Three decades of Convergence without Catching up

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Resumo: *Using data from 1990 until 2019, we provide new evidence that the series of GDP per capita in Portugal and in the remaining of the EU15 have a common stochastic trend. This result is suggestive of stochastic convergence and is consistent with the idea that economies sharing the same body of technological knowledge tend to approach parallel growth paths.*

Palavras chave: *Portuguese economy, economic growth, income convergence.*

1. Introduction

In the recent debate on the Portuguese economy, the period starting in the 2000s until the subprime crisis has been referred to as "the slump" (Blanchard, 2007, Reis, 2013, Blanchard & Portugal, 2017, Torres & Lebre de Freitas, 2019; Sousa Andrade & Duarte, 2011, and Simões et al., 2014 use instead the term "stagnation"). The slump followed a period of fast output growth, initiated in 1995 (the "boom"), characterized by easy credit conditions, in a context where monetary policy was subordinated to the exchange rate, and where large capital inflows fed sizeable imbalances between private sector savings and investment (Blanchard & Giavazzi, 2002, Fagan & Gaspar, 2007).

A question that arises is whether the slump reflected a temporary downturn, or it instead marked a new phase of low growth, that was specific to the Portuguese economy, and distinct from the non-catching up phase that had already been showing up since the early 1990s (Amaral, 2019). This question cannot be addressed comparing the average growth rates along 1995-2000 and 2001-2007 because these two periods correspond to different phases of the business cycle. Evidence of an idiosyncratic productivity slowdown must be assessed abstracting from productivity shocks that are temporary in nature, and from productivity shocks that are permanent in nature but equally shared in Portugal and abroad.

In this note, we investigate whether productivity innovations have impacted in Portugal and in remaining of EU15 (henceforth EU14) with the same long-run weights. Following the time series approach to convergence (for a literature review, see Durlauf et al., 2015), we test for the presence of a unit root in the series of per capita output in Portugal relative to that of the EU14. Our alternative assumption is that of "conditional convergence", whereby the long-run forecasts of per capita output differences tend to a constant as the forecasting horizon tends to infinity (Evans & Karras, 1996). For the asymptotic distribution to be reasonably approximated by the sampling distribution, we restrict the analysis to the period after 1990 (evidence of Portugal-EU convergence during the catching up phase is provided in Lebre de Freitas, 2006). We adopt EU14 as the benchmark converging club, as this is the sub-

set of the world economy more likely to share with Portugal a common pool of technological knowledge. We find that the series of relative per capita output exhibits a mean reverting behaviour along the sample period, without the need to account for structural breaks. This is suggestive of stochastic convergence.

The remaining of this note proceeds as follows: in Section 2 we describe the data used; in Section 3 we present the unit root tests; in Section 4, we briefly discuss the result.

2. Data

Figure 1 displays the evolution of Gross Domestic Product per Working Age Person (GDPWAP) in Portugal, in the EU14, and in Portugal relative to the EU14 (source details in the notes to the figure). Visual inspection indicates that, after three decades of catching up, the income gap stopped narrowing at around 1990. Since then, the series of relative GDPWAP has been drifting up and down. Our conjecture is that these fluctuations reflect an asymmetric incidence of productivity shocks over the medium run, without materializing any regime shift relative to what has been the absence of catching up that characterized the last three decades.

Figure 1: GDPWAP in Portugal, in the EU14, and in Portugal relative to EU14 (2015 PPS, logs), 1960-2020
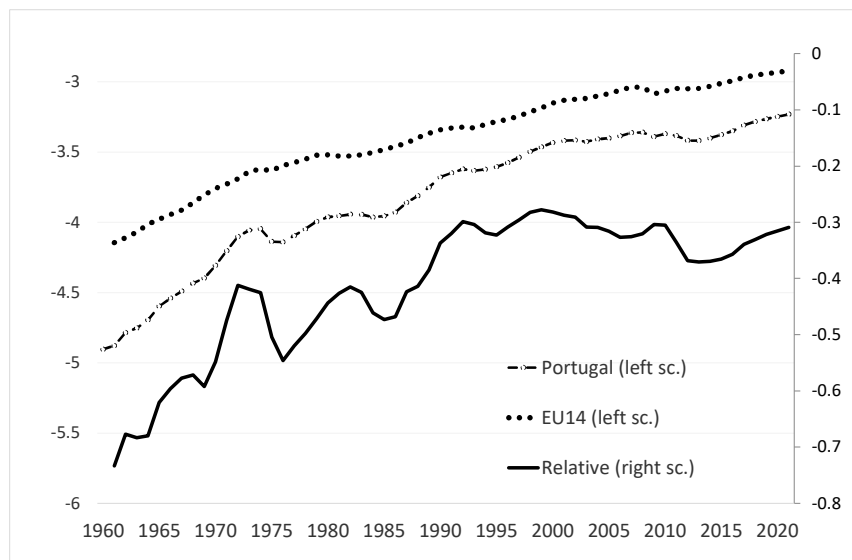
Source: Own calculations using data from European Commission's Annual Macroeconomic Database (AMECO), as of November 2019. Notes: we used GDP at 2015 reference levels (OVGD); Population from 15 to 64 years (NPAN). EU15 data prior to German Unification are interpolated combining the aggregate DU15. GDP levels are adjusted using the 2015' Purchasing Power Standard implied in the tables.

3. Result

In Table 1, we display the test results. Augmented Dickey-Fuller (ADF) tests are first performed with an intercept and, in case of no rejection, with a time trend. Considering first the test results for Portugal and the EU14 individually, we are unable to reject the null. This means that the individual time series contain a stochastic trend, in addition to eventual deterministic trends built through the accumulation of deterministic components.

When the ADF test is performed on the series of relative GDPWAP, the unit root null is rejected in favour of level stationarity, with 5% significance. This result is robust to small variations in the upper limit of the sample window. This means that cointegration eliminates both the stochastic and deterministic trends in the individual time-series. What is left is a stationary process with an estimated intercept implying a long run income differential of around 27%, at 2015 comparable prices.

Notably, our (unreported) tests reveal that stationarity vanishes when the sample window is extended backwards. Arguably, the presence of a catching up component in the years before is biasing the test in favour of the stochastic trend null, given that the alternative assumption in the current procedure is stationarity in levels.

Table 1: ADF tests on the log of GDPWAP (1990-2019)

Variable	Intercept	Intercept & Trend
EU14	0.92	1.77
Portugal	1.41	2.34
Portugal relative to EU14	3.18**	-

Notes: MacKinnon (1991) critical values for rejection of a unit root without (with) trend: 1% (***): -3.6661 (-4.2949); 5% (**): -2.9627 (-3.5670); 10% (*): -2.6200 (-3.2169). Number of observations: 30. The number of lags is determined according to the Akaike information criterion.

4. Discussion

In this note, we implemented a unit root test to investigate whether productivity innovations have been equally shared in Portugal and in the remaining of the EU15, focusing on the post-catching up phase. Due to the small number of observations, the test has little power. Still, the null is rejected in favour to the alternative of level stationarity, with 5% significance. Notably, no regime change is needed to accommodate the "slump" in the error correction representation. We estimate the long-run equilibrium income differential to be 27%, at comparable 2015 prices.

The stabilization of per capita output in Portugal relative to that of the EU average has a natural interpretation in terms of the new-classical growth model and its extensions (for instance, Klenow & Rodriguez-Clare, 2005). According to this

literature, economies sharing the same body of technological knowledge are predicted to approach parallel balanced growth paths, with the long-run income differential reflecting differences in fundamentals. Changes in fundamentals impact on the long-run equilibrium differential, giving rise to temporary episodes of catching up or of "falling behind".

In the case of the Portuguese economy, it looks like the growth surge initiated with the move towards trade openness in the early 1960s already delivered its level effect. According to this interpretation, the growth slowdown experienced by the Portuguese economy in the last three decades is not as much the result of the arrival of new distortions or of new barriers to technological adoption, but rather the absence of policy actions with energy enough to alleviate the existing barriers, in a way to make the economy relatively more attractive for production and investment. In this respect, our subjective assessment today is no different from what it was two decades ago (Lebre de Freitas, 2002): *Se tudo isto existe, nem tudo isto é triste. Mas nada disto é fado.*

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