and fiscal consequences of such demographic differences are presented in a numerical simulation model with international labor mobility.

3. Aging Europe and Brain Drain from SMCs

3.1. Closed Economy and Labor Mobility Simulation Results

Simulations in this section are based on a two-region and two-period overlapping generations model.[4] The population projections for European countries and the SMCs are derived from the 2002 revision of the "World Population Prospects" published by the United Nations (United Nations, 2002). The simulations will be shown for two 30-year periods, 2000–30 and 2030–60 and for the entire period 2000–60. The average population growth rates for the 1970–2000 period are used as a starting point.

We start with the "perfect labor mobility model" where there is perfect international labor mobility with migrant labor participating in the political system of the host country but not the home country. Based on the population projections for the two regions, labor migrates from the

[4] See Tosun (2009) for details on the theoretical model.

SMCs to the European countries. Figure 10 shows this in reference to the change in the number of workers in both regions. European countries experience a major boom in foreign workers, particularly between 2000 and 2030. This boom is almost about six times greater than the growth attributed to the native worker population. Figure 11, on the other hand, shows that the SMCs send labor to Europe and thus experience significantly lower domestic labor growth despite a high population growth.

<Insert Figures 10 and 11 here>

We now compare this to our alternative "labor mobility model with brain drain tax" where migrant workers participate in the political system of both host and home countries but at the same time remit the additional income tax (brain drain tax) to the home country. Figure 12 shows that this leads to a significant decrease in the number of workers migrating to Europe in both periods. Figure 13 mainly confirms this by showing that the growth in the number of workers lost to out-migration of workers is very small compared to the overall growth in number of workers. Apparently, brain drain tax acts as a very strong migration control mechanism.

<Insert Figures 12 and 13 here>

3.2. Model Comparisons

To understand the economic and fiscal impact of brain drain through labor flows, we first compare the perfect labor mobility model to a closed economy model. These simulation results are shown in columns (1)-(4) of Tables 2 and 3. Table 2 shows the per worker values of selected economic variables. European countries benefit from labor migration from the SMCs particularly in terms of education spending per worker and human capital per worker. However, they are adversely impacted by the large influx of foreign workers in the 2000-2030 period. The benefits of the labor migration to Europe are even clearer when we look at the aggregate economic values shown in Table 3. The

aging Europe clearly benefits from the economic expansion made possible by the contributions of migrant workers as laborers, savers and participants in the policymaking that determines the provision of the productivity enhancing public good (education). SMCs, on the other hand, suffer economically (lower capital, human capital and income growth) mainly due to loss of workers to the European countries. As mentioned before, the impact of the loss of workers on human capital in the SMCs are two fold: first through loss of total human capital from outflow of workers and second through reduced average human capital for each remaining worker which is due to the loss of productive political participation of young workers in the home country. We see the clear evidence of this in the sharp decreases in the income tax rate in the SMCs in both periods.

The next comparison is with the labor mobility model with brain drain tax. Simulation results for this model are shown in columns (5) and (6) of Tables 2 and 3. European countries seem to benefit from such a tax through smaller labor flows that lead to more stable changes in the per worker values of their economic variables, particularly in capital per worker and income per worker. On the other hand, their aggregate economic expansion is also less pronounced. Hence, while the brain drain tax has a negative impact on the overall economic activity in European countries, it also triggers a relatively more stable economic growth by limiting large influx of workers. For the SMCs, the brain drain tax improves on both the human capital per worker and total human capital accumulation. While it seems to limit economic growth slightly in per worker terms, it contributes significantly to aggregate economic expansion as seen in Table 3. By limiting harmful out-migration of workers, the brain drain tax functions like a Pigouvian tax which is considered a first-best solution to the negative externality problem.

5. Budgetary Implications of the Brain Drain Tax and Some Administration Issues

Simulations in the previous section give us an idea about the budgetary implications of such a tax for the SMCs. Considering the results for number of migrants, the income tax rate in the SMCs and the income per worker in the European countries, the share of the brain drain tax in total income tax revenues in the SMCs is calculated as 2% for the 2000-2030 period and 3% for the 2030-2060 period. Using actual tax revenue figures from the International Monetary Fund's Government Finance Statistics (GFS), these shares translate to about $1.3 billion in average annual income tax revenue for total of SMCs until 2030 and about $2.8 billion between 2030 and 2060.[5] These are sizeable revenues that SMCs can potentially use to provide enhanced education to the existing workforce and in turn help improve human capital accumulation in the SMCs. A recent study by Desai, Kapur and McHale (2004) shows a similarly substantial potential revenue gain to India from such taxation. However, there can be significant issues related to the administration and use of such a brain drain tax. First, this tax requires a tax system based on citizenship (the American model) rather than residence in the SMCs. Currently, these countries use a residence-based income tax system and switching to a citizenship-based system would bring significant administrative costs. Involvement of international institutions and creation of new international migration regimes have also been discussed (Straubhaar, 2000; Pastore, 2005). Additionally, government sector inefficiencies due to corruption in the SMCs could also become a hindrance to the productive use of this new revenue stream.

[5] GFS revenue figures come from IMF (2003) and are for eight of the nine SMCs. Libya is excluded due to lack of data. Tax revenues are averaged for the last three available years (1995-97) and then converted to constant 1995 dollars.

6. Conclusions

This paper describes the demographic and migration trends in the Euro-Mediterranean region and then shows the economic and fiscal consequences of such demographic differences within a two-region model with international labor mobility. International labor mobility is also examined through an externalities framework where brain drain from migration could be taxed by the home countries. The paper used a two-region, two-period overlapping generations model with international labor mobility to examine the efficacy of using such tax policy.

Demographic outlook of the region shows substantial expected increases in the median age, share of population 65 and older, and the old-age dependency ratio which are clear evidence of demographic deficit through aging of the population in the region. There is however a significant demographic divide in the region largely between North and South where the SMCs have and will continue to have significantly younger populations than the European countries while the gap between the two sub-regions is expected to close to some extent by 2050.

A tax on the brain drain has a substantial limiting effect on labor migration and a small negative effect on per worker growth. It can, however, also raise substantial tax revenue for the SMCs which could be used to enhance human capital in the region. Administrative costs involved with the tax system required to implement a brain-drain tax constitute the biggest obstacle to the use of such a tax.

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Table 1. Demographic Outlook of the Mediterranean Region

	1960	2010	2050
Total Population	239 million	471 million	590 million
Population Growth	1.88%	1.01%	0.07%
Total Fertility Rate	4.67	2.10	1.83
Death Rate	12.58	7.15	10.7
Median Age	23	32.6	43.8
Population 65 and older	5.80%	10.67%	22.87%
Old Age Dependency Ratio	10%	15.90%	38.60%
Share of Urban Population	41.31%	67.55%	81.44%

Source: United Nations World Population Prospects (2010 Revision).

Table 2. Model Comparisons 1/ (per worker values)

		Closed Economy Model (No Labor Mobility)		Perfect Labor Mobility Model with Migrants Voting Only in Host Country		Labor Mobility Model with Migrants Voting in Both Countries and Income Tax on Brain Drain	
	Time Periods	European Countries (1)	SMCs (2)	European Countries (3)	SMCs (4)	European Countries (5)	SMCs (6)
Number of workers	2000–2030	22.2	97.2	150.2	46.8	27.7	95.0
	2030–2060	9.1	36.0	27.3	23.8	16.7	34.0
	2000–2060	33.3	168.2	218.5	81.7	49.1	161.4
Capital stock per worker	2000–2030	6.2	144.8	-49.2	119.7	-0.5	65.4
	2030–2060	-1.6	97.4	44.6	67.8	9.2	82.2
	2000–2060	4.5	383.3	-26.6	268.8	8.6	201.3
Human capital per worker	2000–2030	-2.7	18.6	-2.4	5.2	0.4	7.3
	2030–2060	-25.8	7.7	-7.5	-2.6	-12.1	2.3
	2000–2060	-27.8	27.7	-9.7	2.5	-11.8	9.8
Income per worker	2000–2030	0.2	50.6	-21.3	34.1	0.1	23.7
	2030–2060	-18.5	31.5	7.2	16.6	-5.6	23.8
	2000–2060	-18.4	98.1	-15.7	56.4	-5.5	53.1
Income tax rate	2000–2030	-6.2	1.5	20.6	-15.3	0.8	-3.4
	2030–2060	-40.8	-9.2	-22.2	-19.8	-21.6	-14.7
	2000–2060	-44.4	-7.8	-6.2	-32.1	-21.0	-17.5
Education spending per worker	2000–2030	-6.1	53.3	-5.4	13.9	0.8	19.8
	2030–2060	-51.8	19.3	-16.7	-6.5	-26.1	5.8
	2000–2060	-54.7	82.8	-21.2	6.6	-25.5	26.7

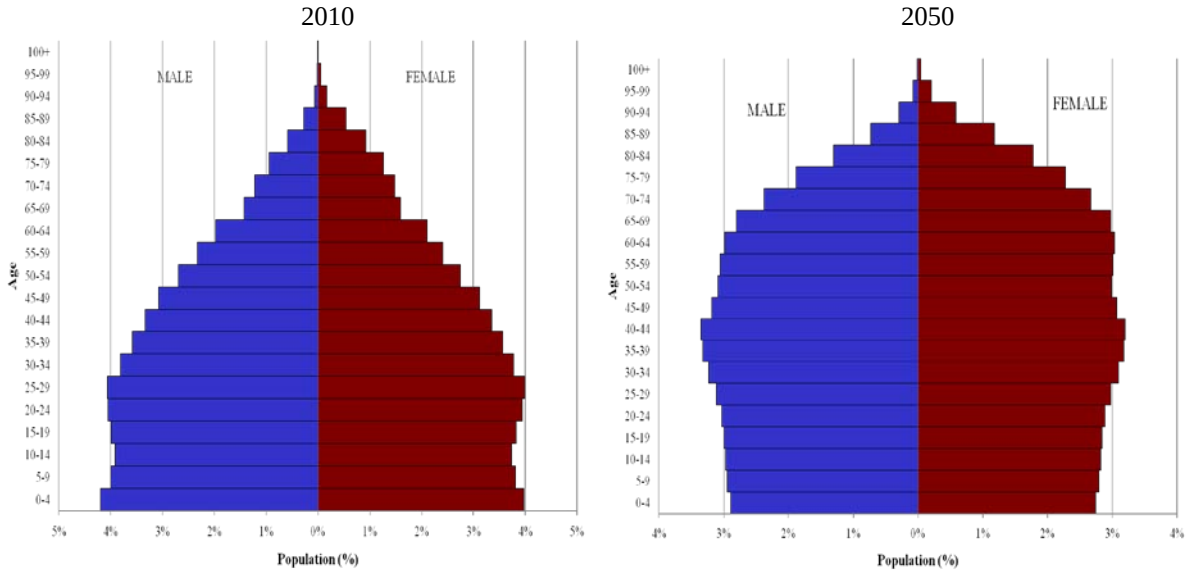
Source: Computed by author.
1/ All numbers refer to percentage changes between the years indicated in the time period.

Table 3. Model Comparisons 1/ (aggregate values)

		Closed Economy Model (No Labor Mobility)		Perfect Labor Mobility Model with Migrants Voting Only in Host Country		Labor Mobility Model with Migrants Voting in Both Countries and Income Tax on Brain Drain	
	Time Periods	European Countries (1)	SMCs (2)	European Countries (3)	SMCs (4)	European Countries (5)	SMCs (6)
Number of workers	2000–2030	22.2	97.2	150.2	46.8	27.7	95.0
	2030–2060	9.1	36.0	27.3	23.8	16.7	34.0
	2000–2060	33.3	168.2	218.5	81.7	49.1	161.4
Total capital stock	2000–2030	29.8	382.8	27.0	222.5	27.0	222.5
	2030–2060	7.3	168.5	84.0	107.7	27.5	144.2
	2000–2060	39.2	1196.4	133.7	570.0	61.9	687.7
Total human capital	2000–2030	18.9	134.0	144.3	54.4	28.2	109.3
	2030–2060	-19.0	46.5	17.7	20.6	2.6	37.1
	2000–2060	-3.7	242.6	187.6	86.2	31.5	186.9
Total income	2000–2030	22.4	197.1	96.9	96.9	27.8	141.4
	2030–2060	-11.1	78.9	36.4	44.3	10.2	65.9
	2000–2060	8.7	431.5	168.6	184.0	40.8	300.3
Income tax rate	2000–2030	-6.2	1.5	20.6	-15.3	0.8	-3.4
	2030–2060	-40.8	-9.2	-22.2	-19.8	-21.6	-14.7
	2000–2060	-44.4	-7.8	-6.2	-32.1	-21.0	-17.5
Total education spending	2000–2030	14.7	202.3	136.8	67.2	28.8	133.6
	2030–2060	-47.4	62.2	6.0	15.8	-13.7	41.8
	2000–2060	-39.7	390.3	151.0	93.6	11.1	231.3

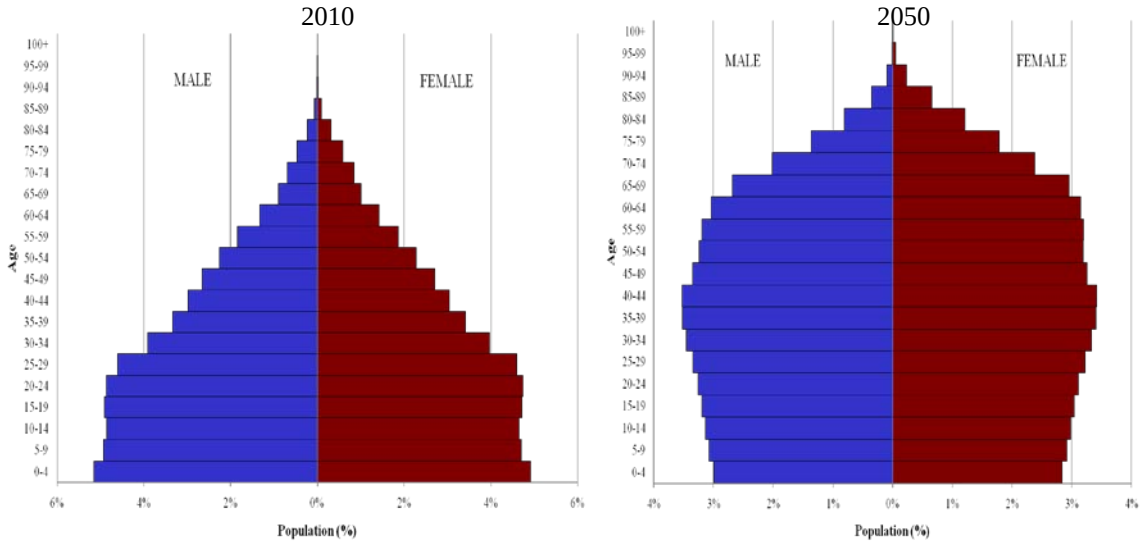
Source: Computed by author.
1/ All numbers refer to percentage changes between the years indicated in the time period.

Figure 1. Population Pyramid of the Mediterranean Region (2010 and 2050)



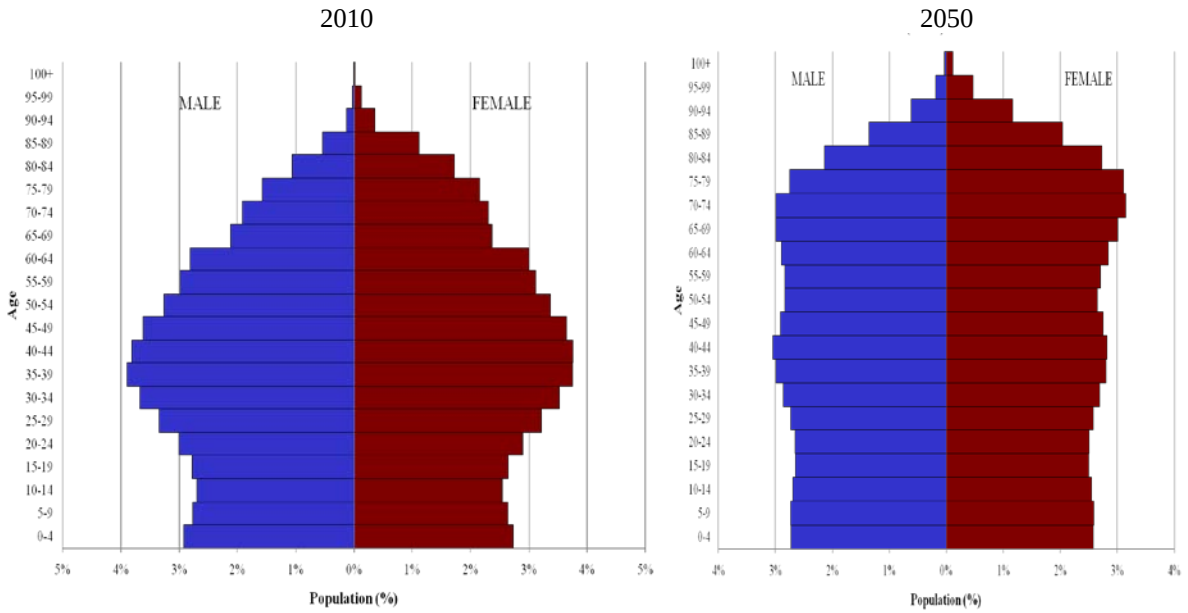
Source: United Nations World Population Prospects (2010 Revision). Population share calculations were computed by the author.

Figure 2. Population Pyramid of the Southern Mediterranean Sub-Region (2010 and 2050)



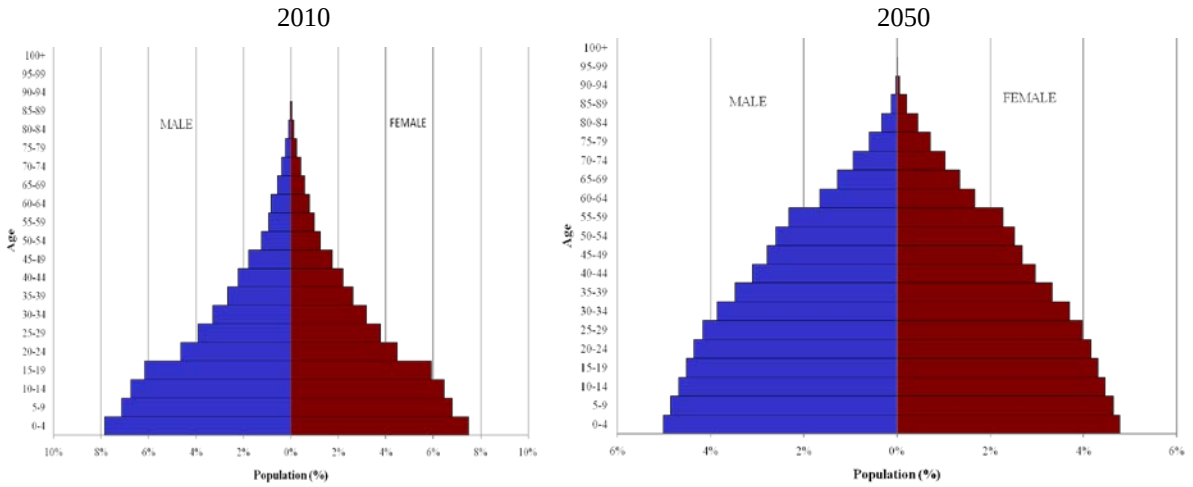
Source: United Nations World Population Prospects (2010 Revision). Population share calculations were computed by the author.

Figure 3. Population Pyramid of the Northern Mediterranean Sub-Region (2010 and 2050)



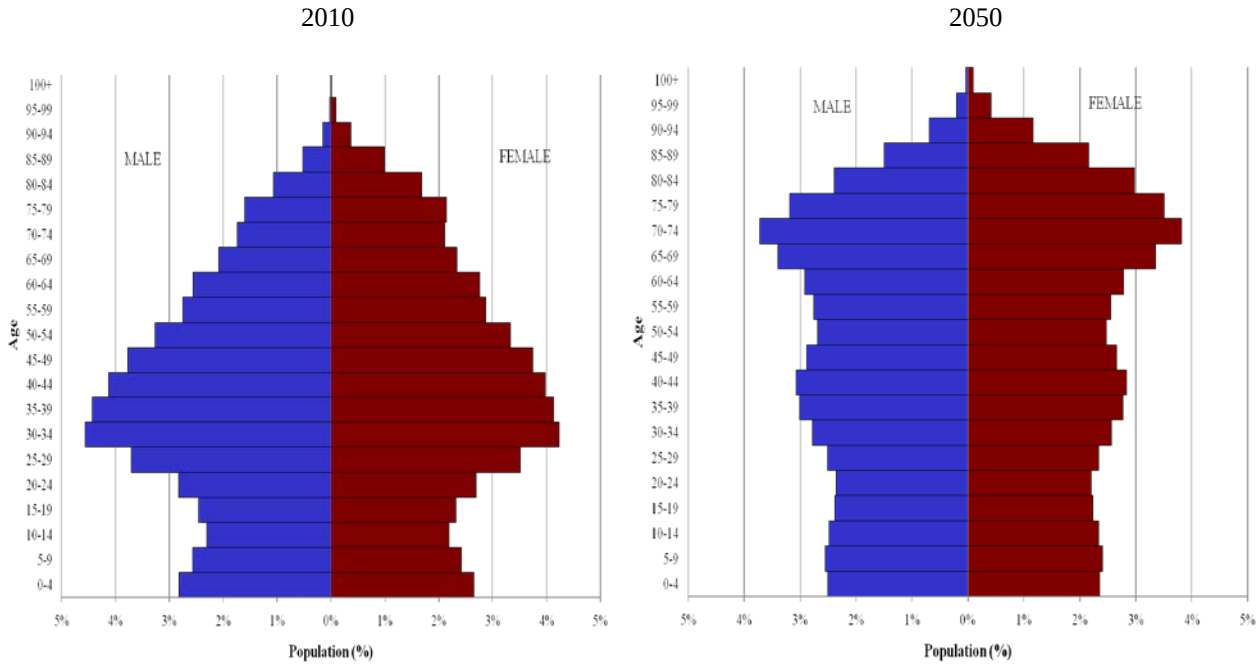
Source: United Nations World Population Prospects (2010 Revision). Population share calculations were computed by the author.

Figure 4. Population Pyramid of the Palestinian Territories (2010 and 2050)



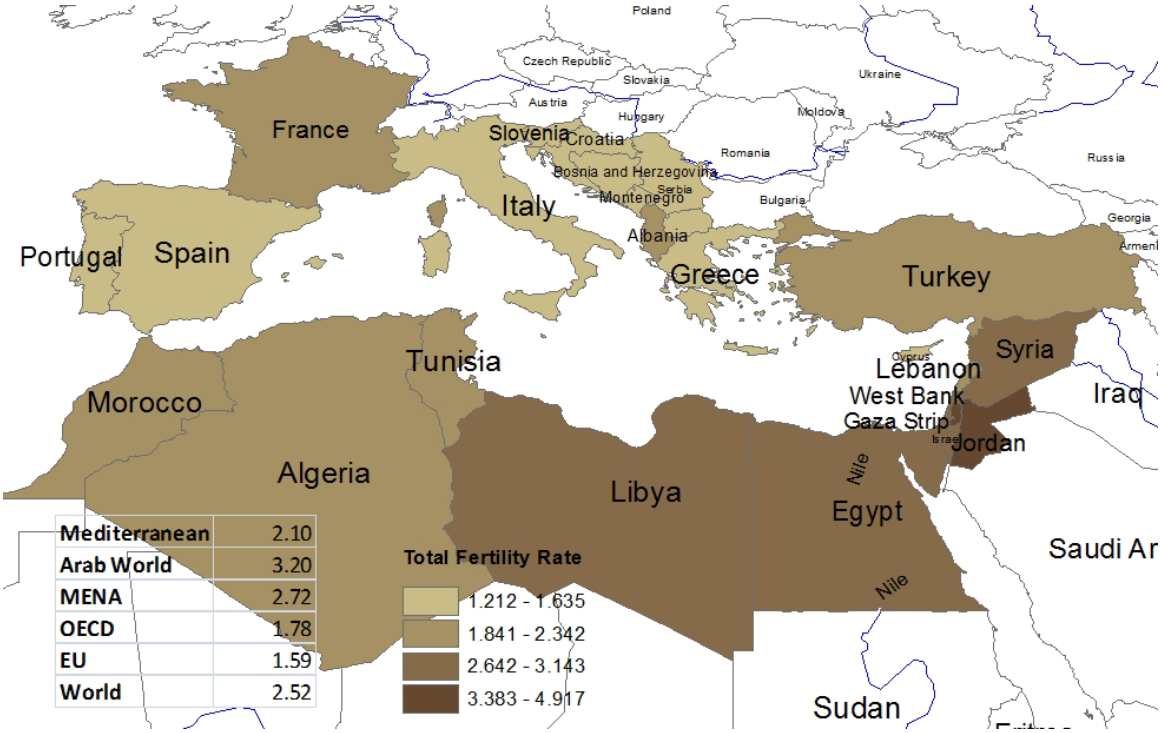
Source: United Nations World Population Prospects (2010 Revision). Population share calculations were computed by the author.

Figure 5. Population Pyramid of Spain (2010 and 2050)



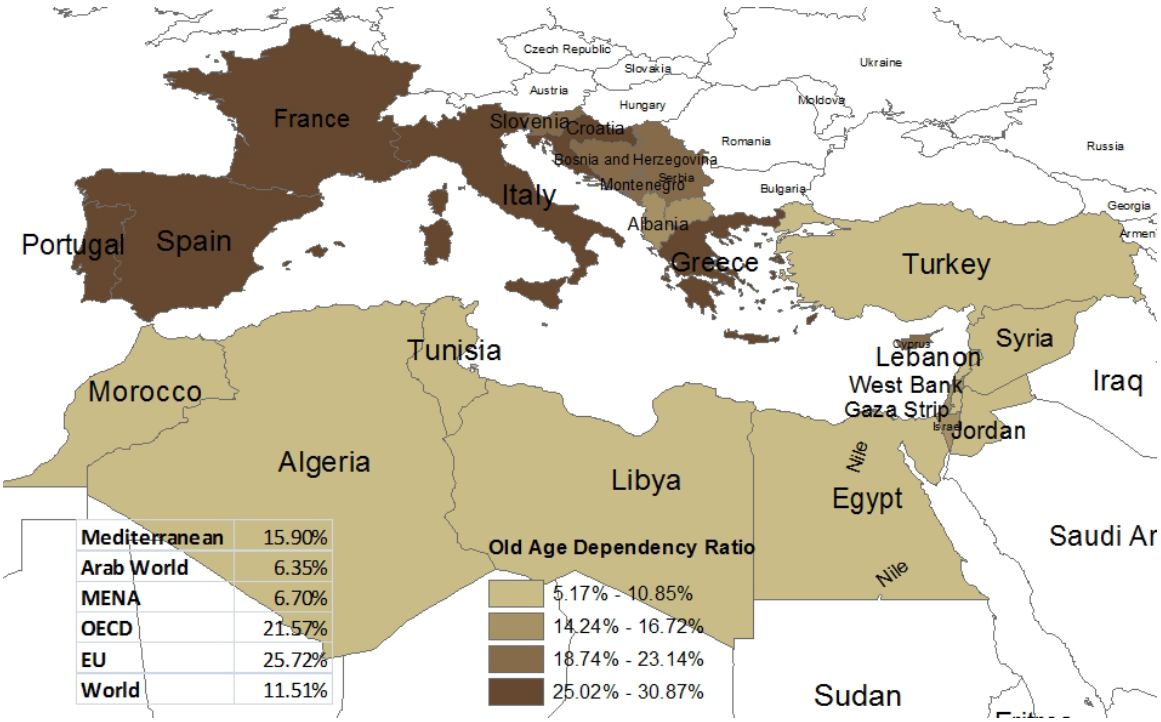
Source: United Nations World Population Prospects (2010 Revision). Population share calculations were computed by the author.

Figure 6. Total Fertility Rate in the Mediterranean (2009)



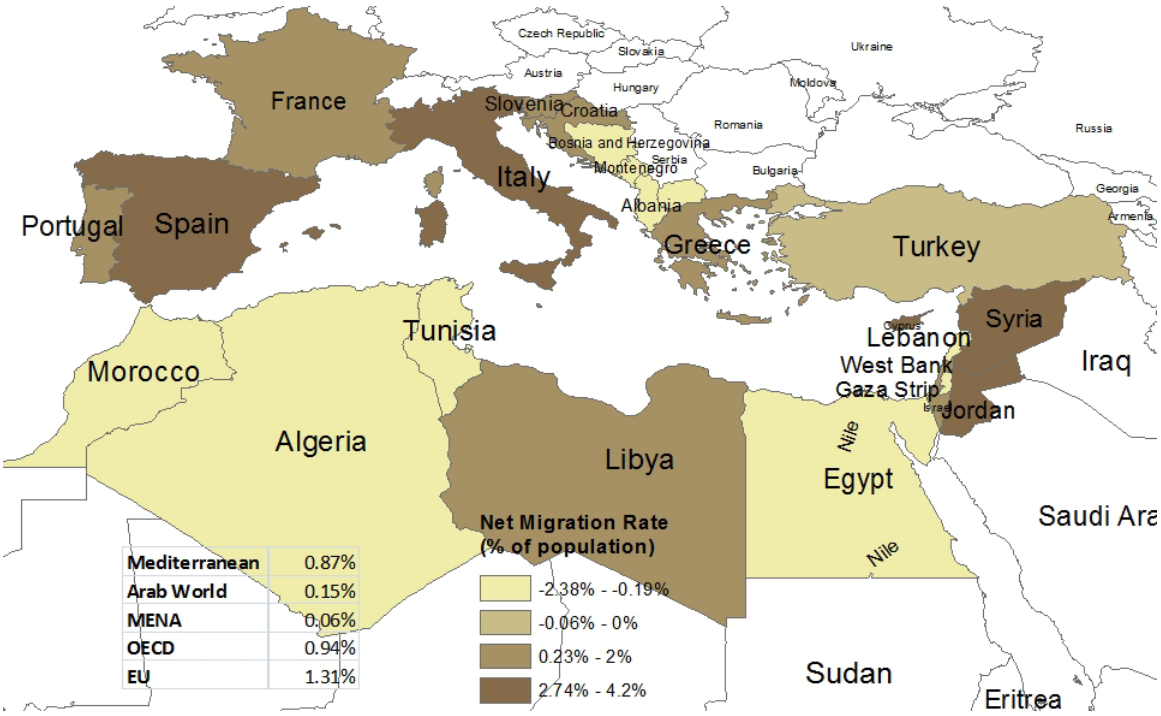
Source: 2010 World Development Indicators, The World Bank.

Figure 7. Old-Age Dependency Ratio in the Mediterranean (2009)



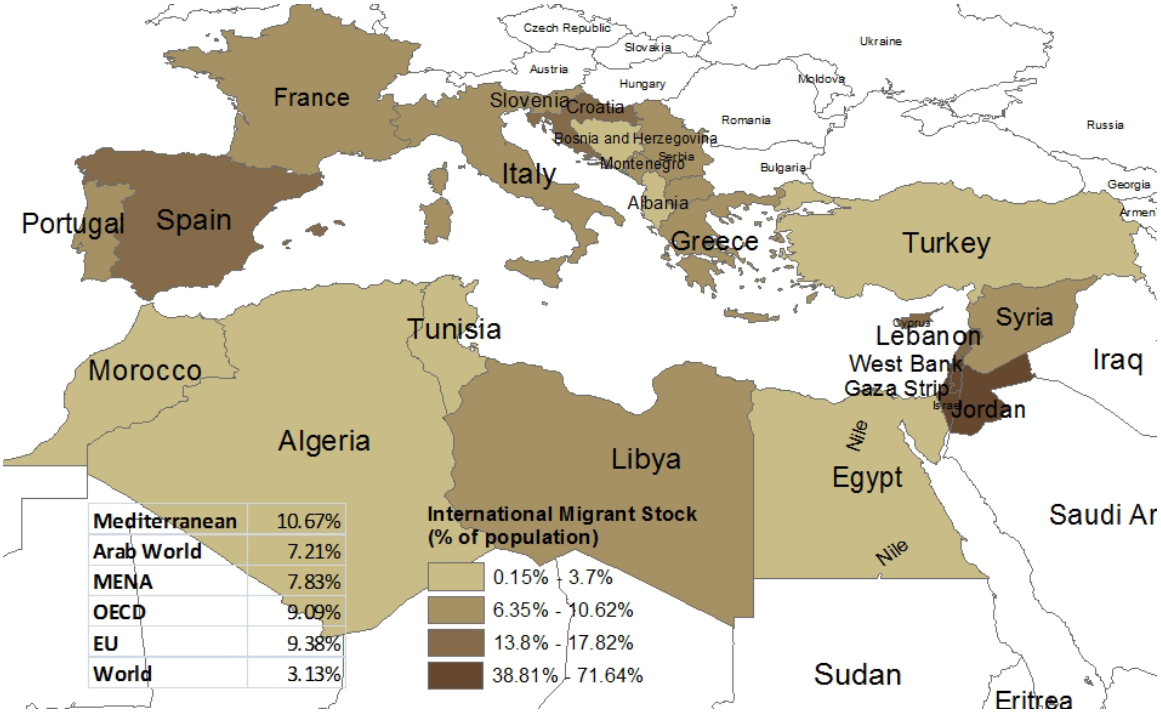
Source: 2010 World Development Indicators, The World Bank.

Figure 8. Net Migration Rate in the Mediterranean (2009)



Source: 2010 World Development Indicators, The World Bank.

Figure 9. International Migrant Stock in the Mediterranean (2009)



Source: 2010 World Development Indicators, The World Bank.

Figure 10. Composition of the Change in Number of Workers in Europe (Perfect Labor Mobility)

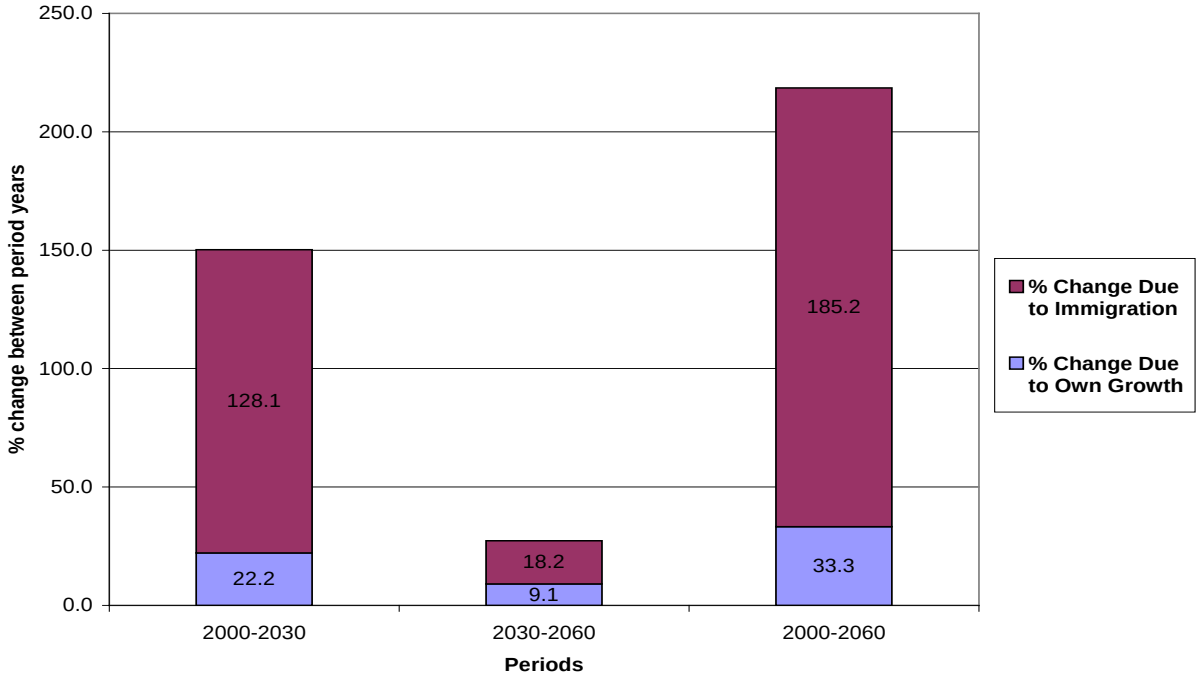


Figure 11. Composition of the Change in Number of Workers in SMCs (Perfect Labor Mobility)

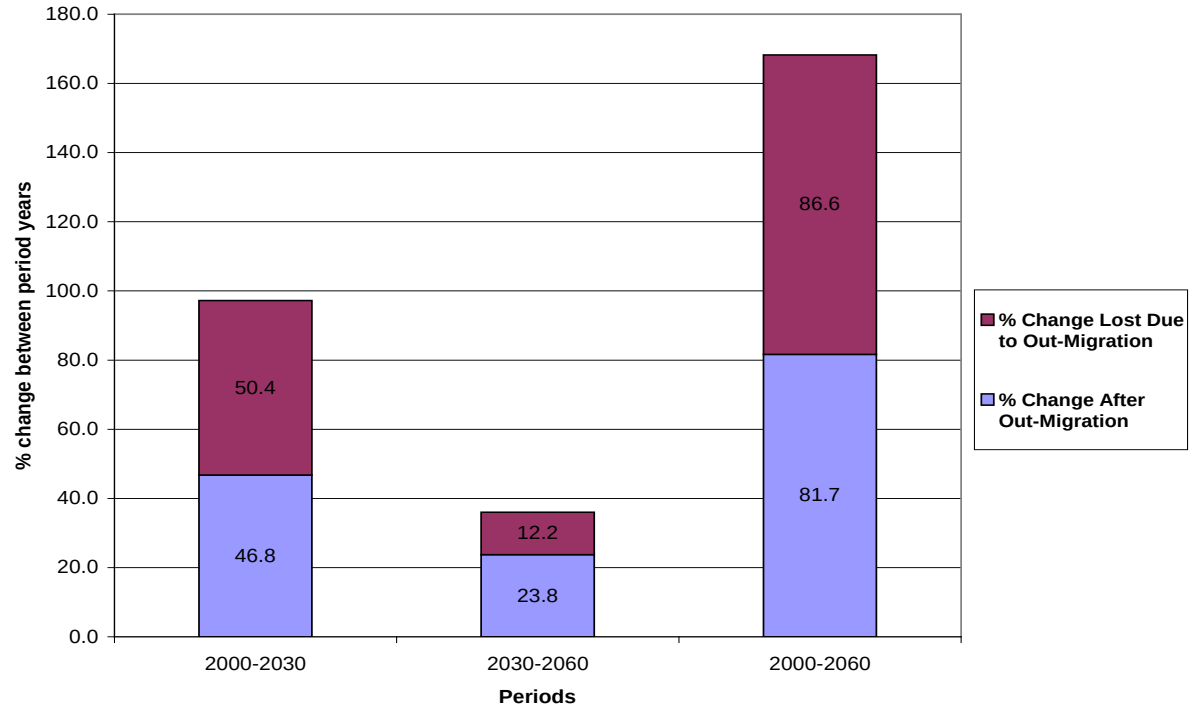


Figure 12. Composition of the Change in Number of Workers in Europe (Labor Mobility w/Brain Drain Tax)

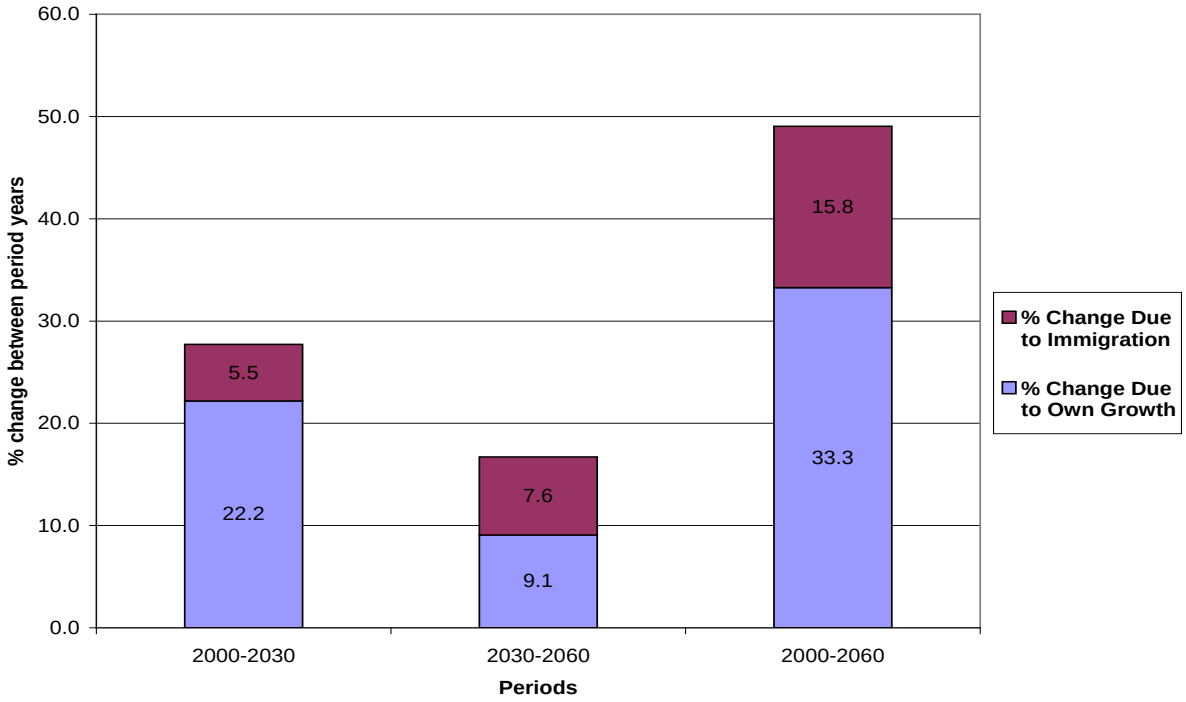


Figure 13. Composition of the Change in Number of Workers in SMCs (Labor Mobility w/Brain Drain Tax)