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QUALITATIVE SURVEY DATA AND THE PERCEIVED 'NORMAL' GROWTH: EVIDENCE FOR PORTUGAL AND THE EURO-AREA

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Abstract

There is an increasing concern among analysts and policymakers that the economic growth that can be inferred from survey data has been changing over time, particularly after recessions, which may harm the effectiveness of soft indicators for short-term forecasting and standard business cycle analysis. This paper tries to contribute to the existing literature, investigating the relationship among economic sentiment, GDP growth, consumer confidence and private consumption growth for Portugal and the Euro-area. It also assesses the perceived 'normal' GDP growth as a complementary measure of potential growth. Overall, results show the existence of a linear relationship between soft-data and real variables growth that differs from one country to another and over time. In particular, recessions are found to play a key role, as the post-crisis 'normal' growth is, on average, lower than the pre-crisis. Moreover, there is some evidence that the estimated 'normal' GDP growth seems to fit fairly well in potential growth estimates, as both measures present identical trends and patterns in most periods of the sample and share identical behaviour in recessions.

JEL classification: C32, E32, O42

Keywords: survey data, business cycle, potential output, Portugal, Euro-area

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1 Introduction

Qualitative indicators (or soft-data) are statistics usually compiled from surveys that are conducted for different sectors of the economy, and measure economic agents' expectations and opinions on diverse economic phenomena. For a long time these statistics have been used as a tool to help monitoring the fluctuations in the economic cycle (*e.g.*, Koopmans, 1947; Zarnowitz, 1992), to forecast the evolution of macroeconomic aggregates (see, among others, Bergström, 1995; Ludvigson, 2004; Dees and Brinca, 2013; Girardi et al., 2016; Lehmann and Weyh, 2016; Garnitz et al., 2019) and to construct uncertainty indicators to assess their impact in economic activity (*e.g.*, Bachmann et al., 2013).

One of the main merits of qualitative data is its timeliness, specifically the fact it usually becomes available right at the end of the reference period, before the main economic aggregates become available, making it particularly useful for a timely assessment of economic activity. For instance, recently, Statistics Portugal[1] denoted the importance of survey data for a real-time assessment of the economic environment in Portugal, highlighting the strong correlation of the Economic Climate Indicator with the real GDP year-on-year (y-o-y) growth rates and its ability to track cyclical turning points. Another particularly important advantage of qualitative indicators is their stability, as revisions in survey data are less frequent – commonly updates to seasonal adjustment factors (which are generally small) or those due to methodological changes, that seldom occur. For this reason, the ECB (2015) built an alternative measure of economic slack for the Euro-area based on survey data.

Most of the literature that makes use of survey data to study economic aggregates relies on the assumption that the relationship between them is stable over time. Nonetheless, there is some evidence of a disruption in the link between qualitative indicators and economic activity after a crisis (*e.g.*, Al-Eyd et al., 2009; Biau and D'Elia, 2011; Rioust de Largentaye and Roucher, 2015; Gayer et al., 2018; and Bruno et al., 2019), especially since the 2008-09 financial crisis (also known as the Great Recession). If this hypothesis is not rejected, there are relevant implications for the use of soft-data in short-term forecasting and business cycle analysis when a large shock hits the economy, such as the Great Lockdown in 2020 in response to the COVID-19 pandemic.[2]

This paper builds in this recent literature and aims to investigate the stability of the relationship between qualitative data and real economic variables in Portugal and in the Euro-area over the 1985-2019 period. The study focus on the relationship between the European Commission's Economic Sentiment Indicator (ESI) and real GDP growth; and between the Consumers Confidence Indicator (CCI) and real private consumption growth. First, the existence and stability of a relationship is analysed. Then, following Gayer et al. (2018) closely, rolling-regressions and time-varying parameter models are used to bring evidence on the evolution of the growth

[1] See the box 'Indicador de Clima Económico' in the Portuguese version of the publication *Inquéritos de Conjuntura às Empresas e aos Consumidores, Maio de 2019*. For some literature on the use of survey data in forecasting and tracking economic activity in Portugal see also Santos (2003), Cardoso and Duarte (2006), Ramos Maria and Serra (2008a) and (2008b).

[2] See the IMF's World Economic Outlook of April 2020.

associated to the benchmark level of survey data – the 'normal' growth perceived by survey respondents. The investigation further assesses whether 'normal' GDP growth perceived by economic agents correlates with available measures for potential output growth. To the best of our knowledge this paper is the first to bring empirical evidence for Portugal on this topic.

The main results of this paper suggest that there is a downward trend in the 'normal' GDP growth corresponding to an ESI level of 100 that, on average, stabilized in Portugal since 2007 and continued dropping in the Euro-area. A similar pattern is found for the 'normal' private consumption growth perceived by survey respondents when CCI is at its long-term benchmark level, although with higher volatility in Portugal. Recessions are found to play a key role in the decoupling between soft- and hard-data as the post-crisis 'normal' growth is, on average, lower than the pre-crisis one. The 'normal' GDP growth seems to fit fairly well as a complementary measure for potential growth, as both measures present identical trends and patterns in most sample periods and share identical behaviour in pre-, post- and during recessions.

The remainder of the paper is organized as follows. The next section reviews the literature in which this paper fits in. Section 3 describes the data and tests for the existence and the stability of the relationship between soft- and hard-data in Portugal and the Euro-area. Time-varying econometric methods are used in section 4 to estimate the perceived growth associated with benchmark levels of survey data and to study 'normal' GDP growth as a complementary measure of potential growth. Section 5 summarizes the main conclusions.

2 Literature review

2.1 Factors for the decoupling between soft- and hard-data

The literature identifies several factors that can contribute to the disruption in the relationship between qualitative indicators and real economic variables growth. Whilst Al-Eyd et al. (2009) analysed the role of structural determinants of consumption, concluding that factors such as financial deepening or house prices affect the relationship between soft- and hard-data, Biau and D'Elia (2011) and Gayer et al. (2018) analysed whether such shift occurred due to a change in agents' expectations. By definition, soft indicators measure the opinions and expectations of agents relative to what they conceive as 'normal'. For example, one of the questions asked to firms in the manufacturing sector is whether their order-book level is 'above normal', 'normal' or 'below normal'. As surveys do not define what economic agents should consider as normal, a revision of their views and expectations will impact their answer. Consequently, when an exogenous shock hits the economy in a lasting way, agents will adapt their expectations and their definition of normal, affecting the linear relationship between confidence and economic performance, in a way that for the same level of qualitative indicators the associated economic performance post-shock may be different than the pre-shock. The hypothesis that the link between agents' economic sentiment and actual macroeconomic data has changed over time to a more modest 'new normal' level is called 'new modesty'.

Bruno et al. (2019), using micro-data from the Italian manufacturing sector, tested the hypothesis that a sampling bias could lead to the decoupling between soft- and hard-data. Business surveys are targeted at firms which are sampled from the universe of firms operating in the economy. As the economy enters a downturn, it would be expected that the worst performing firms – which should be the ones showing the lowest levels of confidence – would be gradually pushed out of the market, leaving only the best performers – which would also be the ones showing higher levels of confidence. As a result, the confidence levels in the sector would be inflated. However, the compilation of official statistics, such as National Accounts or Industrial Production Index, are based on a similar sampling procedure, often involving the same firms that answer the qualitative surveys, meaning that if a sampling bias occurs in the qualitative surveys, the decoupling would not be noticeable as the quantitative indicators would also reflect the same bias. Furthermore, the existence of such bias would lead to significant differences between the confidence levels of firms that have remained in the survey sample for a long time and those that were not surveyed in all rounds.

The research in this paper is aligned with Biau and D'Elia (2011) and Gayer et al. (2018) hypothesis, testing if there is a 'new normal' economic growth perceived by survey respondents.

2.2 Main results in the literature

In the literature closely related to this paper, Al-Eyd et al. (2009) used data for five OECD countries (Germany, France, Italy, the United Kingdom and the United States) to assess the existence and stability of the relationship between the consumer confidence indicator and the growth rate of private consumption. The authors concluded that the relationship between the consumers confidence indicator and the growth rates of private consumption is not observed and stable over time, as confidence effects on consumption are weak when other key determinants of consumption are taken into account across these five major OECD countries, especially over the most recent data period. Dees and Brinca (2013) found contrasting results, showing that there is a link between consumer sentiment and consumption expenditures for the United States and the Euro-area.

Rioust de Largentaye and Roucher (2015) explored how the relationship between French economic survey data and hard-data, such as the real GDP growth or the growth of Industrial Production Index, evolved over time. The authors concluded that the quarterly GDP growth rate associated with the benchmark levels of qualitative indicators dropped from 1980 to 2000. They also replicate their methodology to other European countries and achieve similar conclusions for Italy and Spain, whilst for Germany, the relationship appears to remain stable over time.

Biau and D'Elia (2011) and Gayer et al. (2018) looked at the impact of the 2008-09 financial crisis in the connection between the European Commission's ESI and the Euro-area real GDP growth rate. More specifically, the authors observed that, after the Great Recession, the ESI began showing a profile of steady recovery, whilst real GDP growth rates were not as strong as the survey results would suggest, raising the question as to whether the crisis had

introduced a break in the linear relationship between qualitative and quantitative data. Using time-varying econometric techniques, Gayer et al. (2018) additionally analysed the relationship between qualitative indicators, such as the CCI and the sectoral Confidence Indicators for Services and Industry, and their respective quantitative series (private consumption, gross value added for services and the Industrial Production Index). They concluded that for the long-term benchmark level of the qualitative indicator the associated growth of the quantitative variable suggested by the model had been declining in the last decades, even before the Great Recession, supporting the hypothesis of a 'new modesty'. Gayer et al. (2018) used the results for real GDP growth associated with the long-term average of ESI to build a 'perceived potential growth' measure for the Euro-area and its four largest economies. It was found to have a high degree of similarity with existing potential output growth estimates (excluding from the German case), serving as a complementary measure for a real-time assessment of long-term growth prospects, with fewer revisions.

Bruno et al. (2019) studied for the Italian economy whether in the aftermath of the 2008-09 financial crisis there was a break in the relationship between the Manufacturing Climate Index (soft-data) and the Index of Industrial Production (hard-data). They concluded that a break in the linear relationship between the two indicators emerges in 2008 and a non-linear specification can lead to improved forecast performance especially during extreme slumps. Using a different approach from Biau and D'Elia (2011) and Gayer et al. (2018), the authors also assessed if agents revised downward their ideal setting for productive capacity in the long run (*i.e.*, the hypothesis of a 'new modesty'). Bruno et al. (2019) studied the stability of the 'sufficient' capacity utilization, concluding that it is not stable over time, decreasing during economic downturns – hence suggesting that agents effectively lower their perception of normal during these periods. Using micro-data from the Italian Business and Consumer Survey, the authors also discard the hypothesis that the decoupling between soft- and hard-data in Italy could be related to a sampling bias, as there is no significant difference in the confidence levels of long-lasting firms and non-lasting firms.

Finally, Sorić et al. (2020) focused on the link between consumer confidence and consumption growth in European Union countries, testing the 'new modesty' hypothesis. They find a long-term decline in the perceived 'normal' consumption growth rates that prevails mainly in the European Union old 15 Member-States. The authors attribute the existence of the 'new modesty' hypothesis in consumption growth to the diminished perceptive reactions of consumers to macroeconomic stimuli that surged with the long-term reduction of macroeconomic volatility since the 1980s (the Great Moderation era).

3 Existence and stability of the relationship between soft- and hard-data

3.1 Data

The dataset for Portugal and the Euro-area covers the period from the first quarter of 1985 (the first observation available for the Euro-area ESI and CCI) to the last quarter of 2019. Real GDP and real private consumption series are taken from the national account series of Eurostat, are adjusted for both seasonality and working days effects and are available from 1995 only. In order to backdate the series, it was used the rates of growth of the series in the *Séries Longas Trimestrais* database for Portugal and the rates of growth of the series in the Area Wide Model database for the Euro area (for details see, respectively, Sequeira and Cardoso, 2015; and Fagan et al., 2001).

Concerning the qualitative survey data, both for Portugal and for the Euro-area, this study uses the ESI and the CCI published by the Eurostat and constructed by the Directorate-General for Economic and Financial Affairs of the European Commission. These surveys are conducted by the National Statistics authorities of each member states on a monthly basis and follow the guidelines of the Joint Harmonised EU programme of business and consumer surveys. Each of these indicators is expressed as an arithmetic average and translates a balance of responses in sectoral surveys. The ESI, unlike the CCI, is standardized in order to have an average value of 100 and a standard deviation of 10 in the period between January 2000 and the last December available.[3] The summary statistics for the series used in this paper are shown in Table 1.

Table 1: Descriptive statistics

	Portugal				**Euro-area**			
	y	*c*	*esi*	*cci*	*y*	*c*	*esi*	*cci*
Sample	1985Q1-2019Q4		1987Q1-2019Q4	1986Q3-2019Q4	1985Q1-2019Q4			
Mean	2.2	2.6	103.4	-13.4	1.8	1.7	99.8	-10.0
Median	2.1	2.3	105.4	-13.1	2.1	1.7	100.8	-8.9
Max.	8.7	11.6	131.3	5.6	4.7	4.1	117.6	-1.9
Min.	-4.5	-6.2	78.2	-44.7	-5.6	-1.5	67.4	-23.3
Std. Dev.	2.7	3.4	11.0	12.1	1.7	1.4	10.2	5.0

Notes: *y* - real GDP year-on-year growth (%); *c* - real private consumption year-on-year growth (%); *esi* - Economic Sentiment Indicator; *cci* - Consumers Confidence Indicator.

[3] See the BCS user guide for details.

3.2 Unit root and Granger causality tests

The Augmented Dickey-Fuller and Phillips-Perron unit root tests were performed in order to determine the order of integration of the variables. The results are shown in Table 2, where real GDP and real private consumption are found to be integrated of order one, or I(1). The y-o-y growth rates of real GDP and real private consumption – y and c, respectively – are I(0) as well as the level of most qualitative survey variables, *esi* (as expected by construction) and *cci* (Portuguese *cci* is the exception).

A simple way to test the existence of a relationship between the variables in the dataset is by performing pairwise Granger causality tests. It is assessed whether the relationship between soft-data and hard-data is two-ways (*i.e.*, the evolution of survey variables both determines and is determined by real economic variables) or only one-way. Since the ESI and the CCI are computed to track y-o-y growth of real GDP and real private consumption, respectively, the real economic variables are tested in y-o-y growth rates. P-values are reported in Table 3 for the probability of the row variable not Granger-causing the column variable. Bold numbers represent the rejections of the null hypothesis for 5% significance level.

Table 2: Unit Root Tests

	Portugal		**Euro-area**	
	ADF	*PP*	*ADF*	*PP*
$\ln(GDP)$	2.0	3.5	4.1	5.4
$\triangle \ln(GDP)$	-2.6^{***}	-8.2^{***}	-5.3^{***}	-5.4^{***}
y	-2.2	-2.8^{*}	-3.6^{***}	-3.6^{***}
$\ln(C)$	1.9	3.5	1.8	5.2
$\triangle \ln(C)$	-2.7^{***}	-8.3^{***}	-1.8^{*}	-6.8^{***}
c	-2.2	-2.9^{**}	-2.7^{*}	-2.6^{*}
esi	-3.9^{***}	-3.1^{**}	-5.4^{***}	-3.4^{**}
cci	-2.1	-2.0	-3.6^{***}	-2.7^{*}

Notes: Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. ***99% significance; **95% significance;**90% significance. y, c, *esi* and *cci* were tested with a constant. Lag length selection in ADF test based on the Schwarz info criterion with maximum 13 lags.

The results generally show that the real economic variables are Granger-caused by the qualitative survey data and the direction of causality runs one-way. Only for the Euro-area, the null hypothesis that real private consumption growth does not Granger-cause a qualitative survey variable, *esi*, cannot be rejected at 5% significance level. Nevertheless, there is no reverse causality between *cci* and c, which is the relevant empirical relationship.

Table 3: Granger Causality Tests (p-values)

	Portugal				**Euro-area**			
	y	c	esi	cci	y	c	esi	cci
esi	**0.01**	**0.00**	–	0.19	**0.00**	**0.00**	–	**0.04**
cci	**0.00**	**0.00**	0.14	–	**0.00**	**0.00**	0.40	–
y	–	**0.01**	0.14	0.37	–	0.15	0.43	0.85
c	0.62	–	0.13	0.79	**0.00**	–	**0.00**	0.07

Notes: P-values for the null hypothesis of the row variable **not** Granger-causing the column variable. The rejections of the null hypothesis for 5% significance level are in bold numbers. For each variable, a maximum of four lags were considered, using F-tests for selection criteria.

3.3 A simple estimated model

This section extends the previous analysis with the estimation of a simple model to test the stability of the relationship between hard- and soft-data. Following, among others, Biau and D'Elia (2011), Rioust de Largentaye and Roucher (2015) and Gayer et al. (2018), the linear model specification considers that the y-o-y change of the real economic variable (hard-data, h_t) – GDP or private consumption – depends on the level of the respective qualitative survey variable (soft-data, S_t) – esi or cci, respectively – and on its first difference ($\triangle S_t$),

$$h_t = \alpha + \beta\,(S_t - \bar{S}) + \gamma\,\triangle S_t + \varepsilon_t\,, \tag{1}$$

where $\bar{S}$ is the benchmark level of the qualitative variable, that is set at 100 for esi and equal to the long-term average for cci, and ε_t is the error term. The model is tested with and without $\triangle S_t$.

In this specification, α is the most relevant parameter to examine and can be interpreted as the y-o-y growth of the real variable when the qualitative indicator has stabilized in its benchmark level. In other words, α reflects the growth corresponding to what survey respondents assess as a 'normal' economic situation. The parameter β is the long-term acceleration in h_t associated with a permanent increase of the qualitative indicator by 1-point. $\beta+\gamma$ is interpreted as the acceleration in h_t following a transitory increase of 1 point in the qualitative indicator.

The estimation of equation (1) allows the determination of the real GDP growth compatible with the ESI stable at 100, and of the real private consumption growth compatible with the CCI stable in its long-term average. The parameters are estimated via ordinary least squares (OLS) using an estimator consistent with the presence of heteroskedasticity and autocorrelation (Newey-West). Using the full dataset sample, Table 4 shows that an economic sentiment persisting at its long-term average of 100 correlates with an average y-o-y real GDP growth of 1.4% for Portugal and of 1.9% for the Euro-area. Table 4 reveals both for Portugal and for the Euro-area that γ does not differs significantly from zero in the GDP–ESI relationship. Regarding the parameter β, the results for the full sample indicate that a permanent 1-point increase in the ESI leads to an average acceleration in GDP y-o-y growth of 0.2 p.p. in Portugal and of

Table 4: Full sample estimation of equation (1)

	α	β	γ	Obs.	Adj. R^2
$y_t \mid esi_t^{pt}$	1.41^{***}	0.22^{***}	–	132	0.76
	(0.205)	(0.015)			
	1.40^{***}	0.22^{***}	-0.04	131	0.75
	(0.203)	(0.015)	(0.028)		
$y_t \mid esi_t^{ea}$	1.86^{***}	0.14^{***}	–	140	0.70
	(0.147)	(0.023)			
	1.86^{***}	0.14^{***}	-0.00	139	0.70
	(0.148)	(0.024)	(0.044)		
$c_t \mid cci_t^{pt}$	2.67^{***}	0.23^{***}	–	134	0.70
	(0.268)	(0.026)			
	2.64^{***}	0.24^{***}	-0.15^{*}	133	0.71
	(0.270)	(0.028)	(0.093)		
$c_t \mid cci_t^{ea}$	1.68^{***}	0.22^{***}	–	140	0.69
	(0.119)	(0.021)			
	1.69^{***}	0.23^{***}	-0.09^{*}	139	0.69
	(0.121)	(0.021)	(0.047)		

Notes: Robust standard errors are in parentheses. ***, **, * indicate statistical significance at 1%, 5%, 10% level. *pt* – Portugal; *ea* – Euro-area.

0.1 p.p. in the Euro-area.

Regarding the results for real private consumption, in Table 4 one can conclude that when consumers confidence is stable in its long-term average, the corresponding y-o-y real private consumption growth is about 2.6% in Portugal and 1.7% in the Euro-area. For Portugal, the model shows that a permanent 1-point rise in the CCI origins a temporary 0.09 p.p. consumption acceleration during that quarter ($\beta + \gamma$), followed by a 0.2 p.p. acceleration in the subsequent quarters. Similarly, for the Euro-area, a permanent 1-point rise in the CCI origins a temporary 0.14 p.p. consumption acceleration during that quarter, also followed by a 0.2 p.p. acceleration in the subsequent quarters. Nonetheless, the estimated parameter γ in the consumption-CCI relationship is found to be statistically different from zero only with a 10% significance level. Dropping $\triangle S_t$ from equation (1) has no significant impact in the remaining estimated coefficients as one can infer from Table 4.

3.4 Stability of the statistical link

A simple way to check if the soft- and hard-data link has changed over time is to test for the presence of structural breaks. Table 5 shows the results of performing the Quandt-Andrews (QA) and Bai-Perron (BP) breakpoint tests (see, Andrews, 1993; Andrews and Ploberger, 1994 and

Bai and Perron, 2003), as both tests have the advantage of identifying break dates at unknown points in time, rely on general assumptions and yield robust results.

Table 5: Breakpoint tests

		QA test		BP test
Country	**link**	**Sample period**	**Break date**	
Portugal	$y \mid esi$	1987Q1–2019Q4	1992Q2	1992Q2; 2001Q1
		1993Q1–2019Q4	2000Q2	
		2001Q1–2019Q4	2013Q2	
	$c \mid cci$	1986Q3–2019Q4	2013Q2	1991Q4; 2007Q2; 2013Q2
		1986Q3–2012Q4	1991Q4	
		1993Q1–2014Q4	2007Q2	
Euro-area	$y \mid esi$	1985Q1–2019Q4	2007Q2	1993Q1; 2001Q4; 2007Q2; 2014Q4
		1985Q1–2006Q4	1993Q1	
		2008Q1–2019Q4	2014Q2	
	$c \mid cci$	1985Q1–2019Q4	2000Q2	1993Q1; 2000Q2; 2008Q3; 2015Q1
		2001Q1–2019Q4	2008Q3	
		1985Q1–1999Q4	1993Q1	

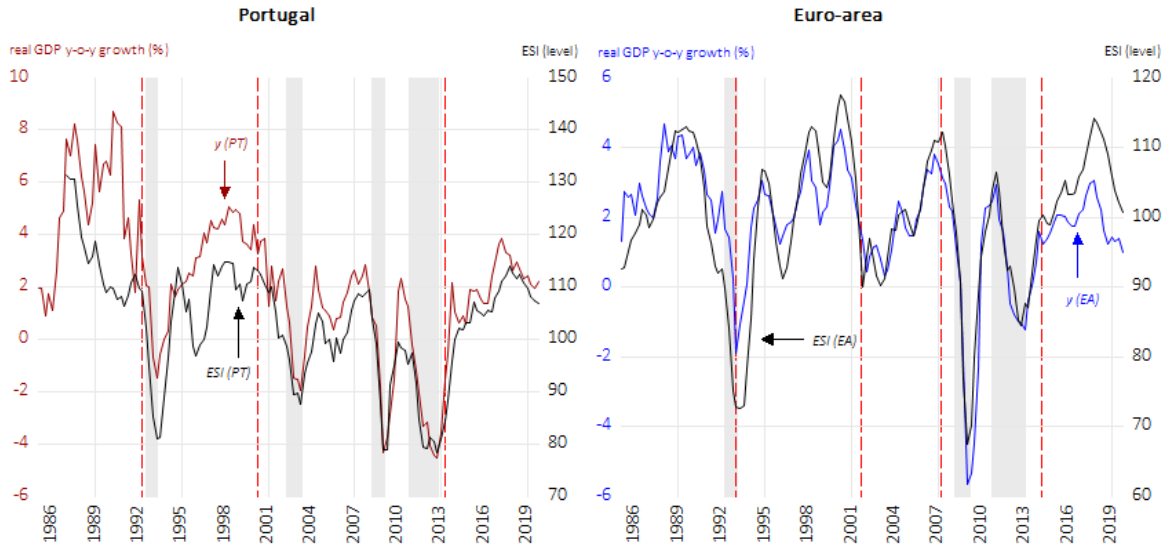
Notes: Quandt-Andrews (QA) and Bai-Perron (BP) breakpoint tests. The BP test for multiple breakpoints (max. four defined), exhibits the 5% significant level results.

For Portugal the tests identify at least two structural breaks in the estimated relationship between real GDP growth and ESI, in the 1992 recession and after the country have adopted the euro around 2000/2001. The QA test also identifies 2013Q2, which matches when the country was leaving from a deep recession brought by the sovereign debt crisis. For the Euro-area, both tests identify 1993Q1, 2007Q2, 2014Q2/Q4, and the BP test additionally points the 2001Q4 date. Regarding the real private consumption growth and CCI link, structural breaks were also identified around the same dates. For Portugal both QA and BP tests identify 1991Q4, 2007Q2 and 2013Q2. For the Euro-area both tests reveal breaks in 1993Q1, 2000Q2 and 2008Q3, and the BP test also shows 2015Q1 as significant at 5% level.

A graphical analysis to the period 1985-2019 suggests that recessions, identified by means of the Bry and Boschan (1971) business cycle dating algorithm,[4] are always very close to the breakpoints estimated in Table 5, as well as the strong slowdown in the Euro-area economy in 2001. Figure 1 and Figure 2 suggest that the structural breaks previously identified in this paper coincide with economic shocks large enough to induce a shift in the perception and expectations of agents in Portugal and in the Euro-area, leading to an eventual decoupling between qualitative survey indicators and real economic variables growth.

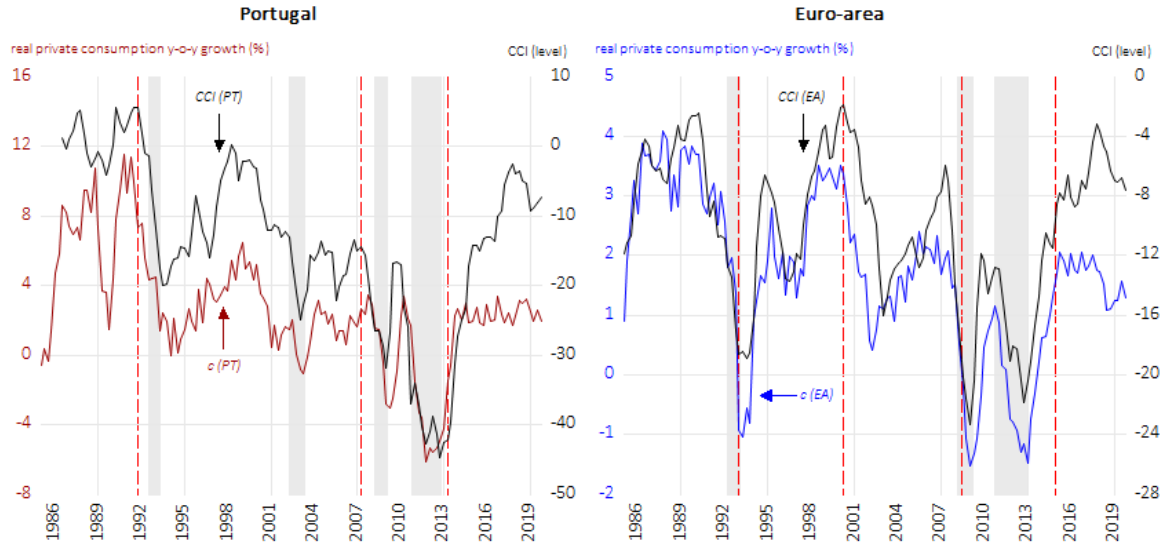
[4]For Portugal the peak-trough periods are: 92Q2-93Q3, 02Q1-03Q2, 08Q1-09Q1, 10Q3-12Q4. For the Euro-area the identified recession periods are: 92Q1-93Q1, 08Q1-09Q2, 11Q3-13Q1.

Figure 1: Real GDP growth and ESI



Sources: Eurostat and own calculations. *Notes:* shaded areas denote country specific recession periods, calculated using the Bry and Boschan (1971) business cycle dating algorithm; the dashed vertical lines (in red) represent the structural breaks obtained in Table 5.

Figure 2: Real private consumption growth and CCI



Sources: Eurostat and own calculations. *Notes:* shaded areas denote country specific recession periods, calculated using the Bry and Boschan (1971) business cycle dating algorithm; the dashed vertical lines (in red) represent the structural breaks obtained in Table 5.

Visually, after the sovereign debt crisis, it is clear from Figure 1 the decoupling between real GDP growth and the ESI in the Euro-area and, from Figure 2, the breaking link between real private consumption growth and the CCI both in Portugal and in the Euro-area.

Estimating the model represented in equation (1) with different subsamples one can obtain a first view on the evolution of the real variables' 'normal' growth as perceived by economic agents, *i.e.*, the growth associated to the qualitative survey variable stable at the respective benchmark level. Given the previous results and following Gayer et al. (2018), the parameters will be estimated with a pre- and post-crisis sample. The crises are the recessions identified previously with the Bry and Boschan (1971) algorithm and are graphically represented in the shaded areas in Figures 1 and 2. This procedure implies that the data from peaks to troughs (*i.e.*, during the crises) are ignored. It also implies that between the 2008-09 financial crisis and the 2011-12 sovereign debt crisis there are no sufficient observations to perform any robust analysis, so the double dip is treated as one crisis.

The results in Table 6 show that the relationship between GDP growth and the ESI has changed both in Portugal and in the Euro-area after each crisis, as the perceived 'normal' growth (*i.e.*, α, when ESI equals 100) is consistently lower in every post-crisis. In Portugal, real GDP y-o-y growth associated to a 'normal' economic sentiment decreased from 2.1% after the 1992 recession to below 1% after the sovereign debt crisis. However, the decrease appears to have been slightly offset by a higher sensitivity of GDP growth to changes in the survey (β) – a permanent 10-point increase in the ESI would lead to an average acceleration in GDP y-o-y growth of 1.4 p.p. after the 1992 recession and of 2.0 p.p. from 2013Q1 onwards. For the Euro-area the level shift in α has a smaller amplitude than in Portugal but in the same direction, dropping from 2.8% prior to the 1992 recession to 1.1% in the last post-crisis. These results are in line with those in the literature implying that the growth associated with an economic sentiment at its long-term average of 100 has been dropping in the Euro-area and in some of its member-states.

Results in Table 6 point to similar conclusions for real private consumption growth: agents lower their perceived 'normal' growth in the post-crisis. Real private consumption y-o-y growth associated with long-term average consumers confidence decreased in the post-crisis from 7.6% to 1.7% in Portugal, and from 3.2% to 1.2% in the Euro-area. For Portugal, this gradual decline is followed by a lower sensitivity of consumption growth to changes in the survey (β), contrarily to what happens in the evolution of the pre- and post-crisis GDP–ESI relationship.

Table 6: Pre- and post-crisis breaks

Spec.	Sample	Estimated parameters α	β	γ	Obs.	Adj. R^2
$y \mid esi^{pt}$	1987Q1–1992Q2	4.70^{***}	0.08	-0.10	21	0.02
		(1.286)	(0.053)	(0.150)		
	1993Q2–2002Q1	2.10^{***}	0.14^{***}	-0.03	36	0.57
		(0.306)	(0.022)	(0.052)		
	2003Q2–2008Q1	1.04^{***}	0.18^{***}	0.04	20	0.80
		(0.125)	(0.027)	(0.050)		
	2013Q1–2019Q4†	0.61^{***}	0.20^{***}	0.19^{**}	28	0.87
		(0.131)	(0.016)	(0.079)		
$y \mid esi^{ea}$	1985Q1–1992Q1	2.82^{***}	0.10^{***}	0.03	28	0.64
		(0.123)	(0.010)	(0.029)		
	1993Q1–2008Q1	2.00^{***}	0.11^{***}	0.05	61	0.87
		(0.071)	(0.007)	(0.029)		
	2013Q1–2019Q4	1.13^{***}	0.12^{***}	0.07	28	0.78
		(0.141)	(0.017)	(0.048)		
$c \mid cci^{pt}$	1986Q3–1992Q2	7.56^{***}	0.48^{***}	-0.33	23	0.22
		(0.640)	(0.266)	(0.240)		
	1993Q2–2002Q1	2.89^{***}	0.23^{***}	-0.16^{***}	36	0.54
		(0.249)	(0.035)	(0.049)		
	2003Q2–2008Q1	1.77^{***}	0.24^{***}	-0.23^{*}	20	0.42
		(0.196)	(0.079)	(0.117)		
	2013Q1–2019Q4	1.70^{***}	0.11^{***}	0.14	28	0.53
		(0.272)	(0.035)	(0.107)		
$c \mid cci^{ea}$	1985Q1–1992Q1	3.24^{***}	0.12^{***}	-0.04	28	0.35
		(0.089)	(0.025)	(0.093)		
	1993Q1–2008Q1	1.79^{***}	0.19^{***}	0.01	61	0.61
		(0.131)	(0.033)	(0.044)		
	2013Q1–2019Q4	1.22^{***}	0.18^{***}	0.00	28	0.74
		(0.170)	(0.027)	(0.076)		

Notes: Robust standard errors in parentheses. ***, **, * means statistical significance at 1%, 5%, 10% level. pt – Portugal; ea – Euro-area. †the results for the alternative regression of this specification without $\triangle S_t$ reaches $\alpha = 0.92^{***}$ and $\beta = 0.17^{***}$.

4 The evolution of perceived 'normal' growth in survey data

4.1 Results using time-varying econometric methods

The previous section provided evidence that the statistical link between real economic variables growth and qualitative survey data has changed over time. The analysis evaluated the implicit growth in the benchmark levels of survey data before and after discrete fixed events, pre- and post-crisis. To better understand the possible continuous changes in the soft- and hard-data relationship over time, this section provides a richer analysis using time-varying econometric models. Following Gayer et al. (2018), this paper uses two different econometric approaches.

The first approach is to estimate equation (1) by means of an OLS rolling regression, making it possible to check for changes in estimated coefficients over time. This technique performs multiple estimations for the specifications of equation (1) over rolling samples of 25 quarters (approx. 6 years) for Portugal and 45 quarters (approx. 11 years) for the Euro-area. Taking the evidence from the previous section about the post-crisis decoupling between soft- and hard-data, the sample was chosen based on the average duration of the business cycle in each country, computed with the Bry and Boschan (1971) algorithm. The results can be considered as a business cycle size centred moving-average of the parameters, meaning that any shift in the link between the qualitative survey data and the real variables growth will take the average size of the business cycle to be completely taken into account by this model.

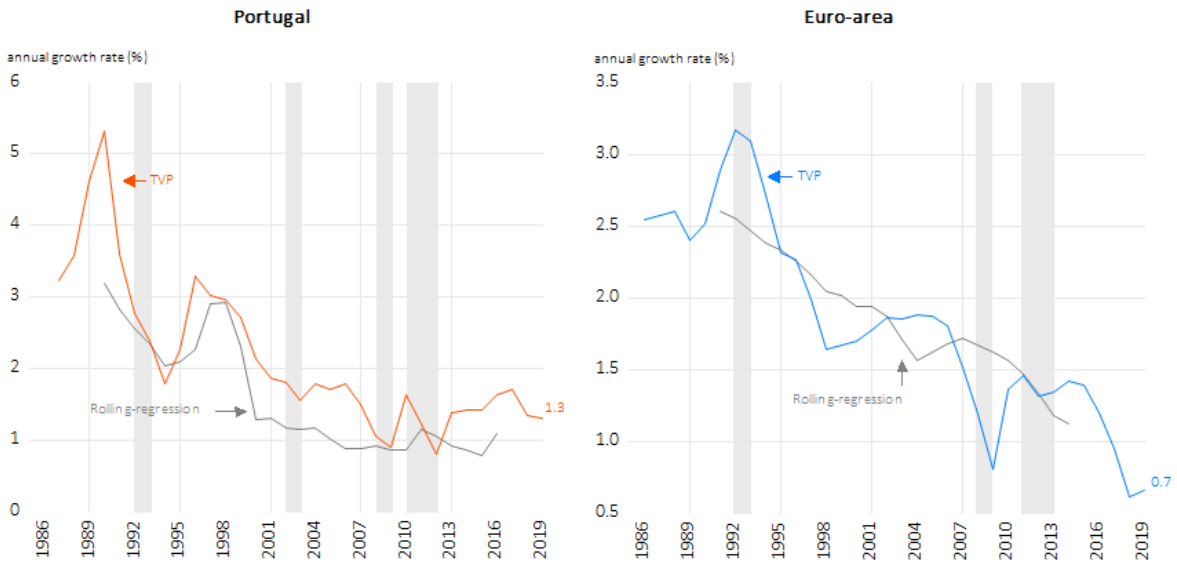
The second approach, and the main one for the analysis in this paper, is the estimation of a time-varying-parameter (TVP) model, which also allows the estimated coefficients to vary over time.[5] As it does not depend on fixing a data sample length it has an advantage compared to the previous approach and, in addition, provides estimates for the sample start and the sample end. Departing from equation (1) and dropping γ, as it generally revealed not significantly different from zero in the results in Table 4 and Table 6, the state-space representation for the TVP model is given by

$$\begin{aligned} \boldsymbol{h}_t &= \boldsymbol{s}_t'\boldsymbol{\theta}_t + \boldsymbol{\nu}_t\,, \boldsymbol{\nu}_t \sim N(0, \boldsymbol{Q_1}) \\ \boldsymbol{\theta}_{t+1} &= \boldsymbol{\theta}_t + \boldsymbol{\zeta}_{t+1}\,, \boldsymbol{\zeta}_t \sim N(0, \boldsymbol{Q_2}) \end{aligned} \tag{2}$$

where $\boldsymbol{h}_t' = (y_t, c_t)$, $\boldsymbol{s}_t' = (1, esi_t - \overline{esi}, cci_t - \overline{cci})$, $\boldsymbol{\theta}_t' = (\alpha_t, \beta_t)$, $\boldsymbol{Q_1} = diag(\sigma^2_{\nu,y}, \sigma^2_{\nu,c})$ and $\boldsymbol{Q_2} = diag(\sigma^2_{\zeta,\alpha}, \sigma^2_{\zeta,\beta})$. The TVP model is estimated using Kalman filtering and smoothing. This section applies both approaches (rolling regression and TVP) to answer what is the real growth corresponding to survey respondents' 'normal' assessment of a 'neutral' economic situation (*i.e.*, ESI of 100 and CCI in its long-term average).

[5] See, for instance, Nelson and Kim (1988) for an application of the TVP method and its state-space representation.

Figure 3: GDP annual growth for benchmark ESI



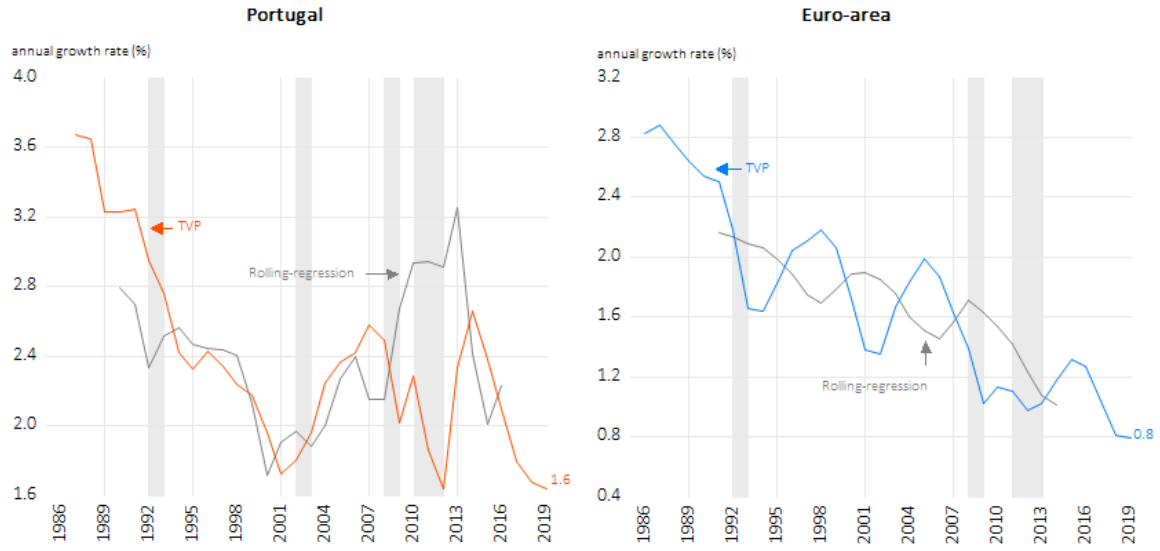
Sources: Eurostat and own estimations. *Note:* TVP stands for time-varying-parameters model; the results are annualized; shaded areas denote country specific recession periods.

Figure 3 shows that the TVP model and the rolling regressions provide similar results for the relationship between GDP growth and ESI. In Portugal, the real GDP growth corresponding to an ESI level of 100 estimated with the TVP method decreased sharply from 5.3% in 1990 to 1.8% in 1994. It then picked up to reach more than 3% in 1996 and started a gradual decline to 1.5% in 2007. During the Great Recession 'normal' growth decreased below 1% until 2009 and, after a short-lived recovery in 2010 to 1.6%, kept decreasing until it hit the lowest value of 0.8% in 2012. After the sovereign debt crisis there was a recovery of 'normal' growth to 1.4% in 2013 and stabilization thereafter around that value. For Portugal one can conclude that a level of 100 in the ESI today implies a lower annual GDP growth than it implied before 2003 and, to a less extent, before the Great Recession. The rolling-regressions results broadly confirm the decreasing path since the early 2000's and a moderate stabilization in later years. Although one should bear in mind that this method represents a 25-quarters moving average of the parameters for Portugal, which may explain the lower values of 'normal' growth that those obtained with the TVP model.

Results for the Euro-area are in line with Gayer et al. (2018), denoting a downward tendency for 'normal' annual GDP growth corresponding to an ESI level of 100. The TVP estimation results for the Euro-area show a decrease in 'normal' growth from above or close to 2% before 2007 to around 1% during the 2008-09 financial. After that period there was a recovery followed by a stabilization from 2010 to 2015 around 1.4%. Since then, there was another sharp decrease during 2016-2018 and currently the Euro-area annual GDP growth corresponding to the ESI's long-term-average is 0.7%. The estimations using the rolling regressions (a 45-quarters moving-

average of the parameters for the Euro-area) are generally in line with the TVP model results.

Figure 4: Private consumption annual growth for benchmark CCI



Sources: Eurostat and own estimations. *Note:* TVP stands for time-varying-parameters model; the results are annualized; shaded areas denote country specific recession periods.

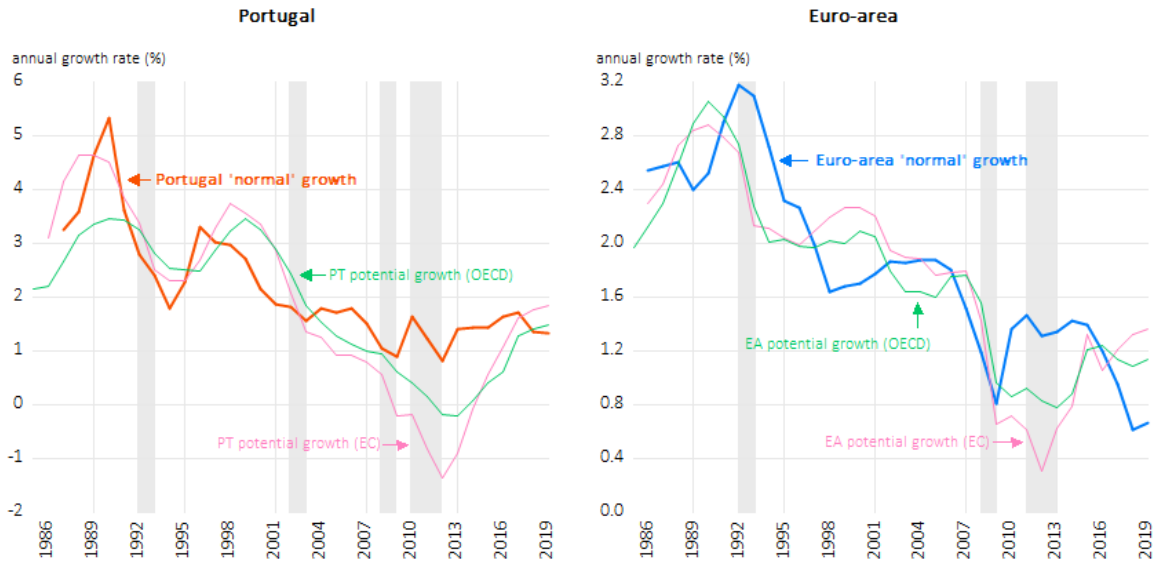
Regarding the annual growth in real private consumption corresponding to the long-term average of CCI, the TVP method estimations show that the profile of 'normal' consumption growth is unstable in the last 30 years (Figure 4). For Portugal, there is a descendent trajectory from 3.7% in 1987 to 1.7% in 2001, after which there is a recovery to 2.6% in 2007. During the double dip marked by the Great Recession and the sovereign debt crisis, 'normal' consumption growth in Portugal decreased to 2% in 2009 and after a contained recovery in 2010 it fell to 1.6% in 2012. In the post-crisis period, TVP model estimations show that 'normal' consumption growth picked up to 2.7% in 2014, decreasing thereafter until reaching 1.6% in 2019. The rolling regressions estimations found similar results, apart from the 2008-2012 period where the results contradict the TVP model estimations. Nonetheless, the TVP results are more robust and corroborate with the events of that period, that are marked by contractions in the disposable income of households and pessimistic confidence indicators.

Concerning the Euro-area 'normal' private consumption growth, the TVP method points to a clear downward trend from 1986 to 2019, with fluctuations around that trend during the whole period. The 2009-2013 was a period relatively stable around 1%. The private consumption growth corresponding to a long-term average of consumers' confidence in Euro-area has been dropping from a 2.9% high in 1987 to a 0.8% low in 2019. The results are generally confirmed by the estimations with the rolling regressions.

4.2 Potential output and the perceived 'normal' growth

This paper builds on the idea that the benchmark levels of the qualitative indicators correspond to what survey respondents assess as a normal economic situation. The real variables growth associated with that benchmark level is then interpreted as the 'normal' growth perceived by survey respondents. Results from previous sections bring empirical evidence that 'normal' growth changes over time, as agents adapt theirs views and expectations based on their perceived and experienced economic circumstances (Gayer et al., 2018). Therefore, given the cyclical proprieties of the ESI, the 'normal' GDP growth can also be interpreted as a measure of GDP growth adjusted for the cycle, *i.e.*, potential growth. Gayer et al. (2018) observe that one of the main merits of this approach for the calculation of potential output, is the fact that it avoids major revisions over time, which are usual in more sophisticated methodologies, as the 'normal' growth estimations are derived from a Kalman smoother that is not revised as subsequent observations become available.

Figure 5: Annual GDP potential growth and 'normal'growth



Sources: Eurostat and own estimations; EC – European Commission AMECO database (autumn forecast 2020 update); and OECD – OECD.stat Economic Outlook No. 108 database. *Note:* 'normal' growth results from time-varying-parameters models for GDP-ESI, estimated with Kalman smoothing; shaded areas denote country specific recession periods.

Following Gayer et al. (2018), this section compares the evolution of the estimated 'normal' GDP growth, previously obtained with the TVP method for Portugal and for the Euro-area, with the evolution of existing potential output growth estimates, assessing whether it can be considered a complementary measure for potential growth. Measures of the potential output based on production functions from the European Commission (EC) and from the OECD are

used for comparison purposes.[6]

Figure 5 reveals that the patterns of the 'normal' growth and the potential growth estimates match fairly well in most periods of the sample, despite the 'normal' growth measure be fully data-driven while the potential growth estimates rely on rather strong economic assumptions. Similarly to 'normal' growth, potential growth observes a decreasing trend in 1986-2019 both for Portugal and for the Euro-area.

In Portugal, all estimations decreased from more than 3% in 1991 to around 1% in 2007 and are consistent with a growth below 2% in 2019. Nevertheless, two main differences should be remarked. First, in the period 1996-2007, the potential growth estimates peaked in 1998-99 around 3.5% and exhibit a persistent drop to around 1% in 2007, while the 'normal' growth peaked in 1996 at 3.3%, reduced to 1.8% until 2002 and stabilized around 1.5% in 2003-2007. Then, during the period from the Great Recession to the sovereign debt crisis (2008-2013), the potential growth estimates dropped sharply and show contractions for Portugal (particularly the European Commission estimate), whereas the perceived 'normal' growth decreased in 2008-09 and in 2011-12 but remained more stable and positive. A possible explanation for this discrepancy could be that the 'normal' growth perceived by Portuguese economic agents during the 2008-09 and the 2011-12 crises was indeed above the 'actual' potential growth, induced by a difficulty in survey respondents to perceive and update the real growth impact of these crises on expectations, in an incomplete information decision-making problem. Another explanation could be due to measurement problems that arise temporarily during a severe crisis and can potentiate the decoupling between soft- and hard-data. However, given the trend and profile of the 'normal' growth measure, its correlation with potential growth estimates and the match with anecdotal evidence for Portugal, it seems to be a useful complement to assess the evolution of potential output.

In the Euro-area the 'normal' growth measure shows a general trend similar to the potential growth estimates by the EC and the OECD (Figure 5). These results update the ones in Gayer et al. (2018), where the differences between 'normal' growth and potential growth are already evidenced for the periods 1998-2002 and 2010-2014. Additionally, using the latest data available, this paper shows that in the period 2017-2019 there is also a substantial difference among methodologies, between an estimated 'normal' growth of 0.7% and an estimated potential growth of 1.1% by the OECD and of 1.4% by the EC.

In general, for Portugal and for the Euro-area, from Figure 5 one can observe that the 'normal' growth and the potential growth measures have similar properties around a crisis: the post-crisis growth is, on average, lower than the pre-crisis – which is in line with the findings in Table 6 (parameter α); and during a crisis there is typically a drop in growth, followed by a recovery in the short term.

[6]See Havik et al. (2014) and the Commonly Agreed Methodology for the EC and Chalaux and Guillemette (2019) for the OECD method.

5 Conclusions

This paper proposed an empirical assessment of the link between qualitative survey data and real economic variables growth for Portugal and the Euro-area. It builds on the idea that the benchmark levels of the qualitative indicators refer to what survey respondents assess as a 'normal' economic situation, so the real variables growth associated to that benchmark level is interpreted as the 'normal' growth perceived by economic agents. With the results for 'normal' GDP growth this paper studies a complementary measure of potential growth.

The results show the existence of a linear relationship between economic sentiment and real GDP growth and between consumers' confidence and real private consumption growth that differs from one country to another and over time. This calls for caution in the interpretation of the growth rate associated with the levels of survey data and in international comparisons. The empirical findings of this paper can be summarised as follows:

i) results support the hypothesis of a 'new modesty' in Portugal and in the Euro-area, as there is a downward trend in the 'normal' GDP growth corresponding to an ESI level of 100. In Portugal it decreased from 5.3% in 1990 to around 1.5% in 2007, since when it has been relatively stable (±0.4 p.p.) apart from the recession periods. For the Euro-area, the duration of the descendent trend of 'normal' GDP growth is longer, having dropped from around 3% in the early 1990's to close to 2% before 2007 and to below 1% more recently;

ii) a similar downward trend is found for the 'normal' private consumption growth perceived by survey respondents when CCI is at the long-term benchmark level. Again, from 2007 onwards a downward trend is still clear in the Euro-area but not in Portugal, this case with higher volatility;

iii) recessions are found to play a key role in the decoupling between soft- and hard-data, as the post-crisis 'normal' growth is, on average, lower than the pre-crisis. Results also suggest that during a crisis, typically there is drop in perceived 'normal' growth followed by a recovery in the short term;

iv) the 'normal' GDP growth measure represents the long-term perspective on growth of economic agents and seems to fit fairly well in existing potential growth estimates for both countries under study. Both measures present an identical trend, a similar pattern in most periods of the sample and share identical behaviour in pre-, post- and during recessions.

Further research includes a more detailed study on the properties of the 'normal' GDP growth and the use of this measure in combination with existing potential growth estimates to assess if it can improve accuracy in real-time business cycle measurement. Proper measurement of cyclical developments in real-time is crucial for policymaking, including the assessment of the fiscal position.

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