

3.3. THE PROCYCLICALITY OF POTENTIAL OUTPUT

Introduction

Any meaningful analysis of cyclical developments, of medium term growth prospects, or of the stance of fiscal and monetary policies, inevitably rests on either an implicit or explicit assumption about the rate of potential output growth. The measurement of potential growth is therefore an important ingredient in the EU's surveillance processes and in evaluating the effectiveness of the EU's structural reform agenda. Unfortunately, however, potential growth is not directly observable and so, must be estimated.

Given its importance in the EU's fiscal surveillance framework, the question of how best to calculate potential growth is a subject of much debate. One criticism sometimes levelled at the EU's commonly agreed methodology (CAM) is the procyclicality of its estimates. Critics argue that the CAM's estimates track actual GDP too closely and therefore fail to accurately distinguish between temporary, cyclical, fluctuations in GDP and permanent, structural, changes in the growth potential of the EU's economy. This concern is particularly relevant now that economic growth is slowing after six years of expansion, as it could lead to an overestimation of potential growth.

The CAM has undergone numerous evaluations since its inception in 2002. It was also updated significantly, in 2010 with respect to total factor productivity (TFP), and in 2014 with respect to the non-accelerating wage rate of unemployment (NAWRU), in response to the concerns about procyclicality. The evaluations showed that the CAM has a relatively good overall track record compared with alternative methodologies with respect to its real time revision properties. However, the general question of procyclicality has been less extensively evaluated, including the specific performance of the CAM at particular stages of the cycle, such as at turning points, or in the downward or upward phases of the cycle where the real time potential output estimates play a significant role in driving fiscal policy changes.

Against this background, the purpose of this special topic is to empirically assess the link between the CAM's potential output estimates and the dynamic pattern of the actual GDP series. A too close link between actual and potential output

growth risks giving policy makers an unrealistically pessimistic view of the structural budget balance in bad times and an unrealistically optimistic view in good times. This specific criticism goes to the heart of the complaints made against the CAM, which is that it risks misleading policy makers and encouraging procyclical fiscal policies, whereas fiscal policy needs to be countercyclical in order to achieve its stabilisation goals. The allegation that the CAM's potential output estimates suffer from excessive procyclicality has been raised widely in the literature.⁽¹⁰²⁾

What is meant by procyclicality and how has the CAM performed with respect to it in the pre-crisis, crisis and post-crisis periods?

One of the advantages of the economics based CAM, compared with purely statistical methods such as the Hodrick–Prescott (HP) Filter, which suffer from end point bias concerns, is that the issue of procyclicality can be assessed from an economic perspective. As such, it is clear that there are both 'realistic' and 'excessive' (i.e. unrealistic) types of procyclicality:

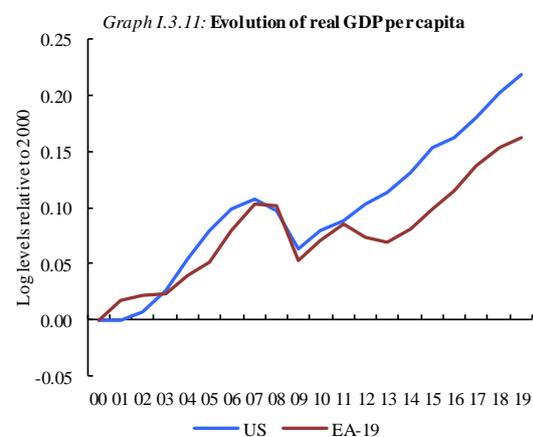
- 'Realistic' procyclicality means that the CAM correctly detects when the EU's underlying growth rate has either shifted downwards or upwards permanently. The biggest test of the CAM therefore occurred during the financial crisis and in the years that followed. Did the CAM 'get the crisis right' and were its estimates before, during and after the crisis realistic, or excessively negative?
- 'Excessive' procyclicality occurs when the CAM produces potential output estimates which rise too much when the economy is in the upward phase of the cycle or go down too much when it is in the downward phase. These episodes can best be identified by the degree of revision after turning points in the cycle.

⁽¹⁰²⁾ See, for example, three contributions: R.Brooks and G.Basile (2019). 'The Campaign against Nonsense Output Gaps'; P.Heimberger (2019). 'The Campaign against Nonsense Output Gaps'; A.Tooze (2019). 'Output gap nonsense'. *Social Europe*. In addition, see Fatas (2018), 'Self-Fulfilling Pessimism : The Fiscal Policy Doom Loop', *VoxEU.org*. Fatas argues that procyclical fiscal policies in the Euro Area in the post crisis years from 2010 to 2014, were driven by an overly pessimistic view of potential output among EU policy makers, creating a self-fulfilling 'doom loop', which resulted in hysteresis and permanently lower levels of GDP.

Should one expect some level of procyclicality to occur in potential output calculations? Some degree of procyclicality is inherent in the calculation of potential output. For example, recessions are often associated with increases in structural unemployment because of hysteresis effects and firms typically cut investment (which lowers the capital stock) or postpone their adoption of new technologies (which lowers trend TFP growth). In the case of financial and banking crises, the evidence for persistent or even permanent output losses is relatively strong.⁽¹⁰³⁾ The great recession of 2008/2009 in the US and the EU, as well as the sovereign debt crisis in the EU, confirm this evidence by showing persistent negative level effects (Graph I.3.11). In the EU, potential growth rates decreased considerably after

⁽¹⁰³⁾ See Ball, L. (2014). ‘Long-Term Damage from the Great Recession in OECD countries’. *NBER Working Paper No. 20185*. The author found that for the most advanced economies, many of the declines in output after the Great Recession have been matched with corresponding declines in potential output estimates. Similarly see Cerra V. and C. Saxena (2008). ‘Growth Dynamics: The Myth of Economic Recovery’. *American Economic Review*, 98:1, pp. 439-57. Based on a panel of 190 countries over the period 1960 to 2001, the authors found that financial crises are associated with persistent downward level shifts of GDP (in industrialised countries) of the order of magnitude of 7%. See also Romer, C and D. Romer (2017). ‘New Evidence on the Aftermath of Financial Crises in Advanced Countries’. *American Economic Review* 107:10, pp. 3072-3118. Based on a panel of OECD countries, the authors found that GDP was persistently lower five years after an extreme financial crisis. Various reasons for a permanent decline in GDP after financial crises are discussed in the literature. With respect to the labour market, see Yagan, D. (2019). ‘Employment Hysteresis from the Great Recession’. *Journal of Political Economy*, 127, (forthcoming). The author found hysteresis effects for the US due to human capital decay related to longer non-employment spells. Capital costs (including credit tightening) have risen persistently (see Gilchrist, S. and B. Mojon (2018). ‘Credit Risk in the Euro Area’. *Economic Journal* 128:608, pp. 118-58), which must also be seen in relation to the excessively lax credit conditions before the crisis. Capital costs appear to play a bigger role in the EU, possibly related firstly to the greater fragmentation of capital markets; secondly, the slower resolution of banking problems and specifically the issue of non-performing loans (see Kollmann, R., B. Pataracchia, R. Raciborski, M. Ratto, W. Röger and L.Vogel (2016). ‘The Post-Crisis Slump in the Euro Area and the US: Evidence from an Estimated Three-Region DSGE Model’. *European Economic Review* 88, pp. 21-41); and thirdly, the larger exposure of banks to sovereign debt holdings. Credit conditions could also explain a lower level, or even a lower growth rate, of TFP if risk premia for intangible capital and technology adoption are rising. At the aggregate level, lower productivity growth could also be the result of capital misallocation before the boom, i.e. increasing the size of low productivity sectors/firms, which are kept alive after the boom has collapsed (see for example Borio, C., E. Kharroubi, C. Upper and F. Zampolli (2018). ‘Labour Reallocation and Productivity Dynamics: Financial Causes, Real Consequences’. *BIS Working Paper 534*).

the financial crisis due to decreases in the contributions of all three drivers of growth, especially capital and labour and to a lesser extent TFP (total factor productivity). Consequently, when it comes to the EU’s CAM methodology for calculating potential output, the aim is to limit procyclicality whilst prioritising the detection of permanent shifts in potential. Since some degree of procyclicality appears justified, the question therefore is whether the CAM gives a ‘realistic’ or an ‘excessive’, real time signal to policy makers regarding the level and direction of change in the underlying strength or weakness of the economy.



Evaluation of the CAM’s procyclicality performance in the pre-crisis, crisis and post crisis periods: Graphs I.3.12 and I.3.13 give an overview of possible procyclicality in the CAM’s potential output estimates.⁽¹⁰⁴⁾

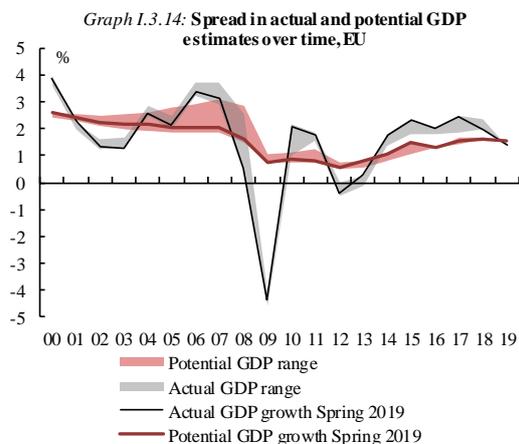
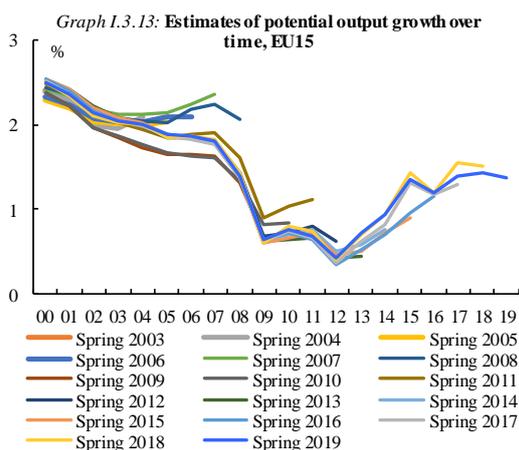
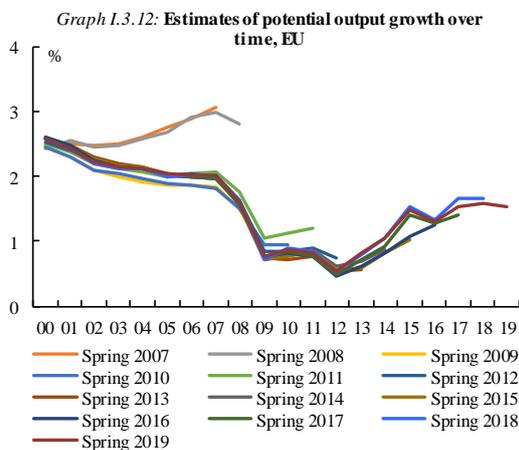
- **Pre-Crisis Period:** In the upswing period leading up to 2008, graphs I.3.14 and I.3.15 show that the CAM’s potential output estimates were showing signs of ‘excessive’ procyclicality, with potential growth rates following actual growth rates too closely and subsequently being revised downwards when more information became available. This can be seen by the area shaded in red in graph I.3.14, which is very wide in the years before the crisis.⁽¹⁰⁵⁾

⁽¹⁰⁴⁾ First vintage available: EU - Spring 2007; EU15 - Spring 2003; final data: Spring 2019

⁽¹⁰⁵⁾ First vintage available: EU - Spring 2007; EU15 - Spring 2003; final data: Spring 2019. The spread is defined by the lowest and highest number of the growth rates ever estimated. More specifically, the 2010 value in the full line comes from the Spring 2019 estimate. The highest estimate we ever made for 2010, creates the top of the spread. This only includes estimates up until the nowcast value (e.g.

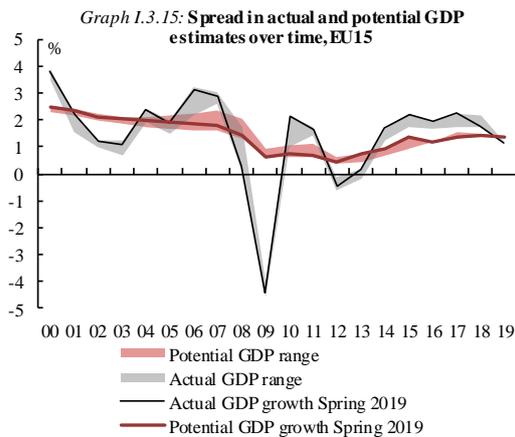
- 2009 Crisis:** Looking at the potential output series from the spring 2019 forecasts (the ‘full’ red line), one sees a clear break in the series around 2009, with potential output falling below historical rates. ⁽¹⁰⁶⁾ The CAM handled this shock to previous patterns of potential growth very well, producing realistic and stable potential growth rate estimates compared with the HP filter, in real time, which signalled to policy makers the permanent, rather than cyclical, nature of the output loss. The crisis period is therefore an example of ‘realistic’ procyclicality.
- In the spring 2009 forecast, the CAM essentially halved its estimated potential growth rates for the euro area and the EU for 2009 and 2010 to 0.7% and 0.8% respectively. Since 10 years have now elapsed, the spring 2019 estimates for 2009 and 2010 can be considered largely final and factual, with those estimates being almost identical to those of the CAM’s spring 2009 assessment for 2009 and 2010, with a maximum difference of 0.1 of a percentage point for both the euro area and for the EU as a whole.
- Consequently, the CAM produced economically accurate and stable estimates in spring 2009 of the short run effects of the crisis, which have not been revised over the last 10 years. In addition, the CAM’s realistic assessment of the short term impact on potential of the financial crisis, and the knock-on implications for output gaps, contrasts sharply with the assessment of its predecessor, the HP filter. In spring 2009, the CAM’s output gap estimates for the euro area for the years

2009 and 2010 were -2.8% and -3.6% respectively, with the HP filter suggesting a zero output gap in 2009 and, extraordinarily, a positive output gap of 0.1% in 2010.



Spring 2010 has estimates until 2010). The lower end of the spread is then given by the lowest estimate ever made for the year 2010 in all vintages. Graphs I.3.12 and I.3.13 show the different forecast vintages - the shorter the line, the earlier the vintage. Graphs I.3.14 and I.3.15 are directly related to Graphs I.3.12 and I.3.13 but instead of giving all of the estimates from all of the vintages, graphs I.3.14 and I.3.15 try to provide a visual overview of the range or spread of the estimates by focusing in on the maximum and minimum values. The grey and red areas therefore are created by the maximum and minimum estimate for the potential or actual GDP growth rates, over all of the vintages between Spring 2003 and Spring 2019. The two full, black and red, lines show the latest Spring 2019 estimate for both actual and potential GDP growth. Graphs I.3.14 and I.3.15 essentially provide a summary visualisation of the CAM’s procyclicality performance in the pre-crisis, crisis & post crisis periods.

⁽¹⁰⁶⁾ The Spring vintages are used for this analysis in order to facilitate a focus on the current year forecasts and to allow a 10 year comparison of the post-crisis Spring 2009 vintage with Spring 2019.



- Period after 2009:** In the first vintages after the crisis, growth in potential output was forecast to be low, but in fact those predictions were not low enough and were subsequently revised downwards. In other words, the CAM, in most of the vintages since spring 2009, underestimated the permanent loss of GDP growth induced by the crisis. On the basis of the spring 2019 forecasts, estimates for the potential GDP growth rates for 2010-2012 (the 'full' red line) are at the lower end of the band of predictions over this period. Consequently, the EU's methodology did not display 'excessive' procyclicality in this period since, in general, the CAM has had to revise its potential growth estimates down, not up, after observing the new facts on actual growth developments.
- A similar conclusion is evident for the early years of the recovery period from 2013 onwards. One can see from graphs I.3.14 and I.3.15 that whilst the potential growth rate estimates moved in line with actual GDP, the degree of procyclical tracking was limited. Over time, the real time potential growth rates ('full' red line) were revised upwards, with the spring 2019 estimates for potential GDP during the 2013-2017 period being at the higher end of the prediction range. In other words, the CAM estimates displayed prudence/cautious optimism in the early recovery stage of the upswing phase, with few signs of 'excessive' procyclicality.
- However, as the recovery became more persistent after 2017, tentative indications of 'excessive' procyclicality, in the form of unrealistic real time optimism, become visible, with the CAM's real time potential growth

projections tending to rise too much in the advanced upward phase of the cycle, only to be followed by downward revisions in subsequent vintages.

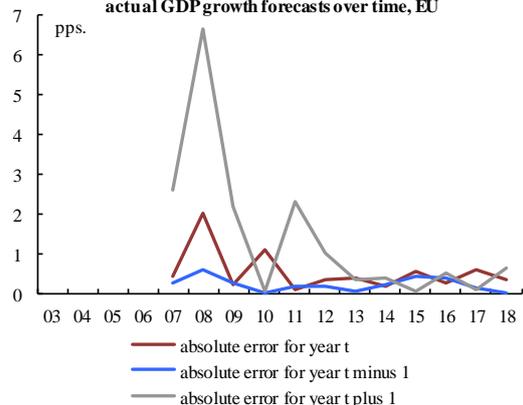
Why do most of the procyclicality problems appear to occur in the advanced upswing phase of cycles?

Whilst the analysis above showed only small revisions of the CAM in the crisis years as well as in the downswing and early upswing stages of the current cycle, it also showed that the CAM appears to be vulnerable to larger errors in the more advanced upswing stage of business cycles. Indeed, the CAM's potential output estimates based on the most recent forecast vintages, do show some tentative signs of 'excessive' procyclicality. Although it is clear from graphs I.3.14 and I.3.15 that the degree of unrealistic procyclicality currently evident is significantly lower than in the pre-crisis period, 'excessive' procyclicality does appear to be an entrenched feature of estimates in the advanced upswing stage of cycles. This section will examine the methodological and non-methodological factors behind CAM's difficulty in removing the cyclical component of actual GDP developments in the upswing stage of cycles.

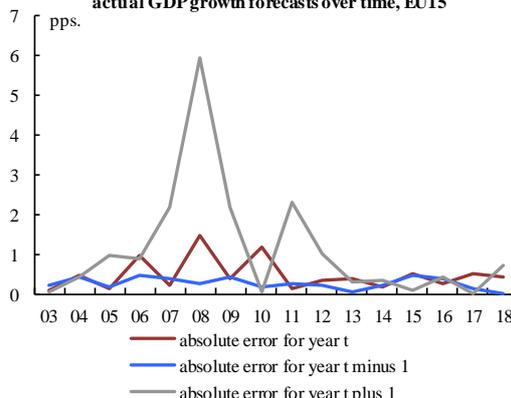
Regarding methodological factors, as the mood of economic agents shifts in the expansion phase of the cycle, it becomes difficult for all trend extraction methods, including the CAM, to make an accurate distinction between the realistic future expectations of consumers and investors and the emergence of irrational exuberance. In addition, the CAM, for sound theoretical and practical measurement reasons, does not cyclically adjust the investment inputs into the potential output calculations (essentially the CAM produces a measure of potential, not equilibrium, output), with the result that it depends heavily on the quality of its cyclically adjusted TFP series. On the labour side, the population of working age variable is also not cyclically adjusted. Whilst the CAM correctly shows a boost to potential growth in countries enjoying strong inward migration due to buoyant economic conditions, it seems to struggle to decipher whether those migration flows are sustainable, long term shifts, or if they are largely cyclical, as was the case for many countries in the pre-crisis period.

Regarding the non-methodological factors explaining the optimistic bias in the advanced upswing stage of cycles, one factor which has not been given sufficient attention in the literature, is the role played by the optimistic bias of forecasts in this stage of the cycle. A major reason for this bias is the general difficulty forecasters have to correctly flag the possibility of business cycle downturns. Although recessions are relatively common, Commission, OECD and IMF forecasters have almost never forecast a negative growth rate in the second year of their short term forecasts. In this context, graphs I.3.16, I.3.17, I.3.18 and I.3.19 ⁽¹⁰⁷⁾ show the absolute revisions to the Commission’s spring actual and potential GDP growth rate projections over time. As one can see from the graphs, there are minimal changes in each Spring forecast round to the T-1 actual GDP estimates (which one would expect). In addition, revisions to the year T forecast are relatively small. However, one year ahead forecasts tend to see significantly more revisions.

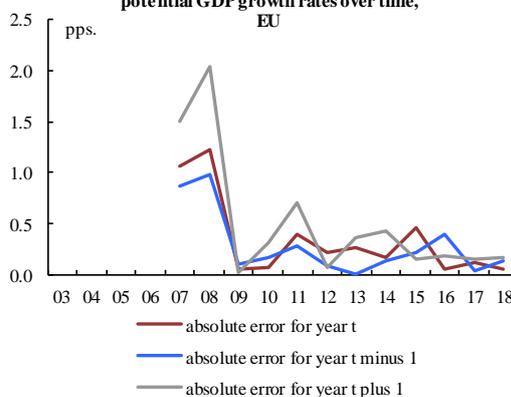
Graph I.3.16: Absolute revisions to the Commission’s actual GDP growth forecasts over time, EU



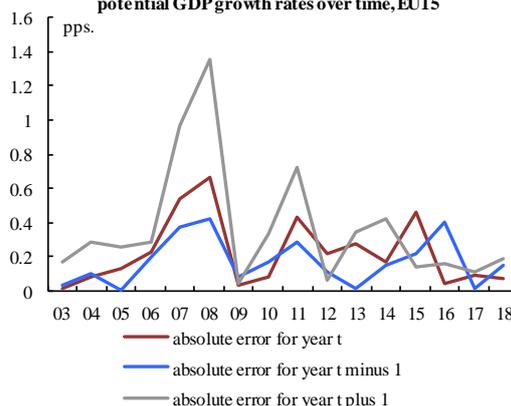
Graph I.3.17: Absolute revisions to the Commission’s actual GDP growth forecasts over time, EU15



Graph I.3.18: Absolute revisions to the Commission’s potential GDP growth rates over time, EU



Graph I.3.19: Absolute revisions to the Commission’s potential GDP growth rates over time, EU15



⁽¹⁰⁷⁾ First vintage available: EU - Spring 2007; EU15 - Spring 2003; final data: Spring 2019

These revisions in actual GDP forecasts, of course, influence the revisions in potential output growth (Graphs I.3.18 and I.3.19), with the differences in the scales for both graphs needing to be considered. On average, at the level of the euro Area and the EU as a whole, for every one percentage point revision in actual GDP, potential output changes by roughly 1/3 of a percentage point. Moreover, several individual member states

may see a larger change in estimates of their potential rates due to revisions in actual GDP (i.e. a change in excess of 1/3) because of two factors:

- Firstly, the *pattern of the actual GDP growth revisions*, and particularly the degree of persistence displayed, plays a very important role in deciding the cyclical versus structural decomposition of any actual GDP change. This explains why the signal given in the second year of the actual GDP forecast is very important for the accuracy of the CAM.
- Secondly, the *composition of the actual GDP growth forecasts* and the input variables driving those revisions are also fundamental. More specifically, since the investment and population of working age variables are not smoothed in the CAM (i.e. they lead directly to changes in potential output), a strong revision for investment growth (especially housing investment) or for population of working age growth (driven, for example, by volatile migration flows) has important knock-on implications for the potential growth rate revision.

Consequently, it is both the pattern of the actual GDP growth rate forecasts (i.e. whether the upward or downward actual GDP revisions are one-off or persistent in nature) and the composition of these forecasts (particularly the extent to which revisions are driven by investment or demographic developments) that influences the proportion of the revision that is considered structural or cyclical.

Concluding Remarks

This special topic has looked at the cyclical properties of the CAM's potential output estimates for EU aggregates. It argues that a certain degree of procyclicality is justified and that it is appropriate that the capital stock and the population of working age variables are not cyclically-adjusted (since the CAM is measuring potential, not equilibrium, output). The main focus of the analysis has been on distinguishing between 'realistic' and 'excessive' (i.e. unrealistic) procyclicality. Whilst pre-crisis potential output estimates showed clear signs of 'excessive' procyclicality, this was not a feature of the estimates during the crisis itself or in the post-crisis period. The improvements made to the CAM's NAWRU and TFP trend estimates in the

post-crisis period, in particular the introduction of the new TFP methodology in 2010, all helped to reduce the CAM's overall degree of procyclicality, with the result that the CAM avoided the 'undue pessimism' of the HP filter-based methodology in the post-crisis years.

In assessing periods of both 'excessive' and 'realistic' procyclicality, the analysis focused on answering two key questions. First, did the EU's CAM produce excessively negative potential growth rate forecasts in the aftermath of the 2008 financial crisis? Secondly, did the CAM display a pessimistic bias over the post crisis period by tracking too closely the low actual GDP growth rates, thereby signalling unrealistically negative future growth expectations for the EU?

- In relation to question 1, the evidence shows that the CAM's assessment of the short-term impact of the crisis was remarkably realistic. It is now clear, 10 years on, that there was a genuine trend break in the EU's growth prospects in 2009 and that the halving of the CAM's potential growth estimates following the crash in Spring 2009 was not a reflection of a procyclicality bias. Since trend growth has been on a lower path in the post crisis period than it was in the post-2000 years, the CAM clearly helped provide policy makers with a more credible/realistic path for future growth rate expectations. In addition, the CAM was not procyclical enough in the post crisis years as the real time CAM predictions had to be progressively revised downwards in subsequent forecast vintages. This absence of 'excessive' procyclicality in the post-crisis period contradicts the 'self-fulfilling pessimism' hypothesis referred to by Fatas (2018).
- Regarding question 2, although there are no clear signs of a procyclicality problem for the CAM during the crisis or in most of the post crisis period, some tentative signs of excessive procyclicality appear to be emerging in recent forecast vintages. Given the CAM's optimistic bias, the biggest risk regarding the emergence of instances of 'excessive' procyclicality is in the advanced upswing stage of any cycle, with this risk due to both forecast issues (i.e. the in-built optimistic bias in the second year of economic forecasts) and methodological issues (i.e. the fact that the capital or population of working age variables are not smoothed in the

CAM, rather than to any serious problems in relation to trend TFP or the NAWRU).

Finally, whilst the CAM performed relatively well in the post crisis downswing period, only time will tell if it has also managed to avoid any ‘false’ optimism in the current stage of the cycle. The evidence so far seems to suggest that the investment bubble which preceded the 2008 crisis seems currently not to be emerging (with investment growing broadly in line with its endogenous determinants, namely labour and TFP growth) and that recent population of working age

trends appear less cyclically driven than in the pre-crisis period. However, given the uncertainties involved, it is clear that great vigilance will be needed to ensure that the CAM’s potential output estimates remain prudent. Ongoing vigilance is essential given that the credibility of the CAM ultimately rests on its ability to provide a realistic growth outlook with which to guide the expectations of both economic agents and policy makers in the EU.