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Real Convergence in Malta and in the EU Countries after the Financial Crisis

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Abstract Strong economic growth after the 2008-2009 financial crisis led to a rapid rate of real convergence in Malta. This article compares Malta's real convergence process with that of other EU27 economies post-financial crisis. A growth accounting framework is used to decompose the sources of growth and convergence from a supply-side perspective. The EU evidence of convergence is mixed. Malta's convergence since 2010 was driven by a higher utilization of labor. The cross-country comparison identifies three important lessons for a country's convergence process: one, the perils associated with rapid growth driven by the accumulation of imbalances; two, the need for a flexible adjustment process following an economic shock; and three, EU and euro area memberships are no panacea for real convergence, without institutions that are conducive to technological adoption and productivity growth.

Keywords: Real Convergence, Labor Productivity, Labor Utilization, Malta, EU

JEL Classifications: E24, O40, O47, O52

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I. Introduction

Convergence, both economic and institutional, has always been a key objective of the EU project. It is also a prerequisite for increasing cohesion within the EU, especially with the New Member States (NMS) that joined since 2004, which have a lower per capita income level compared with EU15.[1)] Convergence is facilitated via access to the single market, with its competition in product markets and a common set of rules, combined with limited transfers from the EU regional policy, targeted primarily on infrastructural projects, and economic development. The process of economic convergence has however been affected by the financial crisis of 2008-2009 and the European sovereign debt crisis of 2012.

This paper documents the convergence process in Malta, the smallest EU member both in terms of gross domestic product (GDP) and population, and one of the world's most open economies, within the broader context of the real convergence process in the EU. Despite its location in a region characterized by regular political upheaval and economic distress—from

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stressed euro area economies in the north and socio-political upheavals from the Arab Spring and the Libyan refugee crisis in the south—Malta has weathered the financial crisis relatively well and has been resilient in the face of shocks.

The Maltese economy recovered strongly after the 2008-2009 crisis and was hardly affected by the sovereign debt crisis, with output returning to its pre-crisis level by the end of 2010. Annual economic growth averaged 7.2% between 2013 and 2018—the highest among all EU countries. Consequently, GDP was 60% above its 2008 level by the end of 2018. Growth was job-rich, and the rate of employment growth in Malta between 2013 and 2018 was more than four times the rate prior to the financial crisis. The unemployment rate was hardly affected by the crisis, steadily decreasing after 2011, reaching a historical low in 2018 (Micallef, 2017). This was accompanied by a sharp increase in the labor supply, driven by rising female participation rates (Micallef, 2018), and an inflow of foreign workers (Grech, 2017). The participation rate of females aged between 20 and 64 years increased from 35% in 2004 to 66% in 2018. Similarly, the share of foreign workers increased from less than 3% of the workforce at the time of EU membership (2004) to 22% in 2018 and was critical in alleviating labor shortages.

This period of strong growth led to fast convergence toward the EU's per capita income. Per capita GDP increased from 79% in 2008 to 98% in 2018—the highest among the NMS, surpassing both Italy and Spain. Few, if any, anticipated this performance especially since the Maltese economy had slowed in the 2000s (compared with a decade earlier), significantly stalling its real convergence (Grech et al., 2018).

Malta's situation contravenes other euro area countries in the region. In fact, the financial crisis has unravelled the convergence process in Europe that occurred in the preceding decade. Just before the crisis, a World Bank study referred to the EU as a convergence machine (Ridao-Cano & Bodewig, 2008). Seven years later, Boeri and Jimeno (2015) described the "unbearable diversion" in the EU, referring to persistent unemployment in a number of EU countries, along with economic, social, and political implications. Taking a longer-term perspective, Diaz del Hoyo et al. (2017) documented a "non-convergence trap" in a number of EU economies that started well before the crisis, mostly due to declining growth in total factor productivity. This implies that convergence (and prosperity) should not be taken for granted and that being part of a rich club with harmonized rules, policies, and institutions, like the EU, does not guarantee success.

Our article makes three contributions to the literature. First, it documents the Maltese

1) EU15 refers to the Member States in the European Union before the accession of 10 New Member States on 1 May 2004 (2 other countries joined on 1 January 2007 and another one on 1 July 2013). The EU15 is comprised of the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom. The NMS refers to: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

experience, which registered the strongest economic growth rate among the NMS after the 2008-2009 crisis, despite its relatively high initial GDP per capita. Malta is rarely included in EU cross-country comparisons because of its small size and data limitations. Second, our paper utilizes a simple growth accounting framework to better understand the sources of convergence/divergence by decomposing GDP and per capita GDP from a supply-side perspective. To the best of my knowledge, this is the first study to apply this framework to all EU countries and not solely to the euro area or the EU15 countries. Studies that apply a similar framework rarely include the NMS that joined the EU after 2004, mostly because of data limitations, especially pre-2000. Finally, a cross-country comparison identifies lessons for a country's convergence process. The importance of these lessons become more compelling going forward as EU economies confront well-known structural challenges such as aging populations, while severe economic problems post-COVID-19, could halt the convergence process or exacerbate the divergence.

The remainder of this article is organized as follows. Section B briefly reviews the relevant literature. Section C compares EU countries in terms of GDP per capita and unemployment rates. Section D discusses the methodology, focusing on convergence testing methods, and a growth accounting framework to understand the sources of divergence. Section E presents the results, starting with aggregate EU-wide estimates of convergence, followed by country-level aggregates for both pre- and post-crisis, and finally, comparing developments in selected countries with comparable levels of development to Malta over time to identify policy lessons for a country's convergence process. Section F concludes.

II. Literature Review

Economic theory postulates that developing economies can potentially grow at a faster rate than developed ones since diminishing returns, particularly capital, are not as pronounced as in capital-rich economies. Moreover, developing economies can adopt and replicate the production methods, technologies, and institutions of developed countries, leading to faster economic growth.

The growth literature distinguishes between two types of convergence: beta convergence and sigma convergence (Barro & Sala-i-Martin, 2004). Beta convergence holds that poor countries should grow faster than rich ones and therefore will gradually catch up. Beta convergence is estimated via univariate cross-country regression of per capita income growth. A negative sign of the estimated coefficient indicates absolute beta convergence, suggesting that countries at a lower initial income grow faster. Sigma convergence assumes a reduction in the dispersion of per capita GDP among different countries. Beta convergence is necessary but not sufficient for sigma convergence.

The hypothesis that poor countries tend to grow faster than rich ones, without conditioning on the characteristics of the economy—known as absolute beta convergence—is rejected empirically (Barro & Sala-i-Martin, 1990; Rodrik, 2011). This is due to pre-requisites for countries to benefit from catch-up growth, such as the ability to absorb new technologies, attract foreign capital, and participate in global trade (Abramovitz, 1989). Conditional (or club) convergence is more supported by the data (Galor, 1996). The former specifies that long-run growth is determined by country-specific structural characteristics, whereas the latter assumes that a group of countries tend to have similar growth trajectories. Hence, conditional convergence depends on policies, institutions, and other country-specific characteristics such as the savings rate, demographics, and foreign aid (Diaz del Hoyo et al., 2017; Rodrick, 2011).

The literature has empirically tested the convergence hypothesis using time series and cross-sectional data. Baumol (1986) used historical analysis spanning almost a century and found convergence in real income only among advanced economies but less so among developing ones. Similarly, Barro and Sala-i-Martin (1990) found evidence of convergence for U.S. states, but their findings can be reconciled quantitatively with neoclassical models only if diminishing returns to capital are assumed to occur very slowly. They argued that the neoclassical theories that fit the data refer either to the neoclassical growth model with broadly defined capital (including, for example, human capital, as in Mankiw et al. 1992) or the endogenous growth model with constant returns and the gradual diffusion of technology across countries.

Evidence of convergence in Europe is mixed. Adopting a long-run perspective starting from the 1960s, Diaz del Hoyo et al. (2017) found evidence of beta convergence in per capita income growth among the euro area countries until the 2008-2009 financial crisis, after which countries diverged. A similar pattern is observed for sigma convergence. However, the literature documents that some euro area countries have exhibited a “non-convergence trap” (Aghion & Bircai, 2017) that started well before the introduction of the euro currency. This non-convergence trap occurs when “an economy does not progress from growth driven by accumulation of capital to growth led by innovation, then it stops converging towards the technology frontier” (Diaz del Hoyo et al., 2017, p. 61). This process is evidenced by the decline in the growth rate of total factor productivity—a key contribution for this reversal of the convergence process in some euro area countries.

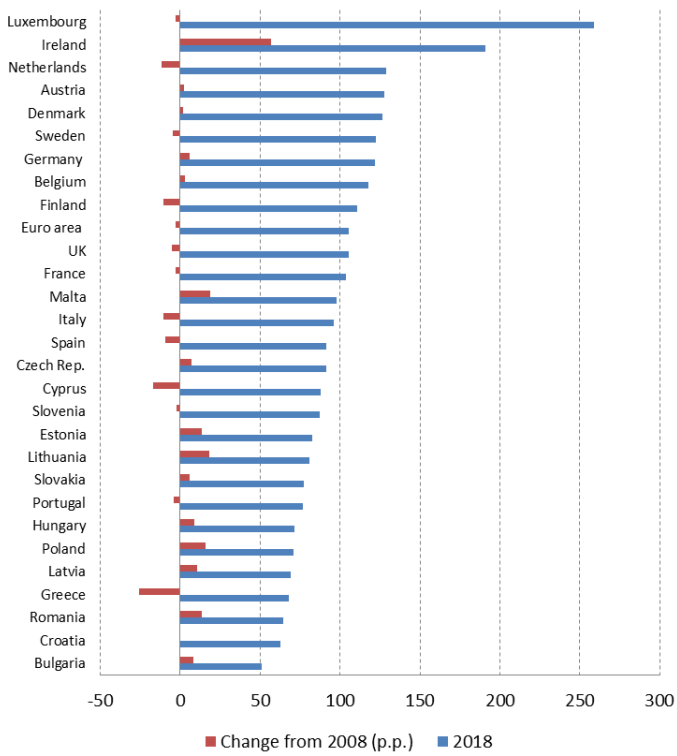
III. Heterogeneity in EU Countries

International comparisons of per capita GDP must be expressed in a common currency and adjusted for differences in price levels. Not to do so overestimates GDPs for countries with high price levels relative to countries with low price levels. GDP per capita is therefore defined

in purchasing power standard (PPS), a common currency that eliminates price level differences between countries, therefore allowing for a meaningful inter-country comparison of GDP.

Substantial differences in income levels exist between EU countries. Because of its particular characteristics, Luxembourg has by far the highest GDP per capita: 259% of the EU average in 2018. Income per capita in Ireland, the Netherlands, Austria, Denmark, Sweden, and Germany exceeds 120% of the EU average. At the other end, the three latest EU members—Bulgaria, Romania, and Croatia—have the lowest per capita income. (More generally, the NMS joining after 2004 rank at the lower end.) Greece has the lowest GDP per capita among the EU15 countries, at 68% of the EU28 in 2018. This country was severely affected by the 2008-2009 financial crisis, its GDP per capita collapsing by 25.5 percentage points from 2008 levels. Malta is the best performer among the NMS, with a GDP per capita of 98% of the EU average in 2018, compared to 80% in 2004.

Figure 1. 2018 GDP per capita in PPS (EU28 = 100)

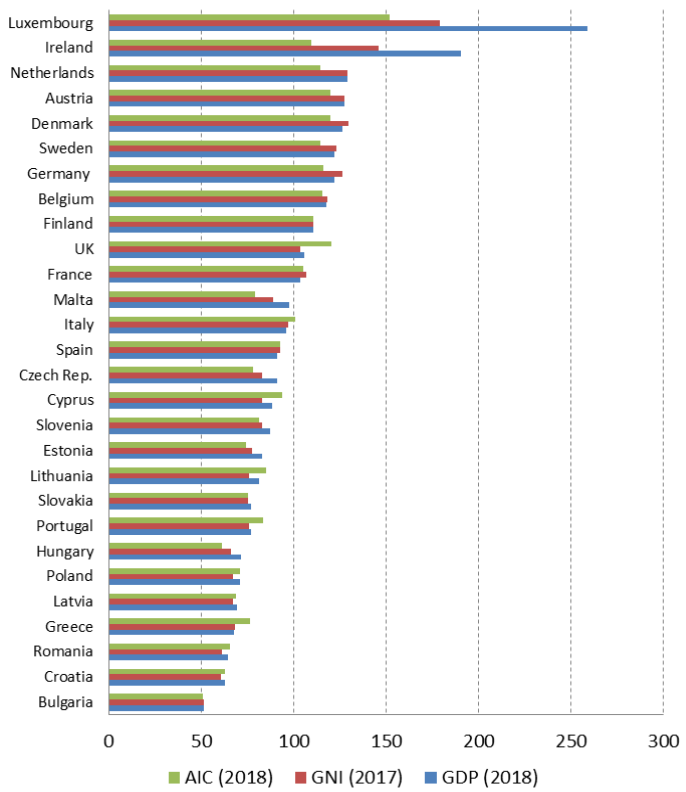


(Source) Author's calculations

Cross-country comparisons must be treated with caution. Specifically, since GDP is an indicator of economic activity, gross national income (GNI) accounts for net income receipts from abroad. Although for most countries the two measures are broadly similar, GNI per capita

in Luxembourg and Ireland is substantially lower compared with per capita GDP (see Figure 2). The former is due to the large banking sector, whereas the latter is due to the presence of multinational companies that have an incentive to report their profits in Ireland for tax purposes. In 2017, GNI per capita in PPS decreased to 179% of the EU average in Luxembourg (compared with 259% with GDP) and to 146% in Ireland (compared with 183% with GDP). Despite these changes, Luxembourg and Ireland still retain first and second places in terms of GNI per capita among the EU countries. Similarly, compared with GDP, an indicator based on actual individual consumption (AIC) might better describe the material welfare of households. Although substantial differences exist across the EU28, AIC per capita is more homogeneous than GDP. Luxembourg has the EU's highest AIC per capita. At 52% above the EU average, however, the Luxembourg difference is much less compared with GDP. One reason is that cross-border workers contribute to GDP in Luxembourg while their consumption expenditures are recorded in their home country. After Luxembourg, the EU member states with the highest AIC per capita are Denmark, Austria, and Germany. Malta's AIC, at 79% of the EU average, is significantly lower than its GDP per capita.

Figure 2. Alternative per capita measures of output, income, and consumption (EU28 = 100)



(Source) Eurostat, various years

Despite these differences, the remainder of this article utilizes GDP, which is the most commonly used, standard in the literature. Figure 3 summarizes the convergence of each EU country during the period 2008-2018. This period starts before the crisis, incorporates both the financial crisis and the sovereign debt crisis of 2012, and the recovery since. Figure 3 is divided into four quadrants, depending on the country's initial level of per capita income in 2008 vis-à-vis the EU average and the average change in GDP per capita during this period.

Countries in the upper left quadrant include countries with a GDP per capita lower than the EU average in 2008 but still having recorded a lower growth rate than the EU average over the period 2008-2018. These four countries—Greece, Croatia, Portugal, and Slovenia—have thus *diverged from below*. All countries in this quadrant have been severely affected by the financial crisis or the sovereign debt crisis. Among the GDP components, investment in this group of countries was particularly affected and, in 2018, remained between 23% and 53% less compared with pre-crisis levels, with Greece being the most severely affected. Besides being an important driver of the business cycle, investment decisions also affect the capital stock and therefore the economy's potential growth.

Figure 3. Convergence and divergent paths in EU countries

		GDP per capita, 2008	
		Lower than EU28	Higher than EU28
Change in GDP per capita, 2008-2018	Lower than EU28	GR, HR, PT, SL	ES, FR, IT, CY, LU, NL, FI, SW, UK
	Higher than EU28	BG, CZ, EE, LV, LT, HU, MT, PL, RO, SK	BE, DK, DE, IE, AT

Divergence from below	Convergence from above
Convergence from below	Divergence from above

(Source) Author's calculations

The lower left quadrant includes countries with a lower income level than the EU average in 2008 but registering above-average growth rates during the sample period. This category, which consists of 10 out of the 13 NMS that joined the EU after 2004, has *converged from below*.

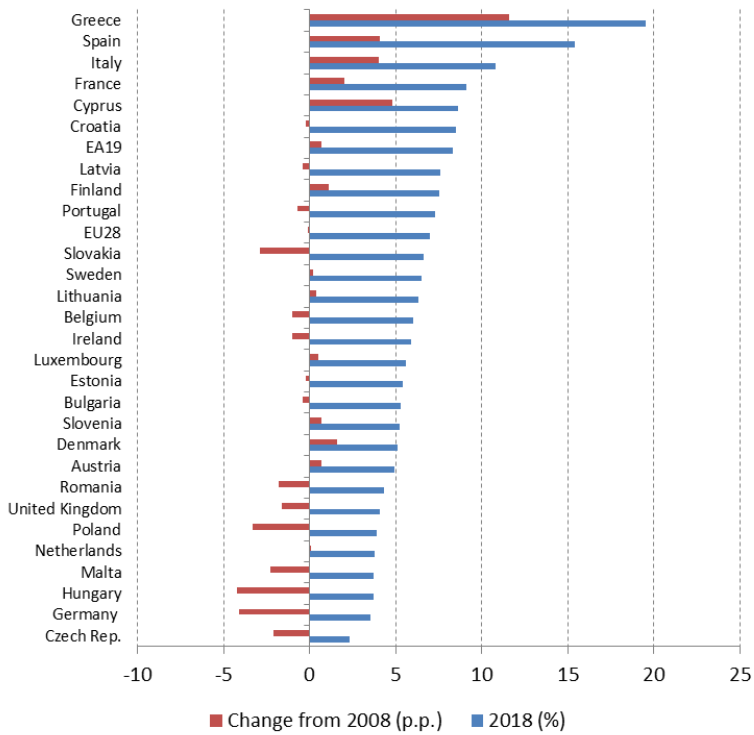
The upper right quadrant includes countries with income levels higher than the EU average in 2008 but which have registered a decline in GDP per capita during the sample period. This category includes nine countries from EU15 as well as Cyprus, which joined in 2004. This group, which has *converged from above*, is quite heterogeneous. For example, two countries—Spain and Cyprus—have registered rapid growth in the pre-crisis period, even exceeding the EU income levels; however, they were both severely affected by the crisis, which led to the

unravelling of convergence. In 2018, their GDP per capita was 91% and 88%, respectively. In Italy, the decline in income levels started long before the crisis. Italy's per capita GDP declined from 124% of the EU28 average in 1995 to 107% in 2008, and decreasing post-crisis reached 96% in 2018.

The lower right quadrant includes countries that, despite having GDP per capita levels higher than the EU average in 2008, registered above-average growth rates during the sample period. The five countries in this quadrant have *diverged from above:* Belgium, Denmark, Germany, Austria, and Ireland.[2)]

The divergence among EU countries is mostly visible from labor market developments. Figure 4 plots the unemployment rates in EU countries in 2018 and differences compared with the pre-crisis level. Three countries—Greece, Spain, and Italy—still have double-digit unemployment rates. In Greece, the 2018 unemployment was more than 11 percentage points higher compared with the pre-crisis, whereas in Spain, Italy, and Cyprus, it is more than 4 percentage points higher. At the other end, six countries—the Czech Republic, Germany, Hungary, Malta, the

Figure 4. EU unemployment rates



(Source) Eurostat, author's calculations

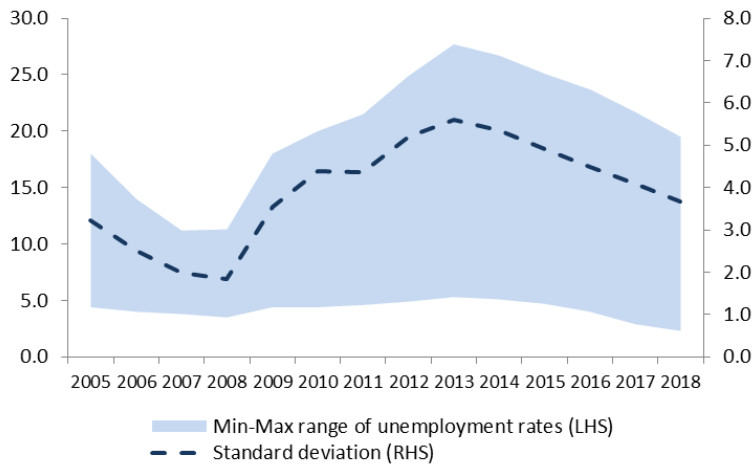
2) The Irish performance is affected by its extraordinarily high growth rate registered in 2015.

Netherlands, and Poland—had an unemployment rate below 4% in 2018. In five of these six countries, the 2018 unemployment rate ranged between 2 and 4 percentage points lower compared with 2008 levels.

Figure 5 plots the range of unemployment rates in EU countries from 2005. Prior to the crisis, the rates had converged substantially, with the difference between the highest and lowest rates in the EU declining to 7.4 percentage points in 2007. The crisis has, however, widened the gap to more than 20 percentage points between 2013 and 2015—the years of "unbearable divergence" in unemployment rates in Europe (Boeri & Jimeno, 2015). Since then, the gap has declined slightly: at 17 percentage points in 2018, although more than double the range before the crisis. The standard deviation of the unemployment rates in Europe, which measures the dispersion of these rates among countries, follows a similar pattern.

For youth unemployment[3], the rates were more pronounced. For example, in 2014, Greece and Spain had youth unemployment rates exceeding 50%, whereas in Croatia and Italy, it surpassed 40%. Like the overall unemployment rate, the labor market for youths has improved since the peaks years although, by 2018, seven EU countries still recorded a youth unemployment rate above 20%.

Figure 5. Divergence of EU unemployment rates



(Source) Author's calculations

IV. Methodology

The methodology utilized in this paper relies on multiple levels of analysis. It starts with

3) The age bracket for youth unemployment is between 15 and 24 years.

aggregate EU-wide conventional measures of convergence, with a distinction between EU15 and the NMS. This is followed by a growth accounting framework applied to all EU countries to analyze the sources of growth from a supply perspective and to decompose the sources of convergence/divergence.

A. Aggregate measures of convergence

Following Diaz del Hoyo et al. (2017), beta convergence can be evaluated via a cross-country linear regression using ordinary least squares, with the average annual change in per capita income regressed on the initial per capita income in PPS. More formally the specification takes the following form:

$$\triangle y_{i,t,t+T} = \alpha + \beta y_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $\triangle y_{i,t,t+T}$ refers to the average annual growth in per capita income between t and $t + T$ (approximated as log differences or $\frac{1}{T}\ln\left(\frac{y_{i,t+T}}{y_{i,t}}\right)$) and $y_{i,t}$ refers to the initial income in PPS (in logs). A priori, β is expected to be negative to comport with the convergence hypothesis, indicating that countries with a higher initial income are associated with lower subsequent per capita growth. Contrarily, a positive β suggests divergence. Furthermore, β is specified as $\frac{(1-e^{-bT})}{T}$, where b is the speed of convergence. Assuming β to be negative and solving for b yields $b = \frac{-\ln(1+\beta T)}{T}$

The literature typically analyzes the speed of convergence by computing its half-life (HL), i.e., the time it takes to reduce the disparities by half. Here, HL (in years) is calculated as $\mathrm{HL} = \frac{\ln 2}{b}$

The other measure of convergence, sigma convergence, measures dispersion. It is calculated by the standard deviation of per capita incomes in PPS of the countries in the sample. These values are subsequently plotted over time, with a negative slope implying a reduction in the dispersion.

B. Country-level growth accounting framework

The above approaches provide an overall assessment of EU-wide convergence (or in selected country groupings) but do not delve into developments at the country level. To overcome this limitation, I use a simple growth accounting framework to better understand the sources of

convergence/divergence among EU countries by supply-side decomposing GDP. Similar decompositions are found in Whelan (2014), Pill and Daley (2015), and McQuinn and Whelan (2017).

An increase in GDP can be due to either of the three factors: higher productivity (defined as GDP per person), higher labor utilization (defined as the ratio of employment to the total population), or an increase in population.

$$GDP = \frac{GDP}{Employment} \chi \frac{Employment}{Population} \chi Population \tag{2}$$

GDP per capita is the product of labor productivity and labor utilization.

Labor utilization can be further decomposed into three factors:

$$\frac{Employment}{Population} = \frac{Employment}{Labor\ \ Supply} \chi \frac{Labor\ \ Supply}{Working\ \ Age\ \ Population} \chi \frac{Working\ \ Age\ \ Population}{Population} \tag{3}$$

The term $\frac{Employment}{Labor\ \ Supply}$ is the share of employment in the labor force or alternatively, $(1 - \frac{Unemployment\ \ Rate}{100})$, since an increase in the unemployment rate will reduce this ratio. The term $\frac{Labor\ \ Supply}{Working\ \ Age\ \ Population}$ is the participation rate, whereas $\frac{Working\ \ Age\ \ Population}{Population}$ captures the age structure of the population. The latter is defined as the ratio of working age population aged between 15 and 64 years to the total population.

Labor productivity can also be decomposed into two separate components, assuming constant returns to scale Cobb Douglas production function with two factor inputs, capital and labor:

$$GDP = TFP \chi\ Capital^{\ \alpha} \chi\ Employment^{\ 1-\alpha} \tag{4}$$

where TFP represents total factor productivity, whereas α and 1 − α are the share of capital and labor, respectively, in the production function. For advanced economies, the share of capital is usually assumed to be 1/3, with the remaining 2/3 going to labor. Dividing both sides of (4) by employment gives the two main components of labor productivity:

$$Labou\ \ productivity = \frac{GDP}{Employment} = TFP \chi \left(\frac{Capital}{Employment} \right)^{\alpha} \tag{5}$$

Productivity is a function of total factor productivity or the capital-to-employment ratio, also known as capital deepening.

The growth accounting framework is derived by substituting equations (3) and (5) into (2):

$$GDP = \left\{ TFP \chi \left(\frac{Capital}{Employment} \right)^{\alpha} \right\} \chi \left\{ \frac{Emp}{Lab.Supply} \chi \frac{Lab.Supply}{WAP} \chi \frac{WAP}{Population} \right\} \chi Population \quad (6)$$

The growth rate of GDP is equal to the sum of the growth rate of the individual components, whereas the level of GDP is obtained by the product of these terms.

This framework can also be used to decompose per capita GDP in PPS. In this case, nominal rather than the real GDP is used, with the PPS index as the deflator.

C. Data

All data were sourced from Eurostat; the only exception was capital stock, which was obtained from the AMECO database. Missing data, mostly for the mid-1990s for some NMS, were in turn sourced from the respective IMF Article IV country reports. Data are in annual frequency, covering the period 1995-2018.

V. Results

A. Aggregate EU-wide estimates of convergence

Table 1 presents the regression results for beta convergence as in Eq. (1). The estimates are computed for three groupings: the entire EU28, the EU15, and the NMS. Moreover, the results are computed for both the full sample (1995-2018) and for two sub-samples: one prior to the financial crisis (1995-2007), and the other, post-crisis, (2010-2018). The table also presents estimates of the speed of convergence (b) and its half-life associated.

Regression estimates in the first panel of Table 1 indicate that EU countries have converged during the sample period and in the two sub-periods, since a statistically significant β coefficient is obtained. Assuming these countries are similar in terms of their steady-state characteristics, the speed of convergence is estimated at 0.031 for the entire sample, with an associated half-life of 23 years, meaning 23 years are needed to reduce the gap in real income per capita by half. Estimates of this half-life increased to 30 years when restricting the sample to the post-crisis period (2010-2018) reflecting the increased heterogeneity across countries post-crisis. Upon further inspection, however, this absolute beta convergence was entirely driven by the NMS, whereas EU15 estimates indicate that this group actually diverged rather than converged. In fact, the β for the EU15 is positive in all periods, although in some cases, it is not statistically significant. Contrarily, the estimate of β is negative and statistically significant for the NMS

Table 1. Estimates of beta convergence

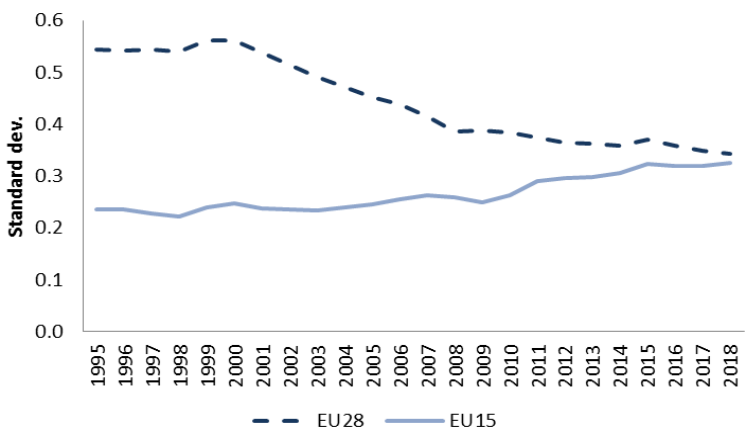
	α	β	R2	T	b	Half-life
EU28						
1995-2018	0.242 ***	-0.022 ***	0.63	23	0.031	23
1995-2007	0.286 ***	-0.024 ***	0.51	12	0.028	24
2010-2018	0.239 ***	-0.021 ***	0.20	8	0.023	30
Eu15(*)						
1995-2018	-0.055	0.009 *	0.23 ^	23	-0.008	-
1995-2007	0.027	0.002	0.00 ^	12	-0.002	-
2010-2018	-0.127 *	0.014 **	0.30	8	-0.013	-
NMS12						
1995-2018	0.332 ***	-0.032 ***	0.79	23	0.058	12
1995-2007	0.402 ***	-0.038 ***	0.52	12	0.051	14
2010-2018	0.444 **	-0.041 **	0.42	8	0.050	14

(Notes) (i) Significance level: *** at 1%; ** at 5%; * at 10%
(ii) ^ indicates F-test not significant at 5% level
(iii) (*) excludes Ireland.
(Source) Author's calculations

over the entire sample and the two sub-periods. Half-life estimates suggest that it takes 12-14 years for this group to reduce their gap in per capita income by half.

Figure 6 illustrates the evolution of sigma convergence for the EU28 and the EU15 during the period 1995-2018. Two results stand out. First, the main trend among the EU28 is a declining standard deviation of per capita income, especially after 2000. This has been driven by the NMS joining after 2004, which have recorded higher growth rates than the EU15. Second,

Figure 6. Sigma convergence in EU countries: 1995-2018



(Source) Author's calculations

the pace of the reduction of income dispersion has slowed after the crisis. This can be observed by the flattening of sigma convergence for the EU28 countries starting after 2009. Contrarily, in the EU15, the sigma convergence has reversed since the start of the crisis, driven by the considerable heterogeneity observed within this group, with a number of countries severely affected by the financial crisis and the European sovereign debt crisis, widening dispersion in per capita incomes.

B. Country-level developments

This section investigates country-level developments using our growth accounting framework. Two separate exercises are used. The first uses the neoclassical framework to decompose the GDP growth into its supply-side components. This will elucidate the sources of the low-growth environment in most EU countries after the crisis, and its difference from the pre-crisis. The second exercise uses a variant of this framework to decompose GDP per capita in EU countries vis-à-vis the EU28 average.

1. Supply-side sources of growth

Table 2 lists the decomposition of GDP growth for all EU countries, as well as the overall EU and euro area averages, post-crisis. For comparison purposes, Table 3 displays the decomposition for the decade prior to the financial crisis (1997-2007).

At 5.7%, Malta had one of the highest growth rates post-crisis. All three main components—labor productivity, labor utilization, and population growth—contributed, although not to the same extent. The largest contributor was labor utilization, mostly due to a higher participation rate. Malta's female participation rate increased from 40% in 2008 to 64% in 2018 because of measures to attract more females to the labor market such as free childcare, longer schooling hours, longer maternity leave, and tax incentives (Micallef, 2018). The decline in the unemployment rate has also contributed to higher labor utilization, whereas the age structure of the population contributed negatively, reflecting an aging domestic population. The contribution of population growth, which averaged 1.8% during this period, is the second highest among EU countries. This reflects the influx of foreign workers, which increased from less than 3% of the workforce in 2004 to 22% in 2018. This inflow was concentrated on both ends of the skill spectrum and was crucial to overcome Malta's labor shortages (Grech, 2017). Finally, since 2010, labor productivity increased on average by 1.3% per annum. Productivity was entirely driven by an increase in total factor productivity, which as illustrated in Micallef and Ellul (2016), has recovered strongly after the crisis following a trend decline from the 1990s. Contrarily, capital deepening contributed negatively to growth as the increase in investment lagged behind strong employment growth. This finding comports with Rapa and Rapa (2019), who documented a

significant infrastructure gap in Malta.

Notable differences emerge when comparing Malta's post- and pre-crisis performance. In fact, Malta and Germany are the only two EU28 countries with a post-crisis growth higher than its pre-crisis growth. All three components have contributed to this difference. The major difference comes from labor utilization, which did not contribute anything pre-crisis. The

Table 2. Supply-side decomposition of GDP growth (2010-2018)

	GDP	Labor Prod.	Capital deepening	TFP	Labor utilization	1-Unr	Particip. rate	Share of working age pop.	Pop.
	1=2+5+9	2=3+4	3	4	5=6+7+8	6	7	8	9
EU28	1.6%	1.1%	0.2%	0.9%	0.3%	0.2%	0.5%	−0.5%	0.2%
EA19	1.4%	0.9%	0.1%	0.8%	0.3%	0.2%	0.4%	−0.3%	0.2%
Belgium	1.6%	0.7%	0.2%	0.6%	0.2%	0.2%	0.4%	−0.4%	0.6%
Bulgaria	2.2%	2.9%	1.1%	1.8%	0.2%	0.2%	0.5%	−0.5%	−0.8%
Czech Rep.	2.3%	1.4%	0.3%	1.2%	0.7%	0.5%	1.2%	−1.0%	0.1%
Denmark	1.6%	1.1%	0.2%	0.9%	−0.1%	0.1%	0.1%	−0.3%	0.5%
Germany	2.1%	1.1%	−0.1%	1.2%	0.7%	0.5%	0.6%	−0.4%	0.3%
Estonia	3.6%	2.4%	0.7%	1.6%	1.4%	1.0%	1.0%	−0.6%	−0.1%
Ireland	6.4%	4.9%	0.1%	4.8%	0.6%	0.9%	0.2%	−0.5%	0.8%
Greece	−2.4%	−1.0%	0.2%	−1.1%	−1.1%	−1.1%	0.4%	−0.4%	−0.4%
Spain	0.9%	0.9%	0.3%	0.6%	−0.1%	0.4%	0.0%	−0.4%	0.1%
France	1.4%	0.8%	0.3%	0.5%	0.1%	0.0%	0.2%	−0.1%	0.4%
Croatia	0.8%	1.4%	0.9%	0.6%	−0.1%	0.1%	0.0%	−0.2%	−0.5%
Italy	0.2%	0.1%	0.0%	0.2%	0.0%	−0.3%	0.5%	−0.2%	0.2%
Cyprus	1.0%	0.5%	0.4%	0.0%	−0.3%	−0.3%	0.2%	−0.2%	0.8%
Latvia	2.6%	2.5%	−0.3%	2.8%	1.3%	1.3%	0.8%	−0.8%	−1.2%
Lithuania	3.4%	2.9%	0.8%	2.1%	1.9%	1.0%	1.4%	−0.5%	−1.3%
Luxembourg	3.2%	0.8%	0.3%	0.5%	0.1%	0.0%	−0.2%	0.3%	2.3%
Hungary	2.5%	0.5%	0.0%	0.5%	2.3%	0.8%	1.9%	−0.4%	−0.3%
Malta	5.7%	1.3%	−0.3%	1.6%	2.5%	0.4%	2.4%	−0.3%	1.8%
Netherlands	1.4%	0.8%	0.2%	0.6%	0.1%	0.1%	0.5%	−0.4%	0.5%
Austria	1.6%	0.7%	0.2%	0.5%	0.2%	0.1%	0.3%	−0.2%	0.6%
Poland	3.5%	3.1%	1.3%	1.8%	0.5%	0.5%	1.0%	−1.0%	0.0%
Portugal	0.6%	0.7%	−0.1%	0.8%	0.2%	0.4%	0.1%	−0.4%	−0.3%
Romania	3.0%	3.9%	1.3%	2.5%	−0.3%	0.2%	0.6%	−1.1%	−0.5%
Slovenia	1.7%	1.2%	−0.3%	1.5%	0.4%	0.1%	0.9%	−0.7%	0.2%
Slovakia	3.1%	2.2%	0.1%	2.1%	0.9%	0.7%	0.7%	−0.5%	0.1%
Finland	1.2%	0.7%	0.2%	0.5%	0.2%	0.1%	0.7%	−0.7%	0.4%
Sweden	2.7%	1.2%	0.2%	1.0%	0.4%	0.2%	0.7%	−0.5%	1.0%
UK	1.9%	0.7%	0.1%	0.6%	0.5%	0.4%	0.5%	−0.4%	0.7%

(Source) Author's calculations

components of labor utilization have also inverted compared with the 2010-2018 period. Both the unemployment rate and the participation rate contributed negatively, whereas the age structure was still contributing positively as the aging effects had not yet kicked in. Second, the contribution of population growth was only a third of that post-crisis. The contribution from population pre-crisis was mostly due to the natural increase in the local population, whereas

Table 3. Supply-side decomposition of GDP growth (1997-2007)

	GDP	Labor Prod.	Capital deepening	TFP	Labor utilization	1-Unr	Particip. rate	Share of working age pop.	Pop.
	1=2+5+9	2=3+4	3	4	5=6+7+8	6	7	8	9
EU28	2.6%	1.6%	0.4%	1.2%	0.7%	0.3%	0.4%	0.1%	0.3%
EA19	2.4%	1.0%	0.3%	0.7%	1.0%	0.3%	0.6%	0.0%	0.4%
Belgium	2.6%	1.5%	0.2%	1.2%	0.7%	0.2%	0.6%	0.0%	0.4%
Bulgaria	2.6%	2.2%	1.0%	1.2%	1.1%	0.3%	0.7%	0.2%	−0.8%
Czech Rep.	3.3%	3.4%	0.9%	2.6%	−0.1%	−0.1%	−0.4%	0.4%	0.0%
Denmark	2.2%	1.4%	0.4%	1.0%	0.4%	0.2%	0.3%	−0.2%	0.3%
Germany	1.6%	1.1%	0.3%	0.8%	0.6%	0.0%	0.6%	−0.1%	−0.1%
Estonia	7.4%	6.8%	2.4%	4.3%	1.1%	0.5%	0.1%	0.5%	−0.5%
Ireland	7.0%	2.7%	0.5%	2.3%	2.3%	0.6%	1.0%	0.7%	1.8%
Greece	4.0%	2.6%	0.4%	2.2%	1.0%	0.1%	0.5%	0.4%	0.4%
Spain	3.8%	0.0%	0.2%	−0.2%	2.7%	1.1%	1.3%	0.3%	1.2%
France	2.4%	1.2%	0.3%	0.9%	0.5%	0.3%	0.2%	0.1%	0.6%
Croatia	4.0%	3.0%	1.0%	2.0%	1.5%	0.0%	1.2%	0.4%	−0.5%
Italy	1.5%	0.2%	0.2%	0.1%	1.0%	0.5%	0.8%	−0.4%	0.3%
Cyprus	4.5%	2.0%	0.8%	1.2%	1.1%	0.1%	0.1%	0.9%	1.4%
Latvia	7.9%	6.6%	0.3%	6.3%	2.2%	1.0%	0.9%	0.3%	−1.0%
Lithuania	6.8%	7.1%	1.7%	5.3%	0.8%	0.4%	0.2%	0.2%	−1.0%
Luxembourg	5.2%	3.3%	0.5%	2.8%	0.4%	−0.1%	0.7%	−0.2%	1.4%
Hungary	3.7%	3.0%	0.9%	2.1%	1.0%	0.2%	0.5%	0.2%	−0.2%
Malta	3.2%	2.6%	0.9%	1.7%	0.0%	−0.1%	−0.3%	0.5%	0.6%
Netherlands	2.9%	1.5%	0.3%	1.2%	0.9%	0.3%	0.7%	−0.1%	0.5%
Austria	2.6%	1.7%	0.5%	1.2%	0.6%	0.0%	0.6%	0.0%	0.4%
Poland	4.5%	4.3%	1.1%	3.1%	0.2%	0.4%	−0.8%	0.6%	0.0%
Portugal	2.3%	1.3%	0.8%	0.5%	0.5%	−0.1%	0.6%	0.0%	0.4%
Romania	3.5%	5.2%	1.1%	4.0%	−0.8%	0.1%	−1.5%	0.7%	−0.7%
Slovenia	4.4%	3.7%	1.2%	2.5%	0.5%	0.2%	0.3%	0.0%	0.1%
Slovakia	5.1%	4.5%	1.1%	3.3%	0.5%	0.0%	−0.2%	0.7%	0.0%
Finland	4.0%	2.3%	0.1%	2.2%	1.4%	0.8%	0.6%	0.0%	0.3%
Sweden	3.4%	2.2%	0.2%	2.0%	0.9%	0.5%	0.2%	0.3%	0.3%
UK	3.1%	1.9%	0.3%	1.7%	0.6%	0.3%	0.3%	0.1%	0.5%

(Source) Author's calculations

after 2010, immigration became population's main driver. Finally, the contribution of capital deepening was much stronger in the pre-crisis period, owing to both a higher investment rate and a slower rate of employment growth.

Almost all EU countries registered slower average growth post-crisis. GDP growth in the EU and euro area averaged 1.6% and 1.4%, respectively, post-crisis, significantly lower than the 2.6% and 2.4% pre-crisis. Labor utilization was the most severely affected, mostly because of an aging population, which resulted in a declining share of the working age population. Similarly, the contribution of population growth has almost halved, from 0.3% to 0.4% pre-crisis to 0.2% post-crisis. Most of the labor productivity decline is driven by capital deepening, reflecting reduced investment post-crisis. The latter could be explained by a combination of subdued demand, heightened uncertainty, and tighter financing conditions (ECB, 2017).

The degree of growth slowdown differs considerably across the EU28. Countries heavily affected by the financial crisis or the European sovereign debt crisis, such as Greece, Spain, Cyprus, and Slovenia recorded the largest slowdown. The Baltic countries also experienced a marked slowdown between the two periods. In the Baltics, the boom pre-crisis was associated with fast credit growth, whereas the onset of the financial crisis limited the availability of foreign capital, pushing these countries into a severe recession (Martin, 2010). Despite this slowdown, the average growth rate registered by the Baltic countries post-crisis still surpassed that of the EU, reflecting their flexible labor market (Fabiani et al., 2015) and thus resuming convergence. Country-specific factors in Finland, such as developments in the semi-conductor and paper industries, explain its sharp growth slowdown. Contrarily, Germany's increase in average GDP growth is entirely due to population growth (reflecting significant immigration), as the contributions from productivity and utilization are broadly similar between the two periods.

2. Decomposition of GDP per capita in PPS relative to EU28

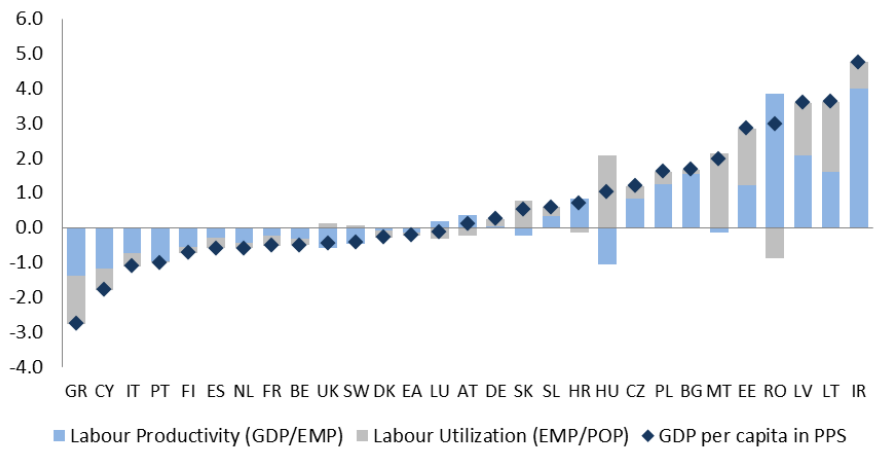
The second exercise decomposes each country's average annual change in per capita GDP in PPS compared with the EU average for the period 2010-2018. For this analysis, some minor changes are necessary from the neoclassical framework discussed above. Particularly, the GDP series refers to nominal GDP in millions of the national currency, with the purchasing power parity index as the price deflator. Because of scaling effects, labor productivity cannot be decomposed further, but labor utilization is still decomposed into its three main components.

Figure 7 decomposes GDP per capita in PPS into the contributions of labor productivity and utilization for the EU28. The speed of convergence depends on whether the movements in the two components of per capita GDP—labor productivity and utilization—cumulate or offset. Except for Ireland, the largest gains in per capita GDP were obtained by the NMS. The convergence process in the NMS was mostly driven by labor productivity, but in Malta's case, it was entirely driven by labor utilization (Micallef, 2016a).

At the other end, Greece, Cyprus and, to a lesser extent, Italy, and Portugal are the biggest losers, with an average decline in GDP per capita exceeding 1% per annum. The decline in Italy, Portugal, and Cyprus was mainly driven by labor productivity, whereas both productivity and utilization contributed almost equally in Greece.

Focusing more specifically on Malta, its productivity level was already relatively high compared with the EU average pre-crisis, much more than the other NMS. For example, Malta's labor productivity was 95% of the EU average in 2000, whereas in the Baltic countries, it was between 47% and 54%. Hence, it is only natural that in catching-up countries productivity would play a much more important role in closing the gap with the EU. In other words, the Balassa-Samuelson effect was more pronounced in the NMS compared with Malta. By 2018, the productivity level in the Baltics (PPP adjusted) ranged between 69% and 76% of the EU average, whereas in Malta, it has remained at 94%. Hence, this gap has not narrowed since 2000 (nor since 2010, which remained at 95%), which explains the slightly negative contribution of labor productivity in Figure 7.

Figure 7. Labor roductivity and utilization
Annual percentage change vis-à-vis EU28: 2010-2018



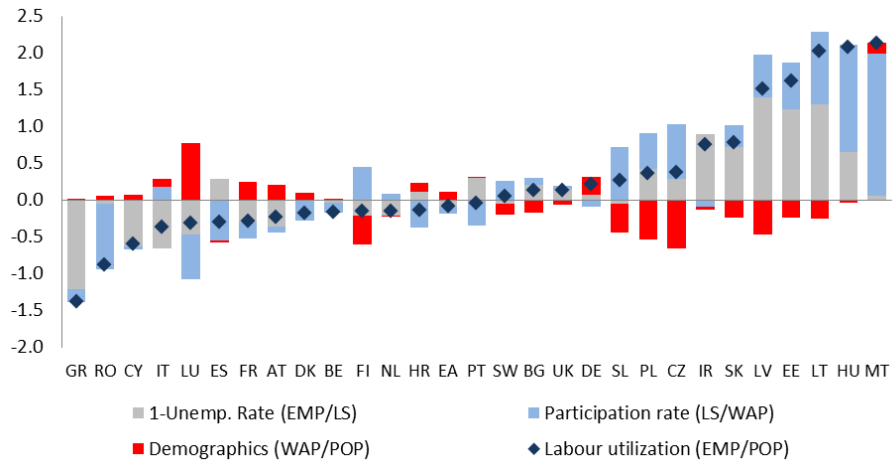
(Source) Author's calculations

Figure 8 decomposes labor utilization into the effects of demographics, the participation rate, and the unemployment rate. The largest gains in labor utilization were by Malta, Hungary, and the Baltic countries. In Malta, most of the gains were due to higher participation rates, mostly females (Grech, 2015, Micallef, 2018). In the Baltic countries, most of the contribution came from the reduction in the unemployment rate from the relatively high post-crisis levels, followed by an increase in the participation rate. However, whereas in Malta, the age structure of the population contributed positively to convergence, it contributed negatively in the three

Baltic countries, reflecting their aging societies. Demographics in these countries are also affected by low fertility rates and significant outward migration of the younger population (IMF 2019). Adverse demographics were also recorded in the Czech Republic, Poland, Slovenia, and Slovakia.

At the other end is Romania, Greece, Cyprus, and Italy—countries most severely affected by the crisis. This deterioration is mainly driven by the increase in the unemployment rate post-crisis.

Figure 8. Decomposition of labor utilization
Annual percentage change vis-à-vis EU28: 2010-2018



(Source) Author's calculations

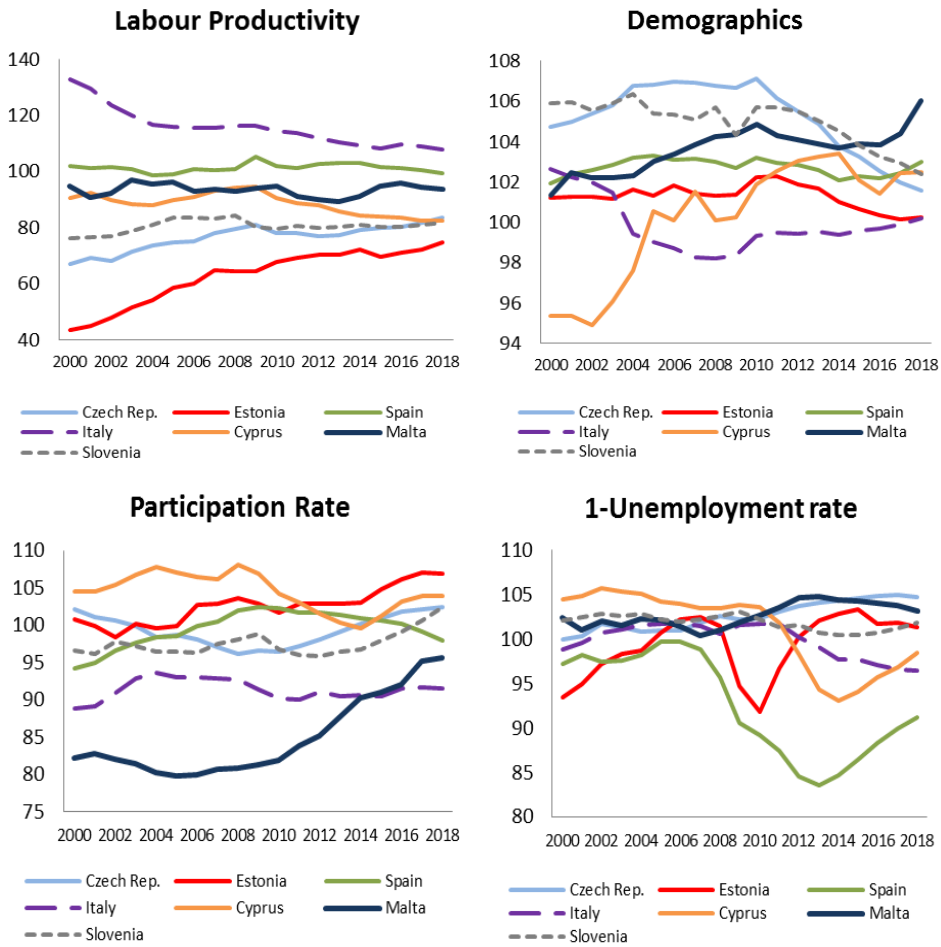
3. A closer look: the divergent paths of countries

The static analysis in the previous section hides the evolution of the key variables during the crisis, as well as the boom-bust dynamics observed. To elucidate, I now compare the development in Malta's convergence with the Czech Republic, Cyprus, Slovenia, and Estonia—four NMS with a broadly similar level of development. In 2018, their GDP per capita (PPS) ranged from 83% to 98% of the EU average. Two of the EU15 countries—Italy and Spain—are also included in the analysis, because of their particular paths in the convergence process. Figure 9 shows the evolution of the main components of per capita GDP—labor productivity, demographics, the participation rate, and the unemployment rate—for these countries during the period 2000-2018.

These countries can be broadly classified according to their convergence paths. The first country—Estonia—experienced rapid catching up, owing to its relatively low initial level of per capita GDP in 2000. Estonia's path was quite volatile, having been severely affected by the financial crisis, although its labor market flexibility enabled a quick recovery. The second

category—Malta and the Czech Republic—started from a higher initial level and, despite oscillations, registered a gradual catching up with the EU income level. These two countries gradually improved their per capita GDP by more than 10 percentage points since joining the EU. The third group—Cyprus and Slovenia—also started from a higher initial level, but their rapid pre-crisis increase was not sustainable, eventually adversely affected by the financial crisis, which unraveled years of convergence. Cyprus' experience was the most dramatic, with per capita GDP declining from 105% of the EU average in 2008 to 80% in 2014, before recovering to 88% in 2018.

Figure 9. Key drivers of convergence in selected EU countries (EU28 = 100)



(Source) Author's calculations

The drivers of growth in these countries also differed. The fast convergence process in Estonia was driven mainly by labor productivity because of its low initial level. The improvement

in relative labor productivity in the Czech Republic was more moderate, increasing from around 67% of the EU average in 2000 to 83% in 2018. Despite different initial levels in the early 2000s, Spain, Malta, and Slovenia had broadly stable productivity levels vis-à-vis the EU, with 2018 similar to 2000. Relative productivity levels in Cyprus were adversely affected post-crisis, whereas Italy experienced a long-term productivity decline beginning well before the financial crisis.

Differences in economic development are also driven by changes in the labor market. The improvement in Malta's per capita GDP was mainly driven by labor utilization, mostly because of the increase in the participation rate and, to a lesser extent, the decline in the unemployment rate. The immigration influx, mostly of working age, has offset the impact of an aging population and contributed positively to labor utilization. Demographics exert a particularly negative impact in the Czech Republic, Estonia, and Slovenia. Major differences are also observed with the unemployment rates, especially in countries mostly affected by the crisis such as Estonia, Cyprus, and Spain. However, whereas in Estonia, the relative unemployment bounced back to its pre-crisis level by 2012/2013, in Spain and Cyprus, the drop was more protracted and, despite the recovery, has not reached pre-crisis levels. In Italy, the relative unemployment continues to diverge from the EU, whereas its participation rate, despite its low level, has shown no signs of convergence, remaining at around 91% of the EU average since 2010.

This cross-country comparison identifies three important lessons for a country's real convergence process. The first two relates to the perils associated with rapid growth driven by the accumulation of imbalances and the need for flexibility in the adjustment process following an economic shock. Cyprus and Estonia clearly illustrate these two lessons. The third lesson is that EU and euro area membership are no panacea for real convergence in the absence of the institutions that are conducive to innovation, technological adoption, and productivity growth. The Italian case illustrates this point.

In Cyprus, the high pre-crisis growth rates and convergence process masked the build-up of unsustainable imbalances and vulnerabilities (IMF, 2014). Significant foreign inflows following the removal of capital account restrictions in 2004 led to the banking sector's rapid expansion and a credit increase that fueled a housing boom and private-sector indebtedness. Cyprus's current account deficit widened to around 16% of GDP by 2008. The financial sector became increasingly interlinked with Greece leading to an accumulation of significant Greek loans and sovereign debt.

The imbalances in Cyprus eventually culminated in the collapse of its banking sector following the restructuring of the Greek sovereign debt in 2011.[4] Cyprus requested official assistance from the EU/IMF in mid-2012, and the authorities took unprecedented measures to avoid bank runs and to stem the crisis, including the recapitalization of the banking system through bail-in of bank creditors, and the imposition of domestic and external payment

4) Cyprus' economy was also adversely affected by the explosion of the country's main power station in 2012.

restrictions. These boom-bust dynamics reversed convergence. This was driven by labor productivity following the collapse of economic activity and deterioration in utilization, mostly due to the sharp increase in the unemployment rate and the reduction in the participation rate.

Estonia was also severely affected by the crisis, but its flexible policy response led to a quick recovery. Growth before the crisis was fueled by credit, driven by large inflows of capital from Scandinavian banks, leading to a construction boom. The burst of the property bubble and the global financial crisis in 2009 led to a severe recession, with Estonia, like its Baltic neighbors, one of the most adversely affected EU countries. Its unemployment rate more than triple in 3 years, reaching 16.7% in 2010.

Estonia managed to avoid a prolonged crisis, returning quickly to growth and resuming its convergence. This was possible because of existing buffers and a determined response by both the public and the private sector. For example, the authorities had ample fiscal maneuverability following sizable fiscal reserves accumulated during the boom years and a very low level of public debt, besides swift and far-reaching adjustment measures taken in 2008 and 2009. The rapid recovery of the Estonian economy was facilitated by a relatively flexible labor market, which allowed most adjustments to occur via reductions in wages and labor (Malk, 2015).

Contrarily, the Maltese banking sector emerged relatively unscathed from the 2009 financial crisis. Despite its small size, the economy became increasingly diversified, especially toward higher value-added sectors, whereas labor market policies and reforms were successful in attracting and retaining more workers (Grech et al., 2018). Growth was not fueled by credit (Borg & Micallef, 2018) but by an increase in competitiveness causing the twin deficits (external and fiscal) to reverse (Grech, 2019). Potential GDP has accelerated substantially in recent years, returning to the growth rates of the early 1990s (Micallef, 2016b; Micallef & Ellul, 2016).

Pertaining to Italy, the decline in productivity growth began by the mid-1990s, well before the financial crisis. Italy's labor productivity declined from 137% of the EU average in 1995 to 116% in 2008 and continued downward post-crisis, reaching 108% in 2018. Typical explanations are the lack of competition and the need for product and labor market reforms (Forni et al., 2010), together with an undercapitalized banking system with high non-performing loans (Cucinelli, 2015). Other explanations include the mismatch between the country's institutions—small family firms, state-owned firms, and government-controlled banks—and the reorganization of the management and production structures necessary to capitalize on the adoption of new technologies (Bloom et al., 2012; Eichengreen, 2019). The latter argument suggests that while Italy's institutions and production structure was suited in the catch-up period of the 1970s and 1980s—channeling resources into established sectors using established techniques—it eventually became an obstacle. In mature economies, productivity growth is the key driver of convergence (Diaz del Hoyo et al., 2017).

VI. Conclusion

This paper has reviewed the convergence process in Malta within the broader context of the real convergence process in EU28 since the mid-1990s. At the EU level, evidence of beta and sigma convergence is only found when the NMS are included, whereas the EU15 countries have exhibited signs of divergence, especially after the financial crisis. At the country level, a growth accounting framework was used to explicate the sources of convergence/divergence from a supply-side perspective. Finally, we compared developments in selected countries over time that experienced different convergence paths to identify policy lessons for a country's convergence process. The latter identified three important lessons for a country's real convergence process: the perils associated with rapid growth driven by the accumulation of imbalances; the need for a flexible adjustment process following an economic shock; and the importance of having the right institutions conducive to innovation, technological adoption, and productivity growth. Going forward, the importance of these lessons becomes more compelling as EU economies deal with structural challenges such as aging populations in conjunction with tackling the severe disruptions to economic activity during and after COVID-19.

Clearly, the speed of convergence toward the EU depends on whether the movements in the two components of per capita GDP—labor productivity and utilization—cumulate or offset. For Malta, real convergence was mostly driven by a higher utilization of labor. Future convergence, however, cannot rely solely on labor utilization but must be increasingly driven by labor productivity. Failure to do so risks falling into a "non-convergence trap" that has affected some of the mature EU economies such as Italy.

The analysis raises a number of questions for further research. Four areas related to productivity seem especially appropriate in light of their importance for long-run growth.: What are the main determinants of TFP trends and cycles? Which institutions and political economy considerations are most conducive to productivity growth-enhancing reforms? What are the effects of changing demographics on productivity? And finally, what are the effects of labor market reforms, such as pension reforms or those targeted to increase the female participation rate, on labor productivity? Further research on these questions, both within and across countries, will enhance our understanding on issues that are of central importance to sustainable convergence.

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