Why Are Capital Flows between Regions So Different from Capital Flows between Countries? Evidence from Europe *

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Abstract

We study the determinants of capital income flows within Europe. We compare the pattern of capital income flows between countries to capital income flows between regions. Simple neoclassical open economy models predict that capital will flow to regions/countries with relatively high output growth. This prediction is confirmed for regions within European countries but the magnitude is smaller than predicted. We find no association between capital flows and growth for the European countries except for Ireland. Net capital flows between regions are large in northern Europe but very small in Italy and Spain. This difference partly explained by the industrial structure and partly by taxes and transfers. Overall the results suggest that capital markets are integrated among European regions–though to a lesser extent than the U.S. states—and not integrated at all across European countries.

Keywords: European capital markets, regional capital flows, ownership, net factor income.
JEL Classification: F21, F41

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1 Introduction

Across the world financial markets are becoming increasingly more integrated. Economists usually consider this a good thing while to the general public "globalization" sometimes has a sinister ring. Financial integration is likely to have positive effects on growth and risk sharing for most countries—although the quantification of these effects is elusive for researchers—while a recognized disadvantage of financial liberalization is the higher potential for financial crises when capital is footloose.

At the international level the channeling of savings from developed countries to developing countries is referred to as "development finance" by Obstfeld and Taylor (2004). Development finance increases welfare for savers, who get a higher return, while countries that receive capital inflows obtain physical investments faster than would otherwise occur without dramatic temporary declines in consumption. The bulk of developed country capital flows in recent years seems, however, to be better described as "diversification finance," where gross flows of capital are large while net flows are small. The benefits of diversification is that income from investments becomes less sensitive to local economic misfortunes. There is an extensive empirical literature that shows international capital flows are not consistent with the predictions of the standard neoclassical model in the sense that capital is not flowing from capital abundant rich countries to capital scarce poor countries but just the opposite. In fact, net flows have not yet reached the levels that were attained at the start of the twentieth century.[1]

In the context of an integrated global economy the standard neoclassical model implies that world wide capital gets allocated in the most efficient way and that cross-country differences in rates of return to capital disappear. For the Solow model, where countries use the same technology and have similar levels of total factor productivity (TFP), this implies

[1]For recent contributions and a survey of the literature see Alfaro, Kalemli-Ozcan, Volosovych (2005), who show that capital may not be entering poor countries due to institutional factors such as weak property rights; Reinhart and Rogoff (2005), who argue that historical default and sovereign risk is a good indicator for the current pattern of international capital flows; and Gourinchas and Jeanne (2006) who show that capital flows "upstream" on net; i.e., to the countries that invest less.

instantaneous convergence of returns and the equalization of output per worker in all countries. In reality, there are frictions in international capital markets and the more severe these are, the slower the convergence of returns. Models that rely on such frictions may imply that differences in cross-country capital stocks explain cross-country differences in output. However, we have learned from the last 20 years of growth research that two-thirds of the variation in cross-country output per worker is accounted by TFP and only one-third is accounted by capital. Maybe more importantly, the optimal capital stock itself depends on TFP as shown by Blomstrom, Lipsey and Zejan (2000), Clark and Feenstra (2003) and Kalemli-Ozcan, Reshef, Sørensen, and Yosha (2006): in a world of completely mobile capital, the amount of physical capital installed in a country, relative to the world average, is fully explained by TFP.

Building on this, we study capital flows between 14 EU countries, 65 NUTS1 level regions and 181 NUTS2 level regions within these countries. We compare the patterns in the data to the empirical predictions of a frictionless open-economy neoclassical model with a Cobb-Douglas production function and a constant saving rate, in which capital income—but not labor income—is fully diversified between regions and where TFP varies across regions and over time. The model predicts that capital flows into regions that experience an increase in TFP resulting in net capital *income* flows out of such regions. The model also predicts the speed at which net capital income flows decline in the absence of further relative TFP movements. In a previous study, Kalemli-Ozcan, Reshef, Sørensen, Yosha (2006) (KRSY), we show that data on the U.S. states match the predictions of this model well.

Net capital income flows between regions are not directly observed; however, in the country-level national accounts net capital income flows are approximately equal to the difference between Gross National Income ("income") and Gross Domestic Product ("output").[2] Output is observed for regions but the region-level equivalent of GNI is not. We use

[2]In the country-level national accounts, the difference between Gross Domestic Product and Gross National Income is net factor income which includes the net earnings of domestic *residents* abroad (not based on citizenship). However, foreign earnings of domestic residents are usually fairly small compared to capital income.

approximations to regional-level GNI based on observed regional personal income and the ratio of output to income ("output/income") is then an indicator of net capital income.

We estimate two sets of regressions. The first set of regressions examines whether the *change* of the output/income ratio is positive for regions with high growth. Our benchmark model, with fully diversified ownership of capital, predicts that the output/income ratio should change by approximately capital's share in output time the relative growth-rate. The second set of regressions are informative about *net* capital flows and examine the relationship between the *level* of the output/income ratio and the level of output. If ownership of capital is evenly distributed, we would expect to find a high level of output to be associated with a high ratio of output to income. Intuitively, a positive productivity shock leads to high output and a high output/income ratio—an effect that gets amplified as capital flows into the region.

2 Model

Our simple benchmark model of diversified ownership of capital is developed in KRSY (2006). Consider N regions indexed by i, each endowed with a labor force L_i and a Cobb-Douglas production function; time is discrete and we suppress the time-index. We consider capital moving between regions within the "aggregate area" where the aggregate area will vary—we consider whether the model fits well when "regions" are NUTS1 or NUTS2 regions within a country (which is then the "aggregate area") or when "regions" are countries within the EU (the EU—or more precisely, the aggregate of the countries in the sample—is then the "aggregate area"). Factors of production are paid their marginal products and capital flows freely between regions implying that the allocation of capital across regions (for given labor force) is determined solely by TFP levels.

The implications of the model are derived in the appendix. The model makes the empirical predictions that 1) a change in output is followed by a change in the output/income ratio of about α times the growth in per capita GDP, where α is capital's share in output

(usually assumed to be about 0.33)—with an additional term, α times population growth if the increase in population is dominated by migrants arriving without savings; 2) the output/income ratio reverts to its mean of 1 with a half-life of about 15 years; and 3) in a multiple regression the output/income ratio will depend positively on the level of output and negatively on (indicators of) ownership shares.

An alternative model would be a model of perfect risk sharing where changes in output are not associated with any change in income (after subtracting aggregate variables). In the case, the output/income ratio would react one-to-one with growth. A polar opposite would be the case of autarky where income in a region is proportional to output and the output/income ratio is not a function of growth.

3 Empirical Analysis

3.1 The Output/Income Ratio

The output/income ratio is our measure of the relative magnitude of net inter-regional capital income flows. If such flows are zero, the ratio is unity; if they are negative, the ratio exceeds unity; and if they are positive, the ratio is less than unity. We calculate this ratio for each country and region year-by-year, which allows us to study the patterns of international and inter-regional capital income flows over time. Of course, at the country level data on capital flows are available from balance of payments statistics and we also use these data for comparison. However, since we are comparing European regions with European countries we use output/income ratio as the main measure of capital income flows throughout the analysis since regional current account data are not available.

The variables regional personal income (RPI) and gross regional product (GRP) contain aggregate (country-wide) components that may vary over time affecting the output/income ratio for individual regions within each country. To correct for this, we use the normalized output/income ratio for the "within" country regression; i.e., when we use the regional data from one country only in a given regression:

$$\text{Output/Income}_{it} \;=\; \frac{\text{GRP}_{it} \,/\, \text{RPI}_{it}}{\text{GRP}_{t} \,/\, \text{RPI}_{t}}\,,$$

where,

$$\text{RPI}_t \;=\; \Sigma_i \,\text{RPI}_{it}, \quad \text{GRP}_t \;=\; \Sigma_i \,\text{GRP}_{it}\,.$$

The ratio $\text{Output/Income}_{it}$ captures region i's output/income ratio in year t relative to the aggregate output/income ratio of all the regions within the given country.

3.2 Graphical Evidence

Figures 1a-1d show GDP/GNI ratios and real per capita GDP growth rates of four countries: Ireland, Sweden, the U.K., and Spain. It is clear from these figures that there is no association between the GDP/GNI ratios and the growth rates for the countries other than Ireland. Also with the exception of Ireland, the GDP/GNI ratio does not vary much and stays constant around 1 which reflects fact that GDP and GNI move together in the absence of significant net capital flows.

Figures 2a-2b shows similar data from South Holland (in the Netherlands) and West Austria respectively. Growth rates and the output/income ratios are normalized so that they are relative to the country of the region. There is larger variation for the output/income ratios for regions. More importantly, South Holland has growth rates that are a half percent above the Netherlands average and the output/income ratio steadily increases as predicted by the model. For West Austria growth improves from being below average to above average the output/income ratio moves from below one to above one—also consistent with model predictions.

3.3 Specification of Regressions

Our first set of estimations regress the *change* in the output/income ratio on *growth*. The KSRY (2006) model predicts that the change in the output/income ratio is a function of output growth with a coefficient of about 0.33. We calculate the change in the output/income ratio between 1996 and 2003 and regress the change in the output/income ratio on the growth rates of GRP per capita between 1992–1994 (total growth for 3 years between 1992–1994). The model predicts a positive coefficient. Further, we include population growth over the same period (1992–1994) which according to the model will have a coefficient between zero and the value of the coefficient to lagged output growth.

Our second set of estimations regress the *level* of the output/income ratio on the *level* of output and other regressors. We avoid using as a regressor GRP data for exactly the same sample as we use for the output/income ratio for the simple reason that GRP is used in the numerator of this ratio. If GRP is measured with error, such measurement error would lead to a spurious positive correlation of GRP with the output/income ratio and we, therefore, use the logarithm of per capita GRP averaged over the four years (1991–1994) prior to the years (1995–2003) used for measuring the output/income ratio. For this empirical strategy to be valid it is important that TFP shocks are persistent such that high output pre-sample is highly correlated with high output in the sample. Glick and Rogoff (1995) provide direct evidence of high persistence of TFP shocks at the country-level.

3.4 Descriptive Statistics

Table 1 reports the mean and standard deviations (across the 14 countries) of the dependent and independent variables. The GDP/GNI ratio has a mean of about 1 and has a standard deviation of 0.04, which is a small amount of variation. A value of, e.g., 1.04 means that 4 percent of value produced shows up as income in other countries on net. Current accounts and net assets vary more among these countries. The regressors also display large variation.

Table 2 reports the same statistics for NUTS2 regions of every country and statistics for variables in changes are reported in Table 3 for the pooled regions. The output/income

ratio shows larger variation than found for countries, especially for the regions of northern countries. The standard deviation of 0.14 for the U.K. means that 14 percent of value produced in some regions of the U.K. shows up as income in other regions of the U.K. GRP growth from 1991 to 1994 has a standard deviation of 1 percent, which means that several countries grew around 0.3 percentage point per year faster than the average country. This variation in regional growth rates makes it possible for us to examine the main implication of our model with good precision.

3.5 Correlation between Regressors

In Tables 4, 5, and 6, we display the matrix of correlations between the regressors (and the regressand) in levels and in changes both for countries and for NUTS2 regions. In general current accounts and net asset variables are highly correlated and so are output and agricultural shares.

3.6 Cross-Sectional Regressions for Countries and Regions

3.6.1 Current accounts, growth, net assets and output/income ratios: Countries

We consider the ratio of output to income as a measure of capital flows because current accounts and asset holdings are not available at the regional level. However, for countries we observe these variable and, in Table 7, we examine the relations between them. We show results with and without Ireland since Ireland is well known to have a substantially more open economy than most other countries. Countries that have run current account deficits are likely to have output/income ratios above one and we examine if this holds for our sample period. The relation may not hold for any given sample period if current accounts have opposite signs in earlier periods. And, indeed, we find no relationship in our sample that includes Ireland, although we find the expected negative relationship when Ireland is excluded. Alternatively, we can examine if net asset holdings are a function of

current accounts and we find a clear positive relation whether Ireland is included or not. We explore if current accounts are negative for countries with high growth and we confirm this to be the case. Next, we examine if high growth countries have seen a decline in net foreign asset holdings, as would be expected if growth is partly financed by other countries, but we find no relation. We find the expected negative sign but with a clearly insignificant coefficient whether Ireland is included or not. We suspect that the large capital gains and losses on financial assets during this period may have obscured the relationship but we not pursue this further here. In the last two columns, we simply ask if countries with high output have relatively high levels of assets and we find a significant positive relation between asset holdings and output.

3.6.2 Change regressions: Countries

Table 8 examines if economic growth is associated with increasing output/income ratios as predicted by our model with diversified capital ownership. We run the regressions for the sample of 14 EU countries (excluding Luxembourg) and, for robustness, also for the sample where Ireland is left out. We find a positive, but not significant coefficient to lagged growth. When Ireland—which is well known to be very open economy—is left out, this positive relation totally disappears and high growth countries show no tendency to attract capital from other countries.

The coefficient to population growth is positive, but imprecisely estimated and far from significant at common levels. Including the lagged output/income ratio gives mixed results depending on whether Ireland is included or not. Without Ireland, the output/income is mean reverting although in this specification lagged growth is insignificant while the lagged output/income ratio is positive, but not significant when Ireland is included. The model prediction of a negative coefficient to the lagged output/income ratio is derived under an assumption of identical savings rates which doesn't hold well for countries; further, the country-level multiple regressions have few degrees of freedom and are mainly included for comparison with the regional regressions below.

3.6.3 Level regressions: Countries

In Table 9, we examine the patterns of net flows of capital by regressing the output/income ratio on (lagged) output. In open economies we expect high output to be a function of high growth and therefore a positive correlation between output and the output/income ratio, although countries and regions with historically high wealth may maintain a low output/income ratio for a period a time. In column (1), we regress the output/income ratio on output and find an insignificant coefficient near 0. This finding is consistent with the well know observation of Feldstein and Horioka (1980) that saving and investment are highly correlated at the country level. In columns (2)-(5), we add the share of output in agriculture, finance, manufacturing, and mining; respectively, as indicators of industrial structure. Most of these are insignificant but adding the share of manufacturing increase the R-square from 0.02 to 0.65—clearly and significantly, countries with large manufacturing sectors have larger output/income ratios. This could be the result of foreign direct investment tending to flow into manufacturing but, again, the finding is tentative due to the small sample. In the last column, we include the number of retirees. If individuals save for retirement they will retire and not contribute to output while still receiving income. The estimated coefficient to the share of retirees is consistent with such behavior as countries with a large number of retirees have a lower output/income ratio, although the coefficient is not quite significant.

3.6.4 Change regressions: NUTS2 regions

We ask if high growth regions have higher output income ratios. We include country dummies hence the estimated coefficients capture how capital moves between regions *within* countries. We show results for regions of all countries pooled after we have tested if the coefficients for all countries can be accepted statistically to be identical.[3] In the first column, we regress the output/income ratio on Gross Regional Product (GRP) and find a strongly significant coefficient with the expected positive sign and an R-square of 0.41. This is consistent with

[3]We calculate an F-statistic of 0.67, which is below the F(159,10) 5 percent critical value of 1.89.

capital flowing to high growth states although the coefficient still is significantly less than the predicted value of about 0.33. The coefficient to initial growth becomes smaller if population growth is included. The negative coefficient to population growth could reflect individuals with high net worth moving to attractive regions along the Mediterranean coast [To be studied further]. Including the lagged output/income ratio, we find a coefficient consistent with mean reversion in the output/income ratio while the coefficient to growth becomes insignificant.

Overall, these regressions seem consistent with capital flowing to high growth regions but not as strongly as the model predicts nor as strongly as KRSY found for U.S. states.

3.7 Level regressions: NUTS2 Regions

From Table 11, column 1, we see that net capital flows between regions display large differences between countries. There is a strong tendency for regions with high output to have a high output/income ratio in the Netherlands and Belgium, a significant but somewhat lower tendency in Austria, France, Germany, Sweden, and the UK, and (not quite significant) for Greece. In Spain, there is no tendency for the output/income ratio to be related to output, while in Italy the estimated coefficient is positive and significant but very small.

In column 2, we show the coefficients to output when the Netherlands and Belgium are pooled into a "North1" group, Austria, France, Germany, Sweden, the UK are grouped into a "North2" group, Italy and Spain are combined into "South" and Greece is allowed a separate coefficient.[4]

There is a clear difference in the patterns of net capital flows between northern and southern Europe and we next look for determinants of net capital flows within the pooled areas.

[4]We calculate an F-statistic of 2.04, to test if the coefficients for all countries that are grouped together can be accepted statistically to be identical. The F-statistic is below the F(159,7) 5 percent critical value of 2.07.

3.8 Level regressions for: Belgium and the Netherlands

Table 12 analyzes the "North1" group of countries in more detail. We examine if the output/income ratios depends on industrial structure, retirement, and migration. We also examine how the results differ if we use "primary income" before taxes and transfers (columns 1 and 2), and if we use income minus taxes (columns 3 and 4), and if we use disposable income, income after taxes paid and transfers received (columns 5 and 6). We find that the output income ratio is robustly related to output levels but this is partly explained by industrial structure: large financial, manufacturing, and mining shares all predict a high output/income ratio. Migration and retirement are not significant but be we see a lower output/income ratio in regions with many retirees in the last column consistent with retirees receiving substantial transfers.

3.9 Level regressions: Austria, France, Germany, Sweden, and the UK

As shown in Table 13, for the "North2" countries the relation between the output/income ratio and output is robustly estimated and none of the indicators of industrial structure are significant. The impact of retirement is positive and insignificant when income does not include transfers but turns significantly negative when transfers are included. Migration has large negative coefficients which seems to indicate that migrants with high savings are more important for patterns on income flows.

3.10 Level regressions: Italy and Spain

Table 14 shows that in Italy and Spain there is a significant but weak relation between the output/income ratio and output. The effect of industrial structure depends strongly on the income concept used: regions with a large financial sector have low output/income ratios before taxes and transfers but high output/income ratios after taxes and transfers. Mechanically this means that regions with large financial sectors pay relatively high taxes.

The share of mining is insignificant for primary income but positive and significant for income after taxes indicating these regions pay high taxes. The share of mining turns strongly negative and significant when income after taxes and transfers are used which indicates that mining regions receive large income transfers. The results for agriculture are consistent with agricultural regions paying relatively low taxes and receiving large transfers. We find that retirees receive positive transfers while migration in Italy and Spain has the opposite sign of that found for the "North2" countries which indicated that low net worth individuals are migrating more in Italy and Spain.

3.11 Level regressions: Greece

Finally, Table 15 shows that in Greece capital tends to flow to high output regions, to manufacturing regions and way from mining regions. We find no evidence that retirees in Greece receive large income transfers.

4 Conclusion

We study the determinants of capital income flows within Europe. We compare the pattern of capital income flows between countries to capital income flows between regions. We examine capital flows, which are not directly observed at the regional level, by studying the level and changes of the ratio of regional Gross Domestic Product (output) to regional personal income (income).

Simple neoclassical open economy models predict that capital will flow to regions/countries with relatively high output growth. We find significant evidence of this prediction at the within country regional level, with no significant differences between countries. However, the relation between growth and capital flows is weaker than predicted by a model where capital ownership is fully diversified. We find no association between capital flows between countries and country-level growth.

We find large net capital flows between regions of North Europe, whereas we find weak

evidence for regions of South Europe. The differences in findings for the northern and southern regions are partly explained by the industrial structure and by taxes and transfers.

Overall the results suggest that capital markets are integrated among European regions–though to a lesser extent than the U.S. states—and not very integrated across European countries.

5 Appendix

5.1 The Model

We write the level of capital in region i, $K(A)$, as a function of the level of productivity in region i, A_i, and then the level of output is given by $GDP_i = A_i K(A_i)^{\alpha} L_i^{1-\alpha}$.

We assume that the labor force is identical to population and, for simplicity of exposition, that each region initially has the same amount of labor $L_i = \frac{1}{N}L$, where L is aggregate labor. The aggregate capital stock installed is K and, because we consider the aggregate to be a closed economy, we can also think of K as being a nationwide mutual fund; i.e., as capital *owned*.

Region i owns a positive share ϕ_i in the mutual fund implying that the amount of capital *owned* by region i is $\phi_i K$ where $\Sigma\phi_i = 1$. The amount of capital owned by region i may be installed in any region. K_i is capital *installed* in region i and $K = \Sigma K_i$. With no frictions, capital will flow to region i until

$$R = \alpha A_i K_i^{\alpha-1} L_i^{1-\alpha}, \quad \forall i, \tag{1}$$

where R is the equilibrium gross rate of interest. We ignore risk premia—which are likely to be small when capital ownership is diversified—so the ex ante rate of return to investment is same across all regions. The gross income of the U.S. mutual fund is $R\,K$ and the wage rate in region i is $w_i = (1-\alpha)A_i K_i^{\alpha} L_i^{-\alpha}$. GNI in region i is, therefore,

$$GNI_i = \phi_i\, RK + w_i L_i = \phi_i\, RK + (1-\alpha)A_i K_i^{\alpha} L_i^{1-\alpha}, \tag{2}$$

and the GDP/GNI ratio is

$$\frac{GDP_i}{GNI_i} = \frac{A_i K_i^{\alpha} L_i^{1-\alpha}}{\phi_i\, RK + (1-\alpha)A_i K_i^{\alpha} L_i^{1-\alpha}}. \tag{3}$$

5.2 Predicted Ratio of GDP to GNI

We start by examining the case of region-varying ownership shares and assume A_i is constant (=1 for simplicity) across regions. In this case, the amount of installed capital K_i is the same in each region and equal to $K_i = K/N$, i.e., *installed* capital is spread out evenly across regions. In this situation, aggregate $GDP = NGDP_i$ and $RK = RNK_i = N\alpha GDP_i$. Therefore, the *predicted GDP/GNI ratio as a function of ownership for identical productivity levels* is

$$\frac{GDP_i}{GNI_i} = \frac{K_i^{\alpha} L_i^{1-\alpha}}{\phi_i \, N\alpha \, GDP_i + (1-\alpha) K_i^{\alpha} L_i^{1-\alpha}} = \frac{1}{N\phi_i \alpha + (1-\alpha)} = \frac{1}{1 + (N\phi_i - 1)\alpha}. \qquad (4)$$

This number is smaller than one for regions with above average ownership ($\phi_i > 1/N$) and vice versa for regions with below average ownership shares.

It is simple to demonstrate that in the absence of productivity shocks the ratio of GDP to GNI reverts to 1 assuming that the saving rate is constant across regions. With $\alpha = 0.33$, a saving rate of 15 percent, and a depreciation rate of 5 percent per year, the model implies a *predicted half-life of about 15 years for the deviation of the GDP to GNI ratio from 1.*

Consider now the case where all ownership shares initially are identical and equal to $1/N = L_i/L$ where L is aggregate population. For $\phi_i = 1/N$ we have $\phi_i RK = \frac{L_i}{L} RK = \frac{L_i}{L} \alpha GDP$, and the *predicted GDP/GNI ratio for identical ownership shares and varying productivity levels* is

$$GDP_i/GNI_i = \frac{GDP_i}{\alpha \frac{L_i}{L} GDP + (1-\alpha) \, GDP_i} = \frac{1}{\alpha \frac{GDP/L}{GDP_i/L_i} + (1-\alpha)}. \qquad (5)$$

Equation (5) predicts that, after controlling for ownership shares, regions with relatively high output per capita will have high values of the output/income ratio. If we interpret equations (4) and (5) as showing the partial effects of changing ownership and output we have the prediction that in a multiple regression the level of output/income ratio will depend positively on the level of output and negatively on (indicators of) ownership shares.

5.2.1 The ratio of GDP to GNI as a function of productivity and ownership

We compare the predicted effects of full capital mobility with that of no capital mobility. From equation (1) we have $R = \alpha A_i K_i^{\alpha-1} L_i^{1-\alpha}$, which implies $K_i = L_i(\frac{\alpha A_i}{R})^{\frac{1}{1-\alpha}}$. When $L_i = L/N$ this implies that the relative stock of capital installed is a simple function of the relative levels of TFP: $\frac{K_i}{K_j} = (\frac{A_i}{A_j})^{\frac{1}{1-\alpha}}$.[5] If all regions $j \neq i$ have $A_j = A$ and region j is negligible in the total, then $K_j = K/N$, which implies $K_i = K/N * (\frac{A_i}{A})^{\frac{1}{1-\alpha}}$.

If there is no *net* capital mobility, $K_i = K/N$ and $\phi_i = 1/N$, and equation (2) becomes,

$$\frac{GDP_i}{GNI_i} = \frac{1}{\alpha A/A_i + (1-\alpha)}, \tag{6}$$

which for $A_i > A$ implies that $\frac{GDP_i}{GNI_i} > 1$. However, under full mobility of capital, $K_i = K/N * (\frac{A_i}{A})^{\frac{1}{1-\alpha}}$, and we have

$$\frac{GDP_i}{GNI_i} = \frac{A_i(\frac{A_i}{A}^{\frac{1}{1-\alpha}}K)^\alpha}{\phi_i N\, \alpha A K^\alpha + (1-\alpha)A_i(\frac{A_i}{A}^{\frac{1}{1-\alpha}}K)^\alpha} = \frac{1}{\phi_i N\, \alpha (A/A_i)^{\frac{1}{1-\alpha}} + (1-\alpha)}. \tag{7}$$

A comparison of equations (6) and (7) reveals that the effect on the output/income ratio of an increase in productivity will be amplified by the inflow of capital in response to the higher level of productivity for given ownership. However, equation (7) also reveals that the stronger positive effect of a positive productivity shock on output/income now can be strengthened or attenuated by the relative ownership share; in particular, a region with large holdings of assets may have an output/income ratio below one even in a period with high growth and productivity.

[5] Clark and Feenstra (2003) derive similar expressions.

5.3 Predicted Change in the Ratio of GDP to GNI as a Function of Growth and Population

In this section we focus on the predicted change in the ratio as a function of observable variables. If initial $GNI_i = GDP_i$ and GDP of region i grows while aggregate output is unchanged and L_i is fixed, we find from differentiation of (5) with respect to GDP_i:

$$d(\frac{GDP_i}{GNI_i}) = \alpha \frac{dGDP_i}{GDP_i}, \tag{8}$$

which regions that the change in the output/income ratio should be proportional to the percentage change in GDP.[6]

The relative population of regions changes over time due to births, deaths, and migration. In case a) capital income received in region i will be constant at $\frac{1}{N}RK$ and relation (8) will still hold. However, the growth rate of GDP is no longer equal to the growth rate of per capita GDP (which is our growth measure in the empirical section). Since the growth rate of GDP equals the growth rate of per capita GDP plus the growth rate of population we obtain the *predicted growth in the GDP/GNI ratio as a function of output and population when migrants have zero assets:*

$$d(\frac{GDP_i}{GNI_i}) = \alpha \frac{d(GDP_i/L_i)}{GDP_i/L_i} + \alpha \frac{dL_i}{L_i} \ . \tag{9}$$

In case b) the capital income received in region i is $\frac{L_i}{L}RK$ where L_i is no longer a constant. We derive the change in the output/income ratio as a function of GDP growth and population growth as

$$d(\frac{GDP_i}{GNI_i}) = \frac{\partial(\frac{GDP_i}{GNI_i})}{\partial GDP_i} dGDP_i + \frac{\partial(\frac{GDP_i}{GNI_i})}{\partial L_i} dL_i \ .$$

We find the *predicted growth in the GDP/GNI ratio as a function of output and population*

[6] As a function of TFP the change in GDP can be found to be $dGDP_i = (K_i^{\alpha} L_i^{1-\alpha} + A_i \alpha K_i^{\alpha-1} L_i^{1-\alpha} dK_i/dA_i) dA_i$. We focus on the relation between output/income and the GDP growth rate because the latter is directly observable.

when migrants have average asset holdings is

$$d(\frac{GDP_i}{GNI_i}) \;=\; \frac{\alpha}{GDP_i}\, dGDP_i \;-\; \frac{\alpha}{L_i}\, dL_i \;=\; \alpha \frac{d(GDP_i/L_i)}{GDP_i/L_i}\;. \tag{10}$$

In this case, the change in the output/income ratio is proportional to the growth rate of output per capita. A regression that allows for growth in output per capita as well as for population growth will, therefore, be consistent whether case a) or case b) holds; however, the coefficient to population growth will be zero in case b).

6 Data Appendix

Data sources are Eurostat electronic database, WorldBank World Development Indicators (WDI) and Lane and Milesi-Ferretti (2006) paper dataset[7]. For level[8] and change[9] regressions, we use the data from Eurostat. WDI and LM data is used for current account regressions.

6.1 Data for Level and Change Regressions

Availability of output and population data for the initial years 1991-1994 to calculate the initial per capita output, and Gross Domestic Product and Personal Income at the regional level to calculate output/income ratio for years 1995–2003 is the main criteria for the specification of the regions. By considering this constraint, we make the following changes to the original NUTS1 and NUTS2 specification:

NUTS1:

We delete the FR9 region, which is the overseas French region. Due to the availability of data, we also exclude Luxembourg. Total number of NUTS1 regions we have in our dataset

[7]Henceforth LM data.

[8]output/income ratio is regressed on initial output and we control for the sector shares, retirement and migration.

[9]output/income ratio is regressed on initial output growth, initial ratio and population growth.

is 70. List of the regions in the dataset is given at the end of this section.

NUTS2:

4 NUTS2 regions under FR9 NUTS1 region,and Luxembourg is deleted from dataset for NUTS2 level data. Another important aspect here is the missing data for NUTS2 regions. Each NUTS1 region consists of a number of NUTS2 sub-regions. In the case of missing data to calculate initial output between 1991-1994 or output/income ratio between 1995-2003 for NUTS2 regions, we do the following specifications to organize NUTS2 level data.

First, if we don't have any data for NUTS2 sub-regions of a particular NUTS1 region, we drop these NUTS2 regions. We use the data for NUTS1 region which contains these NUTS2 regions. Those regions are as follows;

DE4 = DE41+DE42 (Brandenburg = Brandenburg Nordost + Brandenburg - Südwest)
DEA = DEA1+ DEA2+ DEA3+ DEA4+ DEA5 (Nordrhein-Westfalen = Düsseldorf + Köln + Münster + Detmold + Arnsberg)
DED = DED1+ DED2+ DED3 (Sachsen = Chemnitz + Dresden + Leipzig)
IE0 = IE01+ IE02 (Ireland = Border, Midlands and Western + Southern and Eastern)
FI1 = FI13+FI18+FI19+FI1A (Manner-Suomi = Itä-Suomi + Etelä-Suomi + Länsi-Suomi +Pohjois-Suomi)
PT1 = PT11+PT15+PT16+PT17+PT18 (Continente = Norte + Centro + Lisboa + Alentejo + Algarve)
UKI = UKI1+UKI2 (London= Inner London + Outer London)
UKL = UKL1+UKL2 (Wales = West Wales and The Valleys + East Wales)
UKM = UKM1 + UKM2 + UKM3 + UKM4 (Scotland = North Eastern Scotland+ Eastern Scotland + South Western Scotland + Highlands and Islands)

Secondly, another specification is done when we do not have data for some of the NUTS2

sub-regions of a NUTS1 region, but we have the data for the corresponding NUTS1 region. We drop these NUTS2 regions with missing data and define a new region as the "rest of the NUTS1 region". 3 regions are defined as follows;

Rest of ES6 or **(ES63+ ES64)** = ES6 - ES61 -ES62
(Ciudad Autónoma de Ceuta (ES) + Ciudad Autónoma de Melilla (ES))
Rest of ITD or **(ITD1+ ITD2)** = ITD - ITD3 - ITD4 - ITD5
(Provincia Autonoma Bolzano-Bozen + Provincia Autonoma Trento)
Rest of SE0 or **(SE09+ SE0A)** = SE0 - SE01 - SE02- SE04 - SE06 - SE07 - SE08
(Småland med öarna + Västsverige)
After these changes, total number of NUTS2 regions we have in our data set is 185. List of the regions in the dataset is given at the end of this section.

Gross Regional Product: GRP is regional gross domestic product for NUTS1 and NUTS2 regions. This data is collected from two sources. First part is received from internal Eurostat database by request, which contains the 1975-1994 period with ESA79[10], which we use to calculate the initial output for 1991-1994 period. After 1995, data is published in ESA95 standards, and available at the public database. Data is reported in ECU until 1998, after 1999 all series are in units of Euro.

Gross Domestic Product: They are collected from same sources as regional level GDP data to calculate the GDP/GNI ratio. Data is reported in ECU until 1998, after 1999 in units of Euro. We use real per capita GDP series at constant 2000 US dollars for initial output and initial growth calculations at country level regressions.

Gross National Income: GNI at country level is taken from the Eurostat database to

[10]European System of Accounts. ESA79 takes 1979, ESA95 uses 1995 as the reference year in national accounts.

calculate output/income ratio for 1995-2003. Data is reported in ECU until 1998, after 1999 all series are in units of Euro.

Regional Personal Income: RPI is the income of households for NUTS1 and NUTS2 regions. We refer to the gross income level throughout the paper which is reported as "Primary Income" in the dataset. Primary income account records receipts and expenses relating to various forms of property income such as interest, dividends and (land) rent, including an income imputed to households on their reserves with insurance corporations and pension funds. The balancing item is the balance of primary incomes.

Taxes and transfers are also reported. We construct an "Intermediate Income" level as $primary\ income\ -\ taxes$. "Disposable income" is the income level after taxes and transfers which is $primary\ income\ -\ taxes\ +\ transfers$.

Population: Annual average population data from Eurostat database is used.

Total Value Added: Gross value added at basic prices series is used.

Sector Shares:

1995 is taken as the initial year to compute the sector shares. We have a full set of data on sectoral activity for NUTS1 regions, but data is not complete for NUTS2 regions. The International Standard Industrial Classification of All Economic Activities(ISIC) is the international standard for classification by economic activities. It is used to classify each enterprise according to its primary activity. The primary activity is defined in that activity that generates the most value added. NACE[11] is the compatible EU equivalent. Eurostat uses NACE classification to report sectoral data. NACE classification for sectors is reported

[11]Nomenclature générale des Activités Economiques dans les Communautés Européenes– - General Industrial Classification of Economic Activities within the European Communities

in the table. Sectors we used for the regressions are as follows:

Agriculture share: Ratio of "A B Agriculture, hunting, forestry and fishing" NACE branch to the total value added from the Eurostat database. Data for all regions are available in NUTS1, NUTS2 and country level.

Mining share: Ratio of "C Mining and Quarrying" NACE branch to the total value added from the Eurostat database. Denmark and Germany data is missing in NUTS1, NUTS2 and country level.

Manufacturing: Ratio of "D Manufacturing" NACE branch to the total value added from the Eurostat database. Denmark and Germany data is missing in NUTS1, NUTS2 and country level.

Finance: Ratio of "J Financial Intermediation" NACE branch to the total value added from the Eurostat database. Denmark and Germany data is missing in NUTS1, NUTS2 and country level.

Retirement: Share of population over age 65 is used. Average of the years 1992-1994 are used due to availability of data. All regions are available in NUTS1 and country level, Germany, Ireland, Finland and ukk3(Cornwall and Isles of Scilly) and ukk4(Devon) regions from UK is missing in NUTS2 level.

Migration: Net migration is calculated by subtracting the departures from the arrivals. We use the internal migration which is the movements within the country. When we sum up net migration of the regions for a particular country we find zero. Data is not available for Denmark, Germany, Greece, France, Ireland, Portugal, Finland and ukk3(Cornwall and Isles of Scilly) and ukk4(Devon) regions from UK. We use the 1992-1994 average share of

population who migrated over 1992-1994 by excluding these missing regions.

6.2 Data for Current Account Regressions

Net assets: Data is based on Lane and Milesi-Ferretti (2006) dataset. Assets and liabilities are available under the categories of portfolio equities, foreign direct investment, debt and financial derivatives. Total liabilities is the sum of these categories. Total assets include the total reserves besides these assets. Net assets are the difference between the total assets and total liabilities of the particular country, and they enter the regressions as a ratio of GDP.

Current Account: Current account balance is the sum of net exports of goods and services, income, and current transfers. Data is from World Development Indicators dataset, reported in terms of current US dollars.

GDP and GNI data at country level for these regressions are also collected from WDI dataset. All series are in units of current US dollars for the current account regressions.

NACE Classification

A B	Agriculture, hunting, forestry and fishing
A	Agriculture, hunting and forestry
B	Fishing
C D E	Total industry (excluding construction)
C TO F	Industry
C	Mining and quarrying
D	Manufacturing
E	Electricity, gas and water supply
F	Construction
G TO P	Services
G H I	Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; hotels and restaurants; transport, storage and communication
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
H	Hotels and restaurants
I	Transport, storage and communication
J K	Financial intermediation; real estate, renting and business activities
J	Financial intermediation
K	Real estate, renting and business activities
L TO P	Public administration and defence, compulsory social security; education; health and social work; other community, social and personal service activities; private households with employed persons
L	Public administration and defence; compulsory social security
M	Education
N	Health and social work
O	Other community, social, personal service activities
P	Activities of households

List of Countries

BE	Belgium
DK	Denmark
DE	Germany
GR	Greece
ES	Spain
FR	France
IE	Ireland
IT	Italy
NL	Netherlands
AT	Austria
PT	Portugal
FI	Finland
SE	Sweden
UK	United Kingdom

List of NUTS1 Regions

BE	**Belgium(3 regions)**
BE1	Région de Bruxelles-Capitale
	Brussels Hoofdstedlijk Gewest
BE2	Vlaams Gewest
BE3	Région Wallonne
DK	**Denmark (1 region)**
DK0	Denmark
DE	**Germany (16 regions)**
DE1	Baden-Württemberg
DE2	Bayern
DE3	Berlin
DE4	Brandenburg
DE5	Bremen
DE6	Hamburg
DE7	Hessen
DE8	Mecklenburg-Vorpommern
DE9	Niedersachsen
DEA	Nordrhein-Westfalen
DEB	Rheinland-Pfalz
DEC	Saarland
DED	Sachsen
DEE	Sachsen-Anhalt
DEF	Schleswig-Holstein
DEG	Thüringen
GR	**Greece (4 regions)**
GR1	Voreia Ellada
GR2	Kentriki Ellada
GR3	Attiki
GR4	Nisia Aigaiou, Kriti
ES	**Spain (7 regions)**
ES1	Noroeste
ES2	Noreste
ES3	Comunidad de Madrid
ES4	Centro (ES)
ES5	Este
ES6	Sur
ES7	Canarias (ES)

FR	**France (8 regions)**
FR1	Île de France
FR2	Bassin Parisien
FR3	Nord - Pas-de-Calais
FR4	Est
FR5	Ouest
FR6	Sud-Ouest
FR7	Centre-Est
FR8	Méditerranée
IE	**Ireland (1 region)**
IE0	Ireland
IT	**Italy (5 regions)**
ITC	Nord Ovest
ITD	Nord Est
ITE	Centro (IT)
ITF	Sud (IT)
ITG	Isole (IT)
NL	**Netherlands (4 regions)**
NL1	Noord-Nederland
NL2	Oost-Nederland
NL3	West-Nederland
NL4	Zuid-Nederland
AT	**Austria (3 regions)**
AT1	Ostösterreich
AT2	Südösterreich
AT3	Westösterreich
PT	**Portugal (3 regions)**
PT1	Continente (PT)
PT2	Região Autónoma dos Açores (PT)
PT3	Região Autónoma da Madeira (PT)
FI	**Finland (2 regions)**
FI1	Manner-Suomi
FI2	Åland
SE	**Sweden (1 region)**
SE0	Sverige

List of NUTS1 Regions

UK	**United Kingdom (12 regions)**
UKC	North East
UKD	North West (including Merseyside)
UKE	Yorkshire and The Humber
UKF	East Midlands
UKG	West Midlands
UKH	Eastern
UKI	London
UKJ	South East
UKK	South West
UKL	Wales
UKM	Scotland
UKN	Northern Ireland

List of NUTS2 Regions

BE	**Belgium(11 regions)**	DE91	Braunschweig
BE10	Région de Bruxelles-Capitale	DE92	Hannover
	Brussels Hoofdstedlijk Gewest	DE93	Lüneburg
BE21	Prov. Antwerpen	DE94	Weser-Ems
BE22	Prov. Limburg (B)	DEA	Nordrhein-Westfalen
BE23	Prov. Oost-Vlaanderen	DEB1	Koblenz
BE24	Prov. Vlaams Brabant	DEB2	Trier
BE25	Prov. West-Vlaanderen	DEB3	Rheinhessen-Pfalz
BE31	Prov. Brabant Wallon	DEC0	Saarland
BE32	Prov. Hainaut	DED	Sachsen
BE33	Prov. Liège	DEE1	Dessau
BE34	Prov. Luxembourg (B)	DEE2	Halle
BE35	Prov. Namur	DEE3	Magdeburg
DK	**Denmark (1 region)**	DEF0	Schleswig-Holstein
DK00	Denmark	DEG0	Thüringen
DE	**Germany (34 regions)**	**GR**	**Greece (13 regions)**
DE11	Stuttgart	GR11	Anatoliki Makedonia, Thraki
DE12	Karlsruhe	GR12	Kentriki Makedonia
DE13	Freiburg	GR13	Dytiki Makedonia
DE14	Tübingen	GR14	Thessalia
DE21	Oberbayern	GR21	Ipeiros
DE22	Niederbayern	GR22	Ionia Nisia
DE23	Oberpfalz	GR23	Dytiki Ellada
DE24	Oberfranken	GR24	Sterea Ellada
DE25	Mittelfranken	GR25	Peloponnisos
DE26	Unterfranken	GR30	Attiki
DE27	Schwaben	GR41	Voreio Aigaio
DE30	Berlin	GR42	Notio Aigaio
DE4	Brandenburg	GR43	Kriti
DE50	Bremen	**ES**	**Spain (18 regions)**
DE60	Hamburg	ES11	Galicia
DE71	Darmstadt	ES12	Principado de Asturias
DE72	Gießen	ES13	Cantabria
DE73	Kassel	ES21	Pais Vasco
DE80	Mecklenburg-Vorpommern	ES22	Comunidad Foral de Navarra

List of NUTS2 Regions

ES23	La Rioja	**IT**	**Italy (20 regions)**
ES24	Aragón	ITC1	Piemonte
ES30	Comunidad de Madrid	ITC2	Valle d'Aosta/Valle d'Aoste
ES41	Castilla y León	ITC3	Liguria
ES42	Castilla-la Mancha	ITC4	Lombardia
ES43	Extremadura	ITD77 (ITD1+ITD2)	Rest of ITD
ES51	Cataluña	ITD3	Veneto
ES52	Comunidad Valenciana	ITD4	Friuli-Venezia Giulia
ES53	Illes Balears	ITD5	Emilia-Romagna
ES61	Andalucia	ITE1	Toscana
ES62	Región de Murcia	ITE2	Umbria
ES677 (ES63+ES64)	Rest of ES6	ITE3	Marche
ES70	Canarias (ES)	ITE4	Lazio
FR	**France (22 regions)**	ITF1	Abruzzo
FR10	Île de France	ITF2	Molise
FR21	Champagne-Ardenne	ITF3	Campania
FR22	Picardie	ITF4	Puglia
FR23	Haute-Normandie	ITF5	Basilicata
FR24	Centre	ITF6	Calabria
FR25	Basse-Normandie	ITG1	Sicilia
FR26	Bourgogne	ITG2	Sardegna
FR30	Nord - Pas-de-Calais	**NL**	**Netherlands (12 regions)**
FR41	Lorraine	NL11	Groningen
FR42	Alsace	NL12	Friesland
FR43	Franche-Comté	NL13	Drenthe
FR51	Pays de la Loire	NL21	Overijssel
FR52	Bretagne	NL22	Gelderland
FR53	Poitou-Charentes	NL23	Flevoland
FR61	Aquitaine	NL31	Utrecht
FR62	Midi-Pyrénées	NL32	Noord-Holland
FR63	Limousin	NL33	Zuid-Holland
FR71	Rhône-Alpes	NL34	Zeeland
FR72	Auvergne	NL41	Noord-Brabant
FR81	Languedoc-Roussillon	NL42	Limburg (NL)
FR82	Provence-Alpes-Côte d'Azur	**AT**	**Austria (9 regions)**
FR83	Corse	AT11	Burgenland
IE	**Ireland (1 region)**	AT12	Niederösterreich
IE0	Ireland	AT13	Wien

List of NUTS2 Regions

AT21	Kärnten	UKD5	Merseyside
AT22	Steiermark	UKE1	East Riding
AT31	Oberösterreich		and North Lincolnshire
AT32	Salzburg	UKE2	North Yorkshire
AT33	Tirol	UKE3	South Yorkshire
AT34	Vorarlberg	UKE4	West Yorkshire
PT	**Portugal (3 regions)**	UKF1	Derbyshire and Nottinghamshire
PT1	Continente	UKF2	Leicestershire
PT20	Região Autónoma		Rutland and Northants
	dos Açores (PT)	UKF3	Lincolnshire
PT30	Região Autónoma		Worcestershire and Warks
	da Madeira (PT)	UKG1	Herefordshire
FI	**Finland (2 regions)**	UKG2	Shropshire and Staffordshire
FI1	Manner-Suomi	UKG3	West Midlands
FI20	Åland	UKH1	East Anglia
SE	**Sweden (7 regions)**	UKH2	Bedfordshire, Hertfordshire
SE01	Stockholm	UKH3	Essex
SE02	Östra Mellansverige	UKI	London
SE04	Sydsverige	UKJ1	Berkshire, Bucks
SE06	Norra Mellansverige		and Oxfordshire
SE07	Mellersta Norrland	UKJ2	Surrey, East and West Sussex
SE08	Övre Norrland	UKJ3	Hampshire and Isle of Wight
SE077	Rest of SE0	UKJ4	Kent
(SE09+SE0A)		UKK1	Gloucestershire, Wiltshire
UK	**United Kingdom (32 regions)**		and North Somerset
UKC1	Tees Valley and Durham	UKK2	Dorset and Somerset
UKC2	Northumberland, Tyne and Wear	UKK3	Cornwall and Isles of Scilly
UKD1	Cumbria	UKK4	Devon
UKD2	Cheshire	UKL	Wales
UKD3	Greater Manchester	UKM	Scotland
UKD4	Lancashire	UKN	Northern Ireland

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Table 1: **Descriptive Statistics for Countries**

Number of Observations	14
Average GDP/GNI Ratio 1995–2003	1.02 (0.04)
Avg. CA/GDP 1995–2003	2.64 (34.32)
Avg. CA/GDP 1991–1994	-0.33 (8.79)
Avg. Net Assets/GDP 1995–2003	-15.24 (25.86)
Δ Net Assets/GDP 1995–2003	-3.32 (24.31)
GDP Growth 1991–1994	0.77 (1.23)
Avg. GDP 1995–2003	20.34 (5.53)
Avg. GDP 1991–1994	17.36 (4.87)
Agriculture Share in 1995	3.96 (2.35)
Finance Share in 1995	5.30 (0.79)
Manufacturing Share in 1995	20.29 (4.20)
Mining Share in 1995	0.82 (0.81)
Average Retirement 1992–1994	14.67 (1.44)
Average Population 1991–1994	26.30 (26.33)

Notes: Means of the variables are reported (standard deviations are in parenthesis). All ratios except GDP/GNI are reported in percentages. GDP is the Gross Domestic Product and GNI is the Gross National Income. Current Account/GDP is the ratio of the sum of Current Account to the average of GDP over the given years. Net Assets/GDP is the ratio of the net asset position to the GDP. Average GDP is in thousands of constant 2000 US dollars averaged over the indicated years. Growth rate is the average annual change in the real per capita output over the given years. All sector shares are the percentages of total value added in 1995. Retirement is the share of population over age 65 as percent of the total population, averaged over 1992–1994. Average Population is in millions of people, averaged over 1991–1994. Luxembourg is excluded from the sample. Germany data for finance, manufacturing and mining shares is not available.

Table 2: **Descriptive Statistics for NUTS2 Regions**

	Belgium	Germany	Greece	Spain	France	Italy	Nether.	Austria	Portug.	Sweden	UK
Number of Regions	11	34	13	18	22	20	12	9	3	7	32
Avg. Out./Inc. 1991–1994	1.29 (0.48)	1.36 (0.15)	1.27 (0.22)	1.44 (0.02)	1.37 (0.06)	1.35 (0.03)	1.51 (0.22)	1.39 (0.21)	1.66 (0.18)	1.55 (0.09)	1.36 (0.14)
Avg. GRP 1991–1994	16.89 (4.18)	18.92 (6.49)	7.12 (1.04)	11.12 (2.00)	16.17 (2.99)	19.62 (20.31)	16.36 (2.49)	18.12 (4.86)	5.88 (1.12)	20.28 (2.26)	13.37 (1.99)
Agriculture Share in 1995	2.01 (1.14)	1.73 (1.03)	14.33 (6.28)	5.41 (3.65)	4.67 (2.42)	3.99 (1.70)	4.62 (2.54)	3.25 (2.41)	7.25 (4.01)	3.56 (1.94)	2.81 (2.51)
Finance Share in 1995	4.83 (4.23)	– –	3.57 (0.90)	4.88 (1.09)	4.01 (1.02)	4.17 (0.97)	4.70 (2.52)	5.76 (1.50)	5.20 (1.07)	3.71 (2.32)	4.52 (2.01)
Manuf. Share in 1995	19.77 (6.82)	– –	11.00 (7.92)	17.33 (8.30)	20.13 (6.66)	18.73 (7.62)	18.82 (6.67)	20.23 (6.17)	9.41 (8.05)	22.67 (5.66)	23.98 (6.39)
Mining Share in 1995	0.31 (0.39)	– –	1.20 (2.07)	0.86 (1.72)	0.28 (0.23)	0.32 (0.31)	3.67 (7.93)	0.42 (0.26)	0.38 (0.16)	0.70 (1.37)	0.73 (0.74)
Avg. Migrat. 1992–1994	0.10 (0.15)	0.34 (0.41)	– –	0.13 (0.15)	– –	0.22 (0.39)	0.32 (0.79)	0.13 (0.16)	– –	0.31 (0.38)	0.27 (0.34)
Avg. Retirem. 1992–1994	15.13 (1.63)	15.17 (1.32)	15.92 (2.66)	14.89 (2.77)	15.50 (2.57)	16.59 (2.96)	13.01 (1.78)	14.31 (2.16)	12.94 (1.20)	17.82 (1.65)	15.95 (1.76)
Avg. Pop. 1992–1994	0.91 (0.44)	2.38 (2.88)	0.80 (0.95)	2.17 (2.04)	2.61 (2.19)	2.84 (2.28)	1.27 (0.97)	0.87 (0.51)	3.32 (5.32)	1.24 (0.74)	1.82 (1.28)

Notes: Means of the variables are reported (standard deviations in parenthesis). Average Output/Income Ratio is the ratio of regional gross domestic product (GRP) to regional personal income (RPI), averaged over 1995–2003. Average GRP 1991–1994 is the regional gross domestic product (GRP) in thousands of ECU divided by population, averaged over 1991–1994. All the sector shares are the percentages of total value added in 1995. Average Migration is the absolute value of the net population movements within the given country as percent of the total population, averaged over 1992–1994. Average Retirement is the share of population over age 65 as percent of the total population, averaged over 1992–1994. Average Population is in millions of people, averaged over 1991–1994.

Table 3: **Descriptive Statistics for Variables in Changes**

	Countries	NUTS2 Regions
Number of Observations	14	181
Change in Output/Income Ratio from 1996 to 2003	0.22 (2.73)	0.65 (6.31)
GRP Growth from 1992 to 1994	0.75 (1.13)	2.98 (5.05)
Output/Income in 1995	1.01 (0.03)	1.00 (0.14)
Population Growth from 1992 to 1994	1.52 (0.70)	1.41 (1.90)

Notes: Means of the variables are reported (standard deviations in parenthesis). Output/Income Ratio is the ratio of regional gross domestic product (GRP) to regional personal income (RPI), normalized by the total GRP and RPI of the given country. This ratio is GDP/GNI for countries normalized by the EU average. GDP growth for countries is the average annual growth rate of real per capita gross domestic product. GRP growth is the average annual growth rate of regional per capita gross domestic product in nominal terms. Change in Output/Income Ratio is the change between 1996 and 2003. Population is in millions of people and Population Growth is the cumulative growth rate of the population between 1992–1994.

Table 4: **Correlation Matrix for Countries**

	Out/Inc	GDP	AgrSh	FinSh	ManSh	MinSh	Ret
Out/Inc	1.00						
GDP	-0.15	1.00					
AgrSh	0.38	-0.76	1.00				
FinSh	-0.10	-0.05	-0.42	1.00			
ManSh	0.74	0.24	-0.13	-0.13	1.00		
MinSh	-0.07	0.00	-0.12	0.24	-0.04	1.00	
Ret	-0.60	0.38	-0.54	-0.07	-0.29	-0.20	1.00

	GDP/GNI 95–03	CA/GDP 91–94	CA/GDP 95–03	Net Assets/GDP 95–03	Δ NA/GDP 95–03	GDP 95–03	GDP Growth 91–94
GDP/GNI 95–03	1.00						
CA/GDP 91–94	0.15	1.00					
CA/GDP 95–03	0.02	0.36	1.00				
Net Assets/GDP 95–03	-0.03	0.57	0.20	1.00			
Δ Net Assets/GDP 95–03	0.10	0.30	0.89	0.40	1.00		
GDP 95–03	0.16	0.32	0.71	0.30	0.87	1.00	
GDP Growth 91–94	0.43	0.52	-0.29	0.59	-0.09	0.10	1.00

Notes: AgrSh is agriculture, FinSh is finance, ManSh is manufacturing and MinSh is mining shares in total value added in 1995. Ret is abbreviation for Retirement. Output/Income Ratio, GDP, the sectoral shares, and retirement are in logs. See table 1 for the detailed definitions of the variables. All variables are demeaned.

Table 5: **Correlation Matrix for Pooled NUTS2 Regions**

	Out/Inc	GRP	AgrSh	FinSh	ManSh	MinSh	Ret	Mig
Out/Inc	1.00							
GRP	0.26	1.00						
AgrSh	-0.15	-0.32	1.00					
FinSh	0.43	0.23	-0.31	1.00				
ManSh	-0.11	-0.01	-0.12	-0.32	1.00			
MinSh	0.26	0.06	0.06	-0.16	-0.08	1.00		
Ret	-0.02	0.08	0.10	0.01	0.25	-0.01	1.00	
Mig	-0.29	-0.03	0.29	-0.23	-0.03	-0.06	-0.06	1.00

Notes: AgrSh is agriculture, FinSh is finance, ManSh is manufacturing and MinSh is mining shares in total value added in 1995. Ret and Mig are the abbreviations for Retirement and Migration. See table 2 for the detailed definitions of the variables. Output/Income Ratio, GRP, sectoral shares, retirement and migration are in logs. All variables are demeaned.

Table 6: **Correlation Matrix for Variables in Changes**

Countries				
	Change in Ratio	Growth	Out/Inc 1995	Pop. Growth
Change in Ratio	1.00			
Growth	0.43	1.00		
Out/Inc 1995	0.32	0.52	1.00	
Pop. Growth	0.30	-0.20	-0.12	1.00
NUTS2 Regions				
	Change in Ratio	Growth	Out/Inc 1995	Pop. Growth
Change in Ratio	1.00			
Growth	0.00	1.00		
Out/Inc 1995	-0.31	-0.17	1.00	
Pop. Growth	-0.24	-0.14	-0.07	1.00

Notes: See table 3 for the definition of the variables.

Table 7: **Net Capital Income Flows and Current Account**

Dep. Var.:	Out/Inc 95–03	Out/Inc 95–03	NA/ GDP 95–03	NA/ GDP 95–03	CA/ GDP 95–03	CA/ GDP 95–03	Δ NA/ GDP 95–03	Δ NA/ GDP 95–03	NA/ GDP 95–03	NA/ GDP 95–03
Countries	14	13	14	13	14	13	14	13	14	13
Ireland	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
CA/GDP	0.07	–	–	–	–	–	–	–	–	–
1991-1994	(0.49)	–	–	–	–	–	–	–	–	–
CA/GDP	–	-0.06	–	–	–	–	–	–	–	–
1991-1994	–	(-1.63)	–	–	–	–	–	–	–	–
CA/GDP	–	–	1.67	–	–	–	–	–	–	–
1991-1994	–	–	(2.05)	–	–	–	–	–	–	–
CA/GDP	–	–	–	1.69	–	–	–	–	–	–
1991-1994	–	–	–	(1.91)	–	–	–	–	–	–
Growth	–	–	–	–	-2.00	–	–	–	–	–
1991-1994	–	–	–	–	(-1.56)	–	–	–	–	–
Growth	–	–	–	–	–	-2.76	–	–	–	–
1991-1994	–	–	–	–	–	(-2.30)	–	–	–	–
Growth	–	–	–	–	–	–	-0.43	–	–	–
1991-1994	–	–	–	–	–	–	(-0.47)	–	–	–
Growth	–	–	–	–	–	–	–	-0.89	–	–
1991-1994	–	–	–	–	–	–	–	(-0.96)	–	–
GDP	–	–	–	–	–	–	–	–	0.01	–
1995-2003	–	–	–	–	–	–	–	–	(2.84)	–
GDP	–	–	–	–	–	–	–	–	–	0.01
1995-2003	–	–	–	–	–	–	–	–	–	(2.67)
R^2	0.02	0.17	0.32	0.31	0.08	0.12	0.01	0.02	0.09	0.08

Notes: See table 1 for the definition of the variables. t-statistics are in parentheses. "NA" denotes net assets and "CA" denotes current account. Coefficients of the regression of NA/GDP ratio over GDP are multiplied by 1000. Regressions exclude Luxembourg, and each regression is reported with and without Ireland.

Table 8: **Change in Net Capital Income Flows: Countries**

Dependent Var.: Change in Output/Income Ratio						
Number of Countries	14	13	14	13	14	13
Ireland	Yes	No	Yes	No	Yes	No
GDP Growth	0.35	-0.12	0.41	-0.04	0.35	-0.18
from 1992 to 1994	(1.15)	(-0.49)	(1.67)	(-0.19)	(1.68)	(-1.60)
Population Growth	–	–	1.56	0.90	1.57	0.06
from 1992 to 1994	–	–	(1.60)	(1.20)	(1.56)	(0.13)
Output/Income	–	–	–	–	0.13	-0.84
in 1995	–	–	–	–	(0.53)	(-4.71)
R^2	0.18	0.03	0.34	0.14	0.36	0.68

Notes: Output/Income Ratio is the ratio of gross domestic product (GDP) to gross national income (GNI). GDP growth is the cumulative growth rate of real per capita gross domestic product between 1992–1994. Change in Output/Income Ratio is the change between 1996 and 2003. Population Growth is the cumulative growth rate of the population between 1992–1994. t-statistics are in parentheses. Regressions exclude Luxembourg, and each regression is reported with and without Ireland.

Table 9: **Net Capital Income Flows: Countries**

Dependent Variable: Log of Output/Income Ratio 1995–2003						
Countries	14	14	13	13	13	14
Log Average GDP	-0.02	0.05	-0.01	-0.04	-0.01	0.01
1991–1994	(-0.70)	(1.14)	(-0.65)	(-1.95)	(-0.64)	(0.65)
Log Agriculture Share	–	1.16	–	–	–	–
in 1995	–	(1.11)	–	–	–	–
Log Finance Share	–	–	-0.55	–	–	–
in 1995	–	–	(-0.65)	–	–	–
Log Manufacturing Share	–	–	–	0.96	–	–
in 1995	–	–	–	(3.05)	–	–
Log Mining Share	–	–	–	–	-0.27	–
in 1995	–	–	–	–	(-0.43)	–
Log Average Retirement	–	–	–	–	–	-1.96
1992–1994	–	–	–	–	–	(-1.51)
R^2	0.02	0.20	0.03	0.65	0.02	0.37

Notes: Log Output/Income Ratio is the logarithm of ratio of GDP (Gross Domestic Product) to GNI (Gross National Income), averaged over 1995−2003. Log Average GDP is the logarithm of real per capita GDP, averaged over 1991−1994. Sector shares are log transformations of the ratio of the sector value added to GDP in 1995. Log Average Retirement is the logarithm of the share of the population over 65, averaged over 1992−1994. Finance, manufacturing and mining shares are not available for Germany. t-statistics are in parentheses. Regressions exclude Luxembourg.

Table 10: **Change in Net Capital Income Flows: Pooled NUTS2 Regions**

Dependent Var.: Change in Output/Income Ratio			
Number of Regions	181	181	181
Country dummies	Yes	Yes	Yes
GRP Growth	0.15	0.09	0.04
from 1992 to 1994	(6.11)	(1.90)	(0.91)
Population Growth	–	-0.58	-0.77
from 1992 to 1994	–	(-1.81)	(-2.45)
Output/Income	–	–	-0.11
in 1995	–	–	(-2.02)
R^2	0.41	0.43	0.46

Notes: Output/Income Ratio is the ratio of regional gross domestic product (GRP) to regional personal income (RPI), normalized by the total GRP and RPI of the given country. GRP growth is the cumulative growth rate of per capita regional gross domestic product between 1992–1994. Change in Output/Income Ratio is the change between 1996 and 2003. Population Growth is the cumulative growth rate of the population between 1992–1994. t-statistics are in parentheses.

Table 11: **Net Capital Income Flows: Pooled NUTS2 Regions**

Dependent Variable: Log of Output/Income Ratio 1995–2003		
Number of Regions	181	181
Log Average GRP 1991−1994 *North1	–	1.07
	–	(5.70)
Log Average GRP 1991−1994 *North2	–	0.21
	–	(4.90)
Log Average GRP 1991−1994 *South	–	0.01
	–	(1.99)
Log Average GRP 1991−1994 * Greece	0.43	0.43
	(1.56)	(1.56)
Log Average GRP 1991−1994 * Belgium	1.16	–
	(4.73)	–
Log Average GRP 1991−1994 * Germany	0.15	–
	(3.20)	–
Log Average GRP 1991−1994 * Spain	0.00	–
	(-0.15)	–
Log Average GRP 1991−1994 * France	0.23	–
	(10.60)	–
Log Average GRP 1991−1994 * Italy	0.01	–
	(2.55)	–
Log Average GRP 1991−1994 * Netherland	0.89	–
	(7.22)	–
Log Average GRP 1991−1994 * Austria	0.56	–
	(11.91)	–
Log Average GRP 1991−1994 * Portugal	-0.15	–
	(-0.65)	–
Log Average GRP 1991−1994 * Sweden	0.34	–
	(2.80)	–
Log Average GRP 1991−1994 * UK	0.32	–
	(3.82)	–
R^2	0.63	0.59

Notes: Log Output/Income Ratio is the logarithm of ratio of GRP (Regional Gross Domestic Product) to RPI (Regional Personal Income), averaged over 1995−2003 and normalized by the total GRP and RPI of the given country. Log Average GRP is the logarithm of per capita GDP in ECU units, averaged over 1991−1994. Country names and group names correspond to a dummy variable. The group "North1" includes Netherlands, Belgium; the group "North2" includes Germany, France, Austria, Sweden, UK; and the group "South" includes Spain, Italy, Portugal. "Greece" is treated as a separate group.

Table 12: **Net Capital Income Flows: Pooled NUTS2 Regions for NORTH 1**

Dependent Variable: Log of Output/Income Ratio 1995–2003						
Dependent Variable	Out/Inc I	Out/Inc I	Out/Inc II	Out/Inc II	Out/Inc III	Out/Inc III
Regions	23	23	23	23	23	23
Log Avg. GRP	1.07	0.56	1.10	0.44	1.10	0.71
1991–1994	(5.71)	(3.67)	(5.59)	(2.99)	(6.60)	(10.67)
Log Fin. Share	–	4.36	–	5.02	–	3.62
in 1995	–	(3.78)	–	(4.54)	–	(4.83)
Log Man. Share	–	0.84	–	0.98	–	0.43
in 1995	–	(2.12)	–	(2.72)	–	(2.00)
Log Min. Share	–	1.43	–	1.71	–	0.85
in 1995	–	(3.50)	–	(4.37)	–	(3.34)
Log Agr. Share	–	0.66	–	-0.42	–	-0.12
in 1995	–	(0.59)	–	(-0.36)	–	(-0.19)
Log Avg. Retirement	–	1.26	–	1.31	–	-0.19
1992–1994	–	(1.66)	–	(1.67)	-	(-0.35)
Log Avg. Migration	–	2.51	–	2.36	–	3.43
1992–1994	–	(0.63)	–	(0.59)	–	(1.40)
R^2	0.83	0.92	0.81	0.93	0.89	0.96

Notes: Average Output/Income Ratio is the ratio of regional gross domestic product (GRP) to regional personal income (RPI), averaged over 1995–2003 and normalized by the total GRP and RPI of the given country. Average GRP 1991–1994 is the regional per capita gross domestic product (GRP), averaged over 1991–1994. All sector shares are the percentages of total value added in 1995. Migration is the net population movements within the given country as percent of the total population, averaged over 1992–1994. Retirement is the share of population over age 65 as percent of the total population, averaged over 1992–1994. t-statistics are in parentheses. Income measure is primary income for columns 1-2, intermediate income defined as primary income-taxes for columns 3-4, and disposable income defined as primary income-taxes+transfers for columns 5-6. North1 sample consists of the Belgium and Netherlands regions. Dummies for these countries included in all regressions.

Table 13: **Net Capital Income Flows: Pooled NUTS2 Regions for NORTH 2**

Dependent Variable: Log of Output/Income Ratio 1995–2003						
Dependent Variable	Out/Inc I	Out/Inc I	Out/Inc II	Out/Inc II	Out/Inc III	Out/Inc III
Regions	46	46	46	46	46	46
Log Avg. GRP	0.41	0.48	0.42	0.53	0.63	0.60
1991–1994	(6.22)	(5.60)	(4.98)	(5.44)	(14.70)	(8.08)
Log Fin. Share	–	-1.73	–	-2.25	–	-0.84
in 1995	–	(-1.51)	–	(-1.81)	–	(-1.08)
Log Man. Share	–	0.08	–	0.03	–	0.06
in 1995	–	(0.21)	–	(0.07)	–	(0.17)
Log Min. Share	–	-1.25	–	-0.17	–	-1.29
in 1995	–	(-0.58)	–	(-0.07)	–	(-0.80)
Log Agr. Share	–	-0.46	–	-0.65	–	-0.68
in 1995	–	(-0.71)	–	(-0.95)	–	(-1.53)
Log Avg. Retirement	–	0.27	–	0.84	–	-1.53
1992–1994	–	(0.32)	–	(0.88)	-	(-2.86)
Log Avg. Migration	–	-13.31	–	-18.11	–	-6.73
1992–1994	–	(-2.97)	–	(-3.29)	–	(-1.84)
R^2	0.36	0.55	0.33	0.56	0.65	0.80

Notes: Average Output/Income Ratio is the ratio of regional gross domestic product (GRP) to regional personal income (RPI), averaged over 1995–2003 and normalized by the total GRP and RPI of the given country. Average GRP 1991–1994 is the regional per capita gross domestic product (GRP), averaged over 1991–1994. All sector shares are the percentages of total value added in 1995. Migration is the net population movements within the given country as percent of the total population, averaged over 1992–1994. Retirement is the share of population over age 65 as percent of the total population, averaged over 1992–1994. t-statistics are in parentheses. Income measure is primary income for columns 1-2, intermediate income defined as primary income-taxes for columns 3-4, and disposable income defined as primary income-taxes+transfers for columns 5-6. North2 sample consists of the Germany, France, Austria, Sweden and UK regions. Retirement data for the Cornwall, Isles of Scilly and Devon regions of U.K. are missing, these regions are excluded from the regressions. Regions of Germany and France are not included due to missing data. Dummies for these countries included in all regressions.

Table 14: **Net Capital Income Flows: Pooled NUTS2 Regions for SOUTH without GREECE**

Dependent Variable: Log of Output/Income Ratio 1995–2003						
Dependent Variable	Out/Inc I	Out/Inc I	Out/Inc II	Out/Inc II	Out/Inc III	Out/Inc III
Regions	38	38	38	38	38	38
Log Avg. GRP	0.01	0.01	0.04	0.02	0.05	0.03
1991–1994	(2.33)	(3.52)	(3.11)	(2.19)	(2.28)	(1.84)
Log Fin. Share	–	-0.52	–	1.41	–	1.08
in 1995	–	(-3.05)	–	(2.92)	–	(2.33)
Log Man. Share	–	-0.05	–	-0.03	–	0.30
in 1995	–	(-1.29)	–	(-0.30)	–	(2.99)
Log Min. Share	–	0.09	–	1.20	–	-1.20
in 1995	–	(0.92)	–	(6.32)	–	(-5.27)
Log Agr. Share	–	-0.04	–	-0.44	–	-0.90
in 1995	–	(-0.46)	–	(-2.07)	–	(-4.05)
Log Avg. Retirement	–	-0.20	–	0.02	–	-0.55
1992–1994	–	(-1.68)	–	(0.10)	-	(-2.11)
Log Avg. Migration	–	1.46	–	4.30	–	4.22
1992–1994	–	(3.37)	–	(4.65)	–	(1.84)
R^2	0.17	0.49	0.22	0.60	0.18	0.70

Notes: Average Output/Income Ratio is the ratio of regional gross domestic product (GRP) to regional personal income (RPI), averaged over 1995–2003 and normalized by the total GRP and RPI of the given country. Average GRP 1991–1994 is the regional per capita gross domestic product (GRP), averaged over 1991–1994. All sector shares are the percentages of total value added in 1995. Migration is the net population movements within the given country as percent of the total population, averaged over 1992–1994. Retirement is the share of population over age 65 as percent of the total population, averaged over 1992–1994. t-statistics are in parentheses. Income measure is primary income for columns 1-2, intermediate income defined as primary income-taxes for columns 3-4, and disposable income defined as primary income-taxes+transfers for columns 5-6. South except Greece sample consists of the Spain, Italy and Portugal regions. Regions of Portugal are excluded due to missing data. Dummies for these countries included in all regressions.

Table 15: **Net Capital Income Flows: Pooled NUTS2 Regions for GREECE**

Dependent Variable: Log of Output/Income Ratio 1995–2003						
Dependent Variable	Out/Inc I	Out/Inc I	Out/Inc II	Out/Inc II	Out/Inc III	Out/Inc III
Regions	13	13	13	13	13	13
Log Avg. GRP	0.43	0.43	0.46	0.37	0.51	0.35
1991–1994	(1.55)	(1.45)	(1.61)	(1.08)	(2.10)	(1.23)
Log Fin. Share	–	2.30	–	-0.66	–	-4.69
in 1995	–	(0.52)	–	(-0.13)	–	(-0.95)
Log Man. Share	–	1.28	–	1.03	–	0.85
in 1995	–	(3.36)	–	(2.47)	–	(2.17)
Log Min. Share	–	-3.25	–	-4.43	–	-3.82
in 1995	–	(-2.22)	–	(-2.47)	–	(-2.51)
Log Agr. Share	–	0.46	–	-0.43	–	-0.27
in 1995	–	(0.65)	–	(-0.54)	–	(-0.39)
Log Avg. Retirement	–	1.59	–	1.43	–	1.32
1992–1994	–	(0.90)	-	(0.72)	–	(0.76)
R^2	0.15	0.62	0.16	0.57	0.23	0.61

Notes: Average Output/Income Ratio is the ratio of regional gross domestic product (GRP) to regional personal income (RPI), averaged over 1995–2003 and normalized by the total GRP and RPI of the given country. Average GRP 1991–1994 is the regional per capita gross domestic product (GRP), averaged over 1991–1994. All sector shares are the percentages of total value added in 1995. Retirement is the share of population over age 65 as percent of the total population, averaged over 1992–1994. t-statistics are in parentheses. Income measure is primary income for columns 1-2, intermediate income defined as primary income-taxes for columns 3-4, and disposable income defined as primary income-taxes+transfers for columns 5-6. Migration data is missing for Greece.

Table 16: **Descriptive Statistics for NUTS1 Regions (Appendix Table)**

	Belgium	Germany	Greece	Spain	France	Italy	Nether.	Austria	Portugal	UK
Number of Regions	3	16	4	7	8	5	4	3	3	12
Avg. Out./Inc. Ratio 1995–2003	1.68 (0.88)	1.38 (0.19)	1.29 (0.07)	1.44 (0.02)	1.40 (0.07)	1.35 (0.02)	1.53 (0.11)	1.41 (0.06)	1.66 (0.18)	1.40 (0.09)
Avg. GRP 1991–1994	19.73 (6.75)	18.56 (7.81)	7.41 (0.34)	11.08 (2.06)	17.33 (4.48)	15.30 (4.13)	16.50 (1.40)	18.41 (3.23)	5.88 (1.12)	13.64 (2.37)
Agriculture Share in 1995	1.29 (1.07)	1.57 (1.15)	11.81 (7.05)	4.92 (3.53)	3.66 (2.23)	3.79 (1.57)	4.06 (1.09)	2.92 (0.87)	7.25 (4.01)	2.34 (1.46)
Finance Share in 1995	8.32 (7.81)	– –	3.88 (1.26)	5.18 (1.49)	4.44 (1.47)	4.48 (0.99)	4.74 (1.96)	5.77 (1.31)	5.20 (1.07)	5.04 (2.64)
Manufacturing Share in 1995	17.28 (8.39)	– –	12.05 (5.83)	16.79 (6.71)	19.80 (5.79)	19.58 (8.01)	19.31 (5.76)	20.22 (5.03)	9.41 (8.05)	23.38 (5.80)
Mining Share in 1995	0.21 (0.26)	– –	0.64 (0.61)	0.71 (0.89)	0.26 (0.21)	0.39 (0.36)	4.13 (7.68)	0.45 (0.32)	0.38 (0.16)	0.70 (0.56)
Avg. Migration 1992–1994	0.15 (0.23)	0.28 (0.32)	– –	0.08 (0.12)	– –	0.14 (0.16)	0.09 (0.13)	0.07 (0.09)	– –	0.22 (0.30)
Avg. Retirement 1992–1994	16.00 (1.34)	15.05 (1.57)	14.92 (2.19)	14.20 (2.87)	14.68 (2.43)	15.76 (2.11)	12.99 (1.02)	14.83 (1.88)	12.94 (1.20)	15.65 (1.48)
Avg. Population 1991–1994	3.35 (2.44)	5.05 (4.61)	2.60 (1.19)	5.59 (2.99)	7.17 (2.38)	11.36 (3.28)	3.81 (2.35)	2.62 (0.80)	3.32 (5.32)	4.84 (1.83)

Notes: Means of the variables are reported(standard deviations in parenthesis). Average Output/Income Ratio is the ratio of regional gross domestic product (GRP) to regional personal income (RPI), averaged over 1995–2003. Average GRP 1991–1994 is the regional gross domestic product (GRP) in thousands of ECU divided by population, averaged over 1991–1994. All the sector shares are the percentages of total value added in 1995. Average Migration is the absolute value of the net population movements within the given country as percent of the total population, averaged over 1992–1994. Average Retirement is the share of population over age 65 as percent of the total population, averaged over 1992–1994. Average Population is in millions of people, averaged over 1991–1994.

Table 17: **Correlation Matrix for Pooled NUTS1 Regions (Appendix Table)**

	Out/Inc	GRP	AgrSh	FinSh	ManSh	MinSh	Ret	Mig
Out/Inc	1.00							
GRP	0.40	1.00						
AgrSh	-0.15	-0.61	1.00					
FinSh	0.73	0.62	-0.43	1.00				
ManSh	-0.37	0.00	-0.19	-0.46	1.00			
MinSh	-0.16	0.04	0.24	-0.16	-0.07	1.00		
Ret	-0.02	0.19	-0.08	0.16	0.31	0.00	1.00	
Mig	-0.44	-0.24	0.23	-0.55	0.22	0.01	0.18	1.00

Notes: AgrSh is agriculture, FinSh is finance, ManSh is manufacturing and MinSh is mining shares in total value added at 1995. Ret and Mig are the abbreviations for Retirement and Migration. See table 16 for the detailed definition of the variables. Output/Income Ratio, GRP, the sectoral shares, retirement and migration are in logs. All variables are demeaned.

Table 18: **Change in Net Capital Income Flows: Pooled NUTS1 Regions (Appendix Table)**

Dependent Var.: Change in Output/Income Ratio			
Number of Regions	65	65	65
GRP Growth	0.14	0.11	0.13
from 1992 to 1994	(6.31)	(2.96)	(3.37)
Population Growth	–	-0.25	-0.11
from 1992 to 1994	–	(-0.73)	(-0.33)
Output/Income	–	–	0.03
in 1995	–	–	(1.22)
R^2	0.75	0.75	0.75

Notes: Output/Income Ratio is the ratio of regional gross domestic product (GRP) and regional personal income (RPI), normalized by the total GRP and RPI of the given country. GRP growth is the cumulative growth rate of per capita regional gross domestic product (GRP) between 1992–1994. Change in Output/Income Ratio is the change between 1996 and 2003. Population Growth is the cumulative growth rate of the population between 1992–1994. t-statistics are in parentheses. Country dummies are included.

Table 19: **Net Capital Income Flows: Pooled NUTS1 Regions (Appendix Table)**

Dependent Variable: Log of Output/Income Ratio 1995–2003		
Number of Regions	65	65
Log Average GRP 1991−1994 *North1	–	1.34
	–	(8.51)
Log Average GRP 1991−1994 *North2	–	0.18
	–	(3.48)
Log Average GRP 1991−1994 *South	–	-0.04
	–	(-1.28)
Log Average GRP 1991−1994 * Belgium	1.40	–
	(8.64)	–
Log Average GRP 1991−1994 * Germany	0.18	–
	(2.91)	–
Log Average GRP 1991−1994 * Greece	-0.78	–
	(-8.56)	–
Log Average GRP 1991−1994 * Spain	-0.01	–
	(-0.96)	–
Log Average GRP 1991−1994 * France	0.22	–
	(13.64)	–
Log Average GRP 1991−1994 * Italy	-0.02	–
	(-0.81)	–
Log Average GRP 1991−1994 * Netherland	0.76	–
	(3.67)	–
Log Average GRP 1991−1994 * Austria	0.24	–
	(11.79)	–
Log Average GRP 1991−1994 * Portugal	-0.15	–
	(-0.65)	–
Log Average GRP 1991−1994 * UK	0.11	–
	(1.03)	–
R^2	0.76	0.74

Notes: Log Output/Income Ratio is the logarithm of ratio of GRP (Regional Gross Domestic Product) to RPI (Regional Personal Income), averaged over 1995−2003. Log Average GRP is the per capita GDP in ECU units, averaged over 1991−1994. Country names and group names correspond to a dummy variable. The group "North1" includes Netherlands, Belgium; the group "North2" includes Germany, France, Austria, UK; and the group "South" includes Greece, Spain, Italy, Portugal.

Figure 1a: Small Developed: Ireland

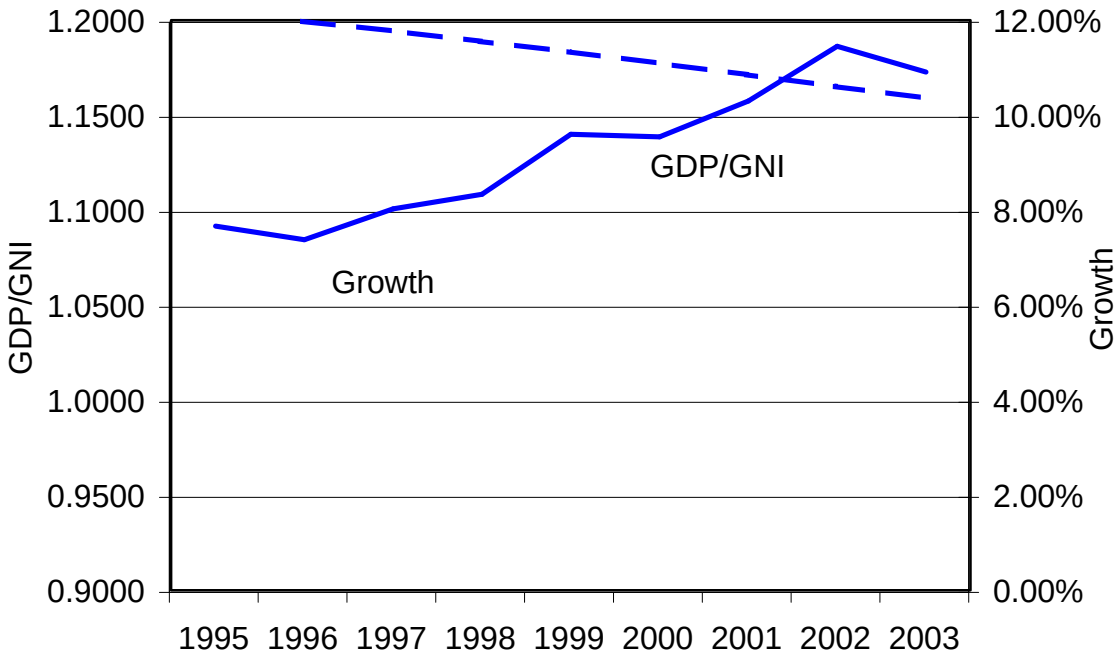

Figure 1b: Small Developed: Sweden

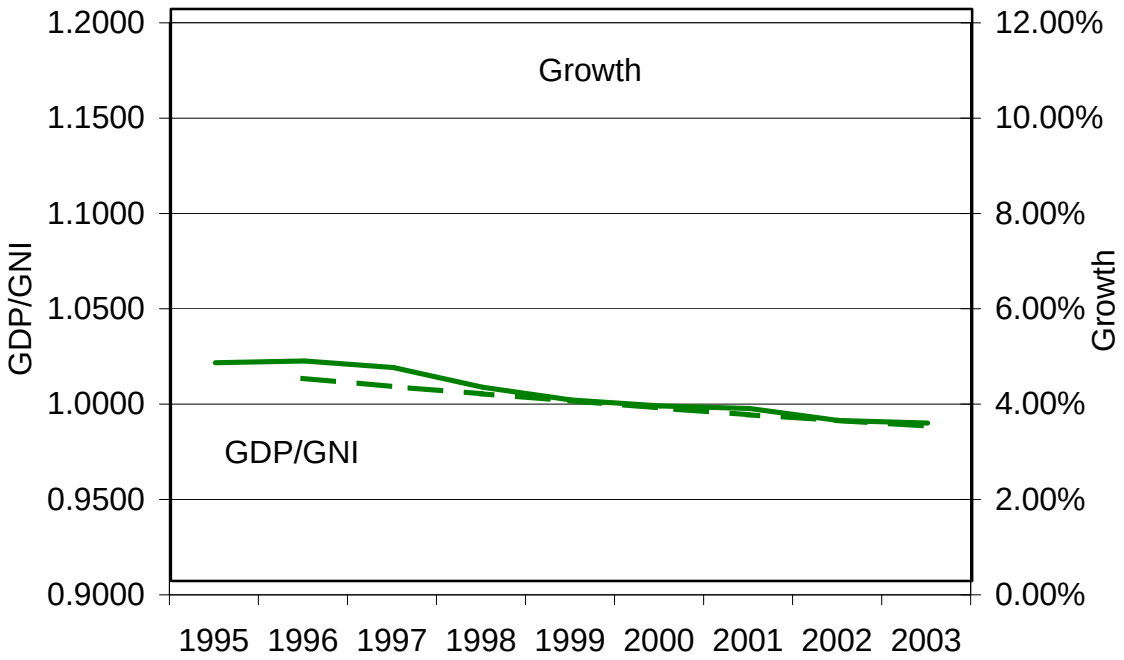

Figure 1c: Large Developed: U.K.

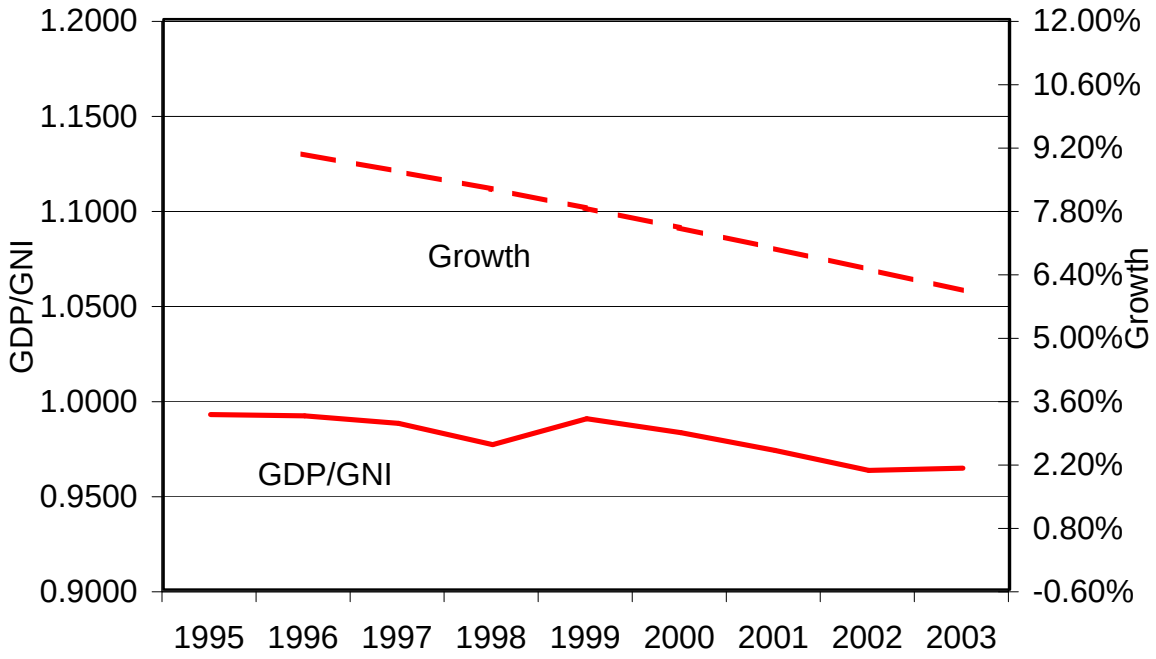

Figure 1d: Less Developed: Spain

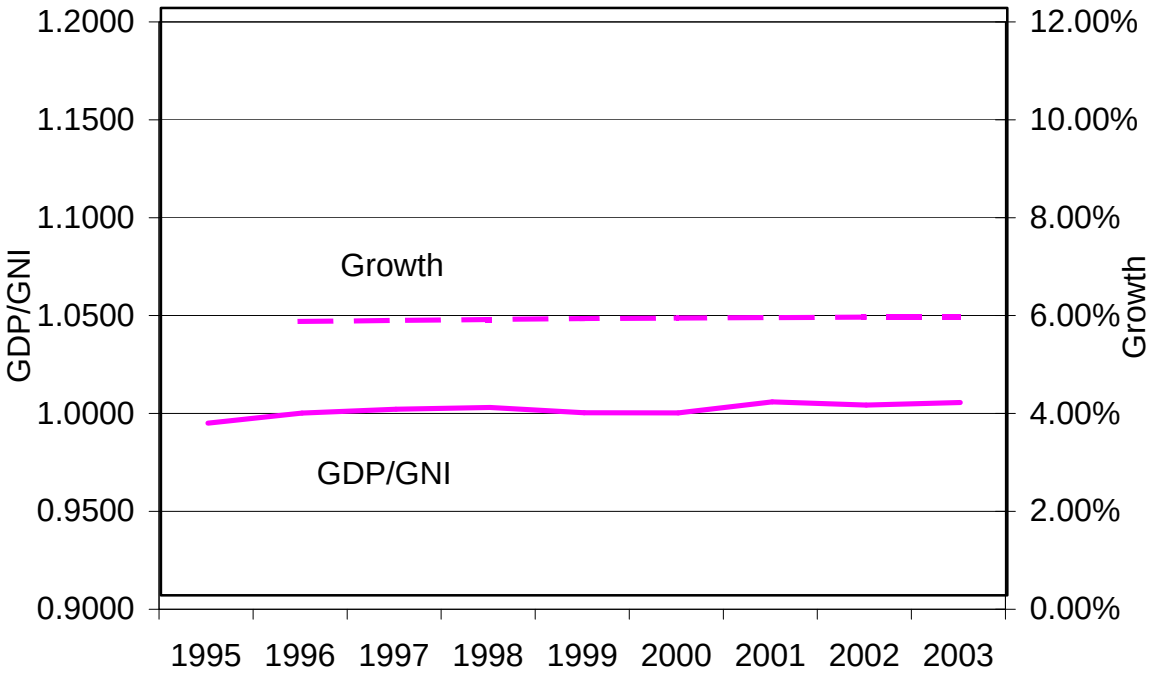

Figure 2a: Zuid-NLD

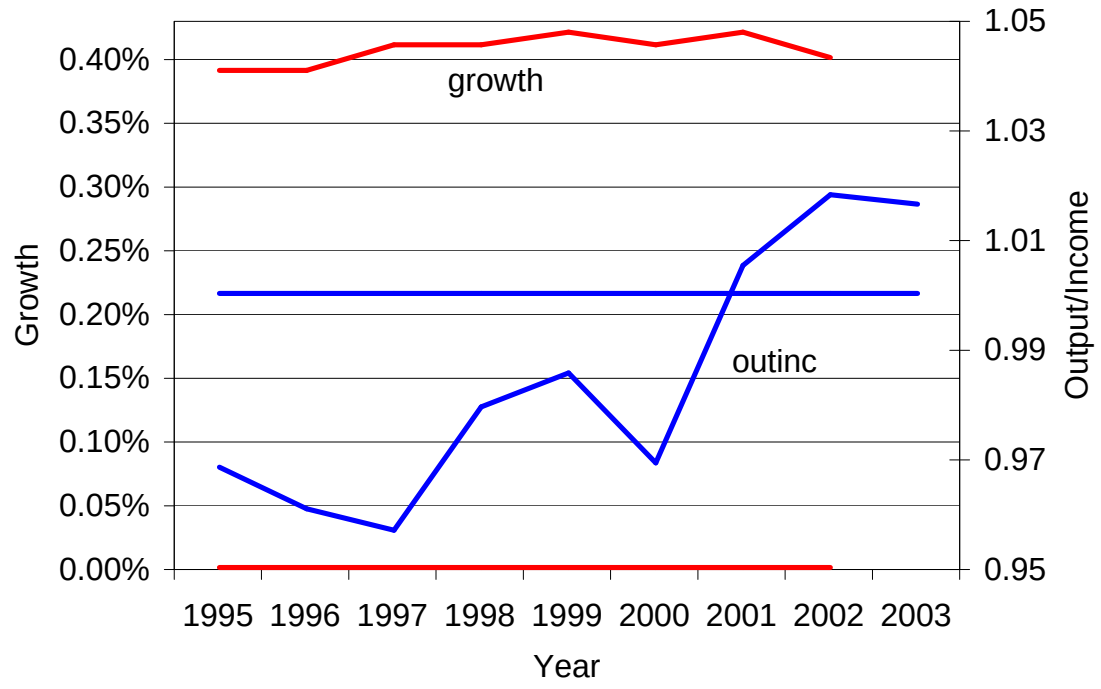

Figure 2b: Westösterreich-Austria