CASE Reports

Economic recovery and inflation

Marek Dabrowski

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Abstract

In the last decade, advanced economies, including the euro area, experienced deflationary pressures caused by the global financial crisis of 2007–2009 and the anti--crisis policies that followed—in particular, the new financial regulations (which led to a deep decline in the money multiplier). However, there are numerous signs in both the real and financial spheres that these pressures are disappearing. The largest advanced economies are growing up to their potential, unemployment is systematically decreasing, the financial sector is more eager to lend, and its clients—to borrow. Rapidly growing asset prices signal the possibility of similar developments in other segments of the economy. In this new macroeconomic environment, central banks should cease unconventional monetary policies and prepare themselves to head off potential inflationary pressures.

Executive Summary

- In the last decade, advanced economies, including the euro area, experienced deflationary pressures caused by the global financial crisis of 2007–2009 and the esulting collapse in financial intermediation which, in turn, led to a deep decline in the money multiplier and the money supply. The anti-crisis policies aimed at avoiding a deflationary spiral similar to that of 1929–1933 (by means of unconventional monetary policies, including quantitative easing) and repeating financial crises in the future (by tightening financial regulation) further pushed the money multiplier down. Other deflationary shocks have come from the decreasing money velocity and the collapse of world commodity prices in 2014–2015. However, these deflationary factors have had either a temporary or one-off character.

- In 2016–2017, economic and monetary conditions started to change: most advanced economies, including the euro area, entered a path of economic growth and have either already closed or are about to close the negative output gap. There are signs of rising inflationary pressures, in particular, on asset markets. The post-crisis deflationary factors are gradually disappearing. Commodity prices have started to increase again. The money multiplier and money velocity are unlikely to continue their decline and may start recovering soon, reflecting greater consumer and investment confidence and faster credit growth.

- The recent growth recovery takes place in a low-inflation environment. This means that low or even moderately negative inflation (for a certain period of time) does not need to be damaging for growth and employment and that a Phillips curve type of interrelation between inflation and unemployment does not necessarily hold in these new circumstances.

- In the new macroeconomic environment, major central banks, including the ECB, must prepare themselves to deal with potential inflationary pressures, which were largely absent in the last decade. They should not continue pushing inflation up to the

officially-targeted level of 2%. There is nothing wrong if inflation remains below 2%, so long as the economy is growing and a country's negative output gap is disappearing. Instead, they must focus their attention to avoid the risk of building new asset bubbles (which may lead to a new round of financial crises if they burst) and overheating their economies.

- Central banks must also intensify their work on departing from unconventional monetary policy measures. It will not be an easy process because of the potential consequences for financial markets (changes in the profile of the yield curve) and governments (pushing up the price of government securities), but this is the reason to start normalisation sooner rather than later.

- As one of the lessons from the post-crisis experience, policy makers should remember the strong impact of changes in financial regulation on the monetary condition, a factor which was not always sufficiently understood in the last decade. Another lesson points to the importance of constructing a broader price aggregate which, apart from consumer prices, would also include asset prices. This could help avoid the illusion of low inflation in situations where asset markets are evidently overheated.

1. Introduction

A bit more than a decade has passed since the real estate market imploded in the United States (US) in the summer of 2007, starting the most severe global financial crisis in the post-WWII era. Central banks in major currency areas faced the dramatic challenge of how to avoid a deep deflation and depression of the sort experienced by the world economy in the late 1920s and early 1930s. This task has been largely accomplished by aggressive monetary easing, including the prolonged use of unconventional monetary policy measures such as asset purchase programmes (quantitative easing) and negative interest rates. The period of the crisis-related recession was relatively short—in most advanced economies (AE)[1] it was limited to the second half of 2008 and the first half of 2009. Most emerging market and developing economies (EMDE) did not experience a recession at all. A deflationary spiral was avoided even if the consumer price index (CPI) was temporarily negative. However, the side effect of this success was a prolonged period of slow growth, stagnation, or even moderate recession, depending on the country.

Only very recently, AE, including the European Union (EU) and euro area (EA), entered a path of economic recovery; however, inflation remains low—in most cases, below central banks' inflation targets. In this context, the question arises whether low inflation is the "new normal"—that is, has it become independent of the business cycle and is it driven by deeper structural institutional changes in individual AE and the world economy as a whole? Or is it only a temporary legacy of the global crisis and post-crisis policies, which may one day disappear?

This paper[2] presents a brief analysis of the factors which influenced inflation trends in three major AE (the US, the EA, and Japan) in the last decade and the potential durability of these factors in the foreseeable future.

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1 The terms *advanced economies and emerging market and developing economies* are borrowed from the International Monetary Fund's World Economic Outlook (IMF WEO) country grouping; for the most recent version of this grouping, see http://www.imf.org/external/pubs/ft/weo/2017/02/weodata/weoselgr.aspx.

2 This is a reformated version of the briefing paper prepared in response to the request of the European Parliament's Committee on Economic and Monetary Affairs ahead of the European Parliament's Monetary Dialogue with the President of the European Central Bank on 26.02.2018 – http://www.europarl.europa.eu/committees/en/econ/monetary-dialogue.html. The opinions expressed in this paper are the sole responsibility of the author and do not necessarily represent the official position of the European Parliament, CASE or other institutions, which the author is associated with. The author would like to thank Kristen Hartwell for her editorial support.

Our analysis will start with a review of macroeconomic trends since 2000 and the available macroeconomic forecasts for major AE (Section 2), followed by a discussion of the factors which may be responsible for low inflation, such as changes in financial intermediation, other structural changes, various supply-side shocks, and the absorption of excess liquidity by asset markets (Section 3). In this section, we will also try to assess whether the analysed factors have a temporary or durable character and, in the case when we deal with irreversible changes, whether they have a one-off character or whether the new trend may continue. Based on this analysis and its findings, we will formulate recommendations for the monetary policies of major central banks for the next few years (Section 4). Section 5 will present conclusions.

In our analysis, we will use the data sources of the International Monetary Fund (IMF), Eurostat, the European Commission, the European Central Bank (ECB), Frankfurt' Stock Exchange, and Robert Shiller's database on US stock and home prices.

Our working hypothesis is that while the decade following the global financial crisis of 2007–2009 was unique for monetary policy makers due to the extraordinary macroeconomic circumstances created by the crisis itself, the anti-crisis policies that followed, and some parallel changes of a structural and institutional character (which, in turn, put downward pressure on inflation), many of these circumstances have had a one-off or temporary character. In other words, central banks must be ready to respond to inflationary pressures, which may return at some point.

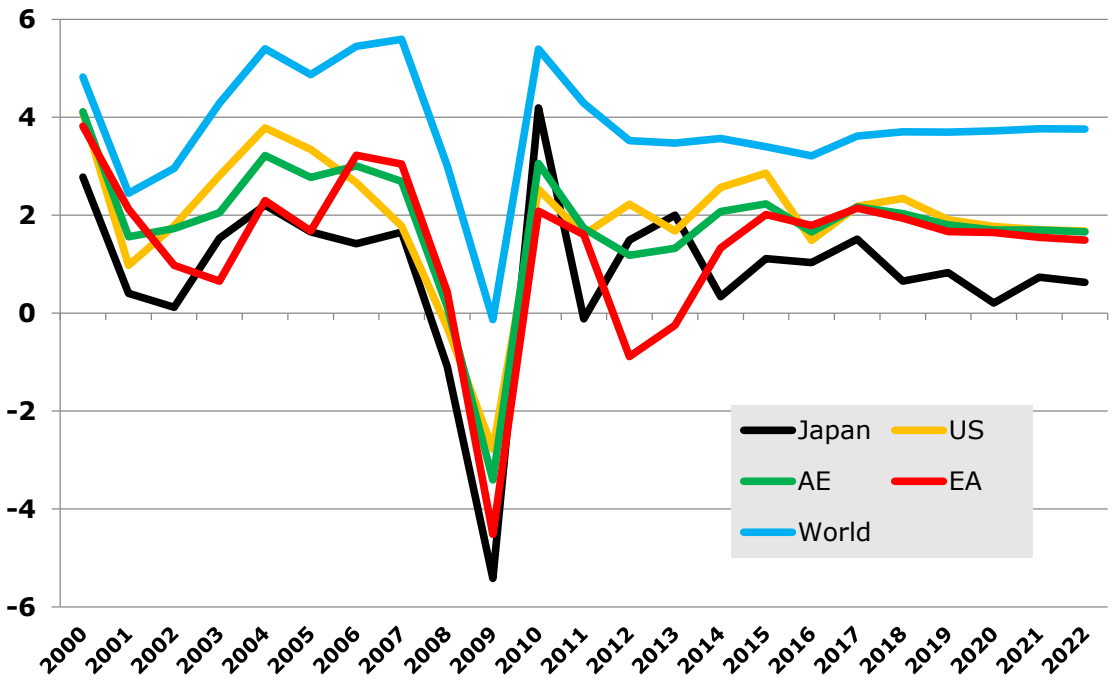
2. Analysis of macroeconomic trends

In this section, we analyse the dynamics of GDP, inflation, and unemployment in the three largest AE—the US, the EA, and Japan—between 2000 and 2016 (Subsection 2.1), the interrelations between these three variables (Subsection 2.2), and the differences in the macroeconomic situation within the EA (Subsection 2.3). We also review the available short-to-medium term forecasts related to the major AE (Subsection 2.4).

2.1. GDP, inflation, and unemployment trends between 2000 and 2016

Figures 1-3 present the annual changes in real GDP, end-of-year inflation, and unemployment rates in the US, the EA, and Japan for the period of 2000–2016, according to the IMF World Economic Outlook database, October 2017 edition. For comparison, we also present aggregate data for all AE and, in the case of GDP, additionally for the entire world economy. In addition, each figure contains IMF estimates and forecasts for the period of 2017–2020—the subject of our analysis in Subsection 2.4.

Figure 1: Annual change in GDP, constant prices, 2000–2022 (in %)



Source: IMF World Economic Outlook database, October 2017

Regarding GDP dynamics, Figure 1 clearly shows that both AE as a group and the three largest AE analysed here have not been this century's leaders of the world's economic growth (in fact, they had already lost their leadership roles in the early 1990s). Global growth has been increasingly driven by the catch-up growth of EMDE before, during, and after the global financial crisis of 2007–2009.

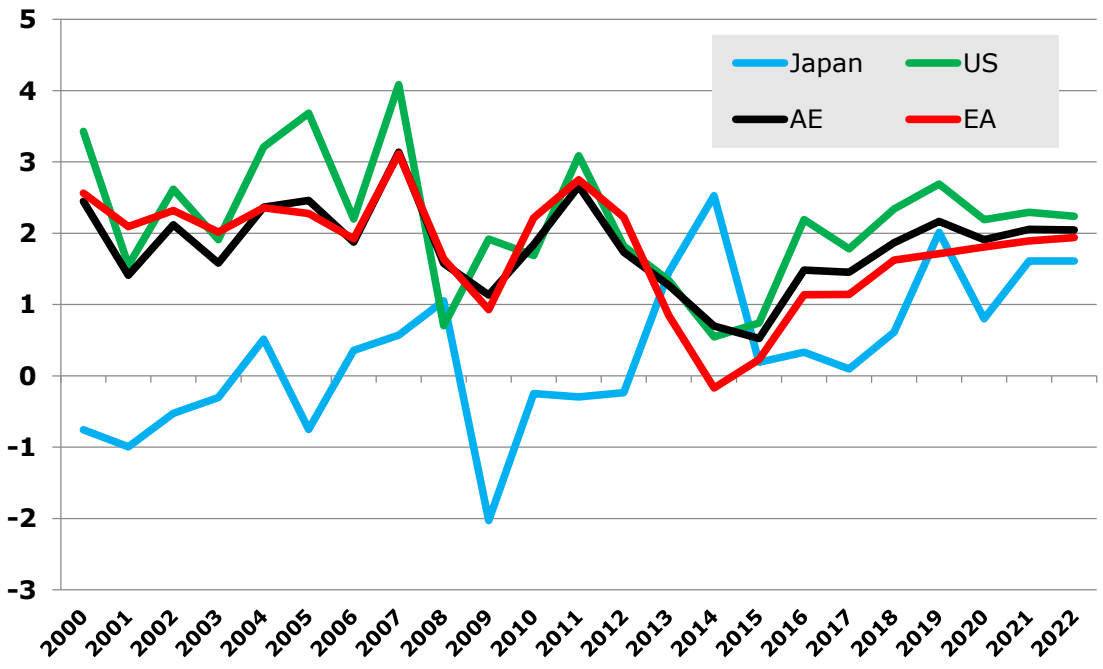
As compared to the AE average, the US outperformed the others for most of the examined period, except for 2001 (the dotcom recession and the shock which followed the 9/11 terrorist attack), 2006–2008, 2010, and 2016. Japan systematically underperformed, except for 2010 and 2013. The EA also underperformed, except for 2001, 2006–2008, and 2016; however, it performed better than Japan, except for 2003 and 2012–2013 (the peak of the EA financial crisis).

Comparing the EA with the US, the former represented two periods of lower growth—between 2002 and 2005 and between 2009 and 2015. Recently, in 2016-2017, the growth rates of both economies tend to converge.

A decade after the eruption of the global financial crisis, it is also clear that neither the global economy nor the AE are going to return to their pre-crisis rates of growth,

at least in the near future. This is not only a consequence of the unhealthy character of the pre-crisis boom, which was based on several financial bubbles (see Dabrowski, 2010), and crisis-related wounds (for example, far-reaching financial deleveraging—see Subsection 3.1), but also a consequence of changes in supply-side factors—not always necessarily in favour of faster growth, such as a decline in the working-age population (Europe and Japan), population aging, and the end of the main phase of the third industrial revolution based on the mass implementation of information and communication technologies (ICT), which caused the slow growth in total factor productivity as compared to the second half of 1990s and early 2000s (Gordon, 2016, p.).

Figure 2: Inflation, end of period, 2000–2022 (in %)



Source: IMF World Economic Outlook database, October 2017

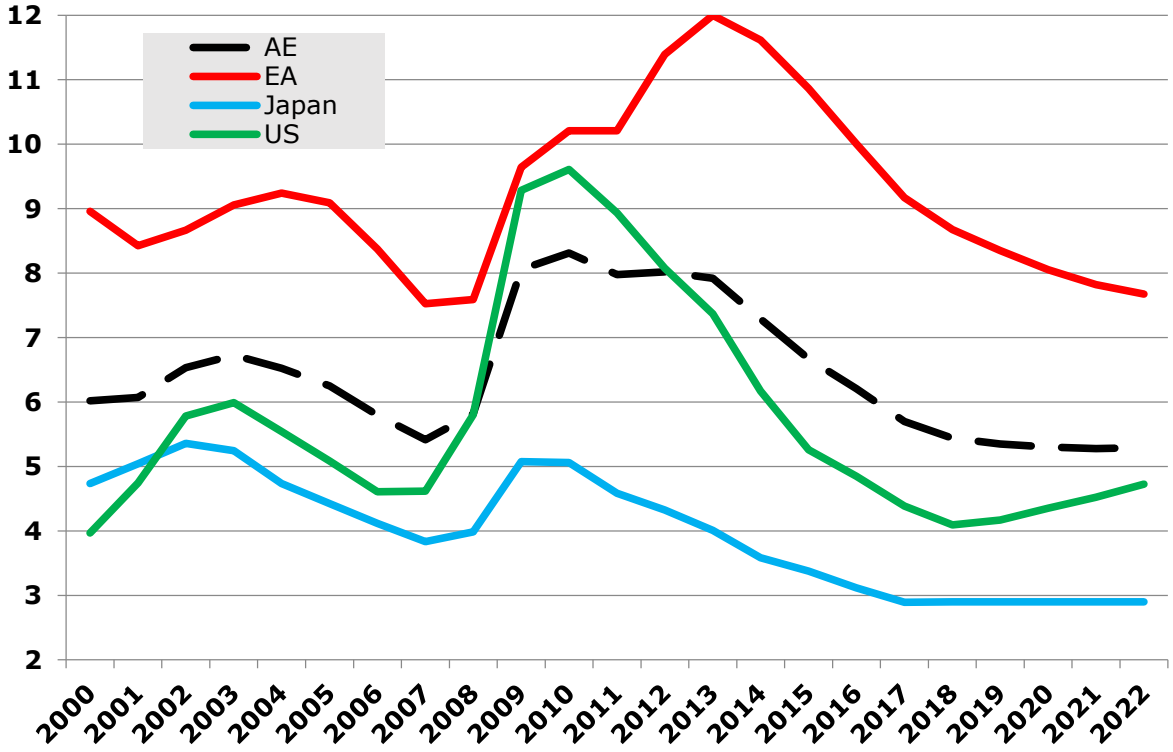
Figure 2 shows that the inflation rate in Japan was systematically lower than in other AE, except for a short episode in 2014. In several years (2000-2003, 2005, and 2009–2012), it was even negative, feeding the debate on the Japanese deflation trap (see e.g., Krugman, 1998; Ito and Mishkin, 2004; Murphy, 2016). Since 2000, the US has not recorded a negative inflation rate, and the EA—only once in 2014 (-0.2%). This means that the

fear of deflation so prevalent in the economic debates of both early 2000s and early 2010s was not well grounded.

For most of the examined period, except for 2001, 2003, 2008, 2010, and 2015, the EA had lower inflation than the US. However, until 2012, the EA inflation rate frequently exceeded the level of 2% (the upper inflation target of the ECB). This occurred in 2000–2002, 2004–2005, 2007, and 2010–2012. In several years (2000, 2002, 2004–2007, 2011, and 2016), US inflation also exceeded 2%, the official inflation target of the Fed since 2012. Furthermore, US inflation performance has been slightly more volatile as compared to the EA, especially in the period preceding the global financial crisis. However, Japanese inflation was the most volatile among the three largest AE.

Figure 3 shows that the differences in the unemployment rates of the three analysed AE have a systematic character. Japan has had the lowest unemployment rates, well below the AE average, despite also having the lowest inflation and growth rates. The US have also recorded unemployment rates below the AE average, except for the post-crisis period of 2009-2012, but higher than those of Japan. The EA has had the highest level of unemployment, above the AE average. The differences in unemployment rates seem to be determined by the differences in the labour market institutions in individual economies.

Figure 3: Unemployment rate, 2000–2022 (in % of total labour force)

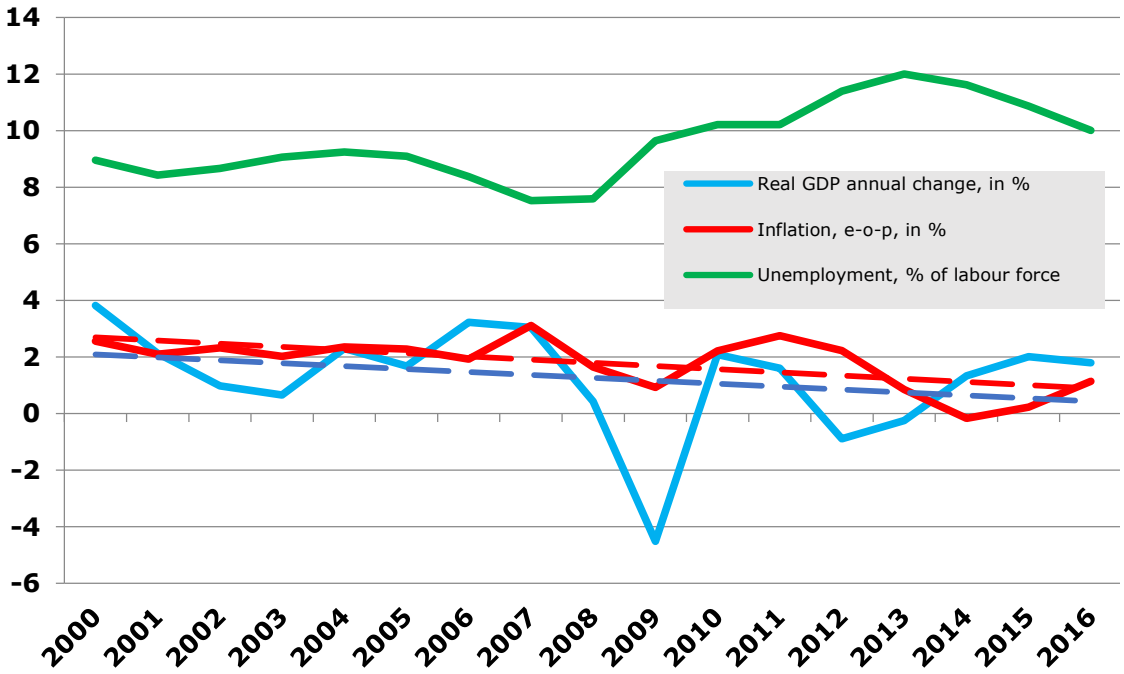


Source: IMF World Economic Outlook database, October 2017

2.2. Interrelation between growth, inflation, and unemployment

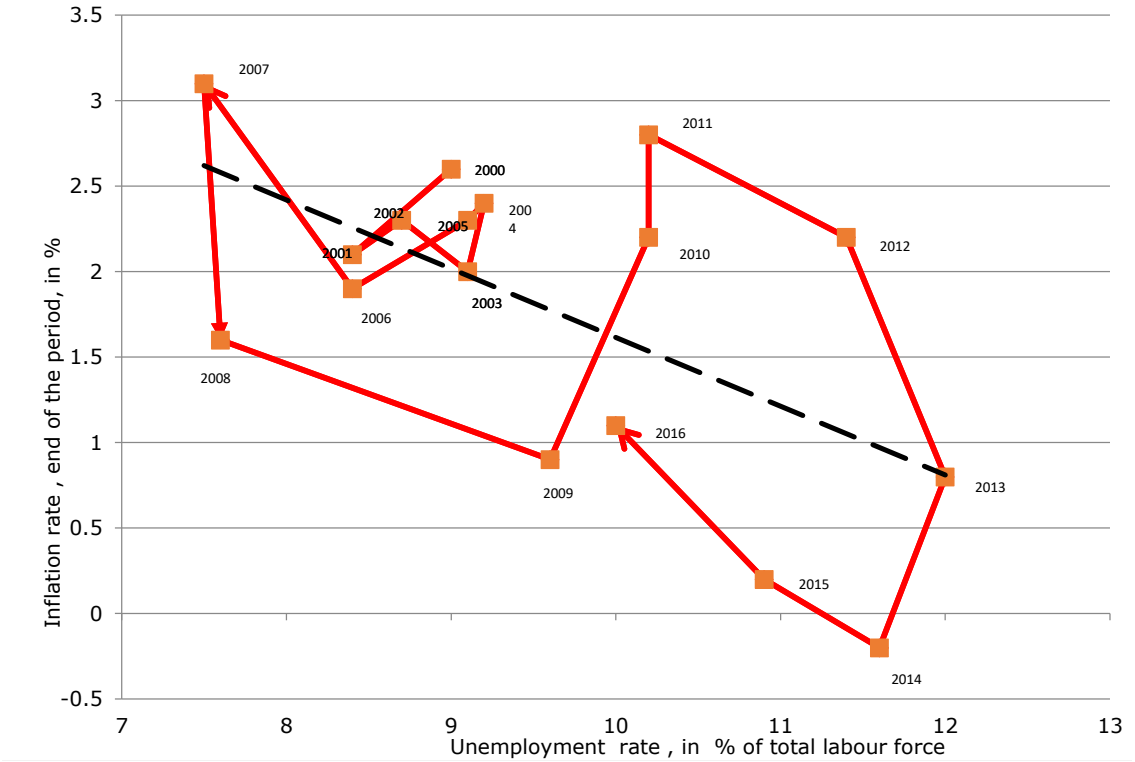
Figures 4, 6, and 8 show the changes in real GDP, inflation, and unemployment for each analysed country, while Figures 5, 7, and 9 plot inflation rates against unemployment rates for each country and each year between 2000 and 2016 (they may be considered as a sort of Phillips curve).

Figure 4: Euro area: real GDP, inflation, and unemployment, 2000–2016



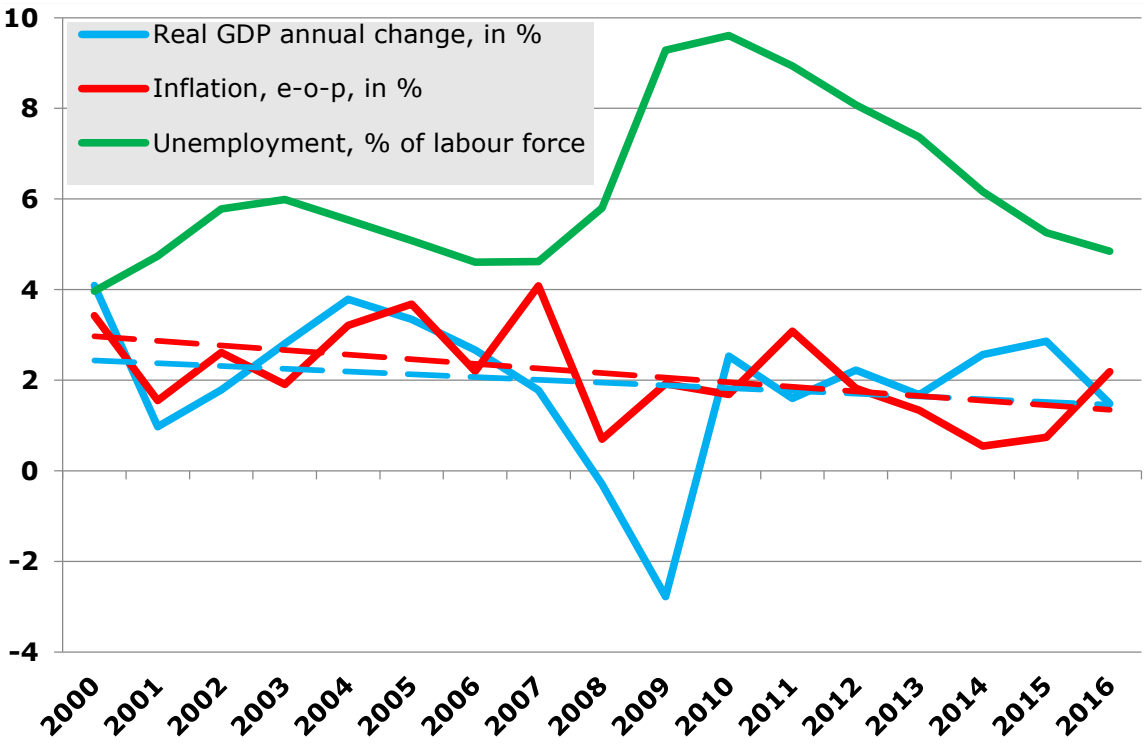
Source: IMF World Economic Outlook database, October 2017

Figure 5: Euro area: interrelation between inflation and unemployment, 2000–2016



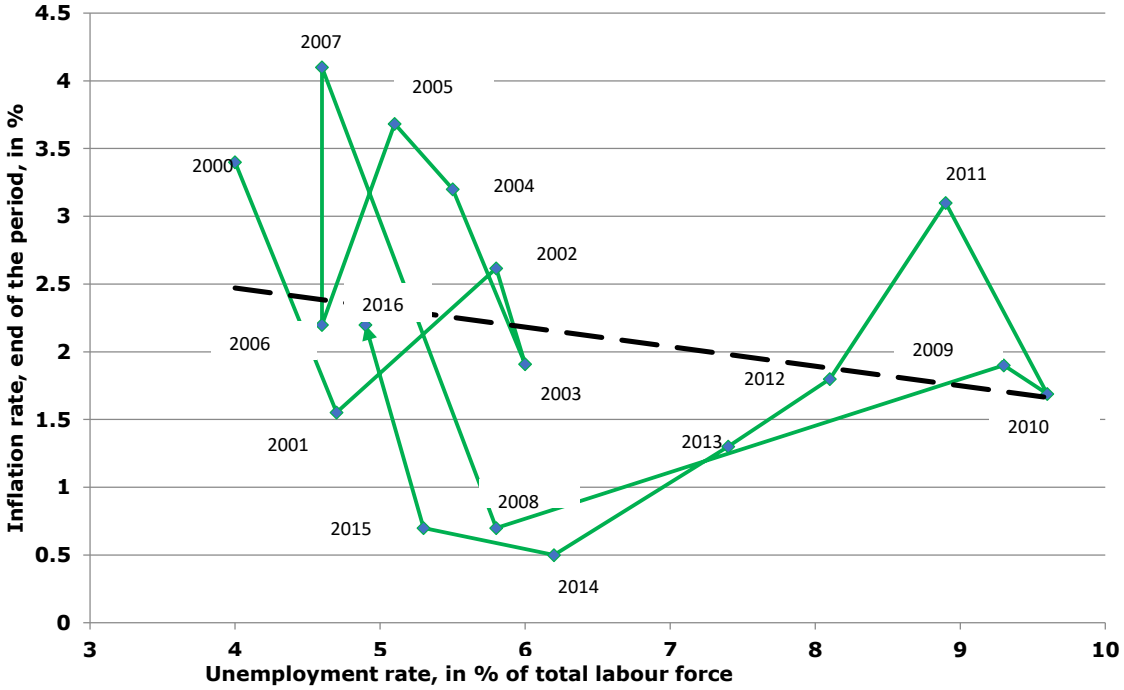
Source: IMF World Economic Outlook database, October 2017

Figure 6: United States: real GDP, inflation, and unemployment, 2000–2016



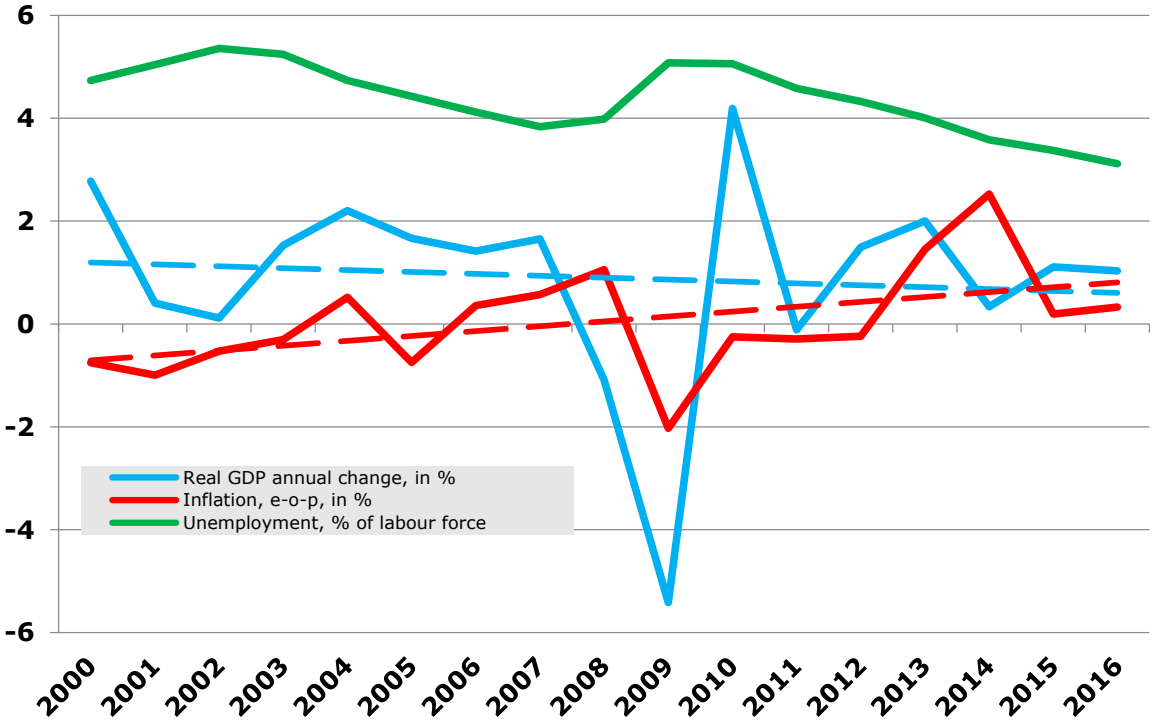
Source: IMF World Economic Outlook database, October 2017

Figure 7: United States: interrelation between inflation and unemployment, 2000–2016



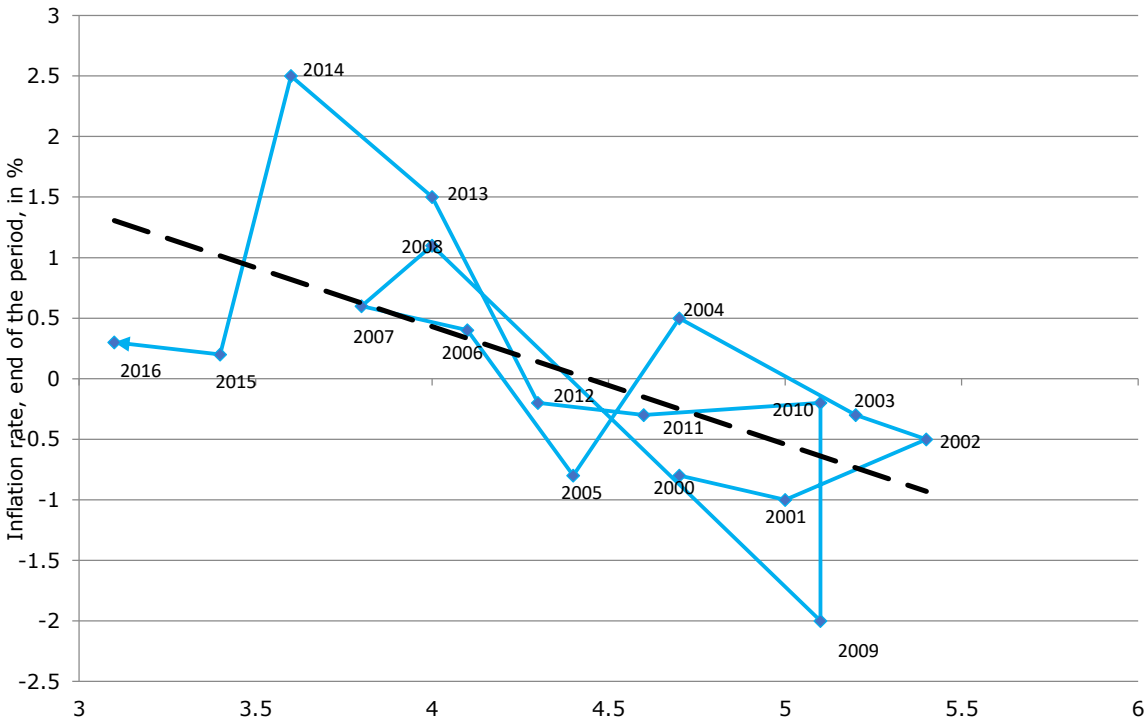
Source: IMF World Economic Outlook database, October 2017

Figure 8: Japan: real GDP, inflation, and unemployment, 2000–2016



Source: IMF World Economic Outlook database, October 2017

Figure 9: Japan: interrelation between inflation and unemployment, 2000–2016



Source: IMF World Economic Outlook database, October 2017

The interrelation between economic growth and unemployment is the easiest to detect and analyse. In all three largest AE, the unemployment rate has been an inverse function of changes in real GDP, with some lag. That is, it decreased following periods of economic growth and increased as a reaction to a recession or growth slowdown. In Japan, the amplitude of these reactions was the weakest (Figure 8), while in the US (Figure 6) – the strongest; the EA (Figure 4) represents the intermediate case.

The interrelation between growth and inflation looks more problematic. Before and during the first phase of the global financial crisis (up to 2010), they broadly moved together; although, for Japan and the EA, changes in GDP were more volatile than changes in inflation. The opposite situation was experienced by the US. However, since 2010, growth and inflation trends have often moved in opposite directions in the three currency areas—that is, periods of declining inflation were associated with growth recovery and vice versa.

Looking at the entire analysed period (2000-2016), the trend lines of growth and inflation moved in parallel only in the EA (Figure 4). In the US (Figure 6), both declined, but at various speeds (inflation faster than growth). In Japan (Figure 8), they moved in opposite directions—that is, growth decreased and inflation increased, which may suggest the ineffectiveness of the continuous anti-deflationary monetary and fiscal policies (see Roach, 2017; Armstrong and Okimoto, 2016). This means that growth and inflation are not necessarily strongly interconnected, in particular, in the post-crisis period, and that the very low inflation experienced in recent years by several economies (not only the three largest AE analysed in this paper) does not necessarily need to be associated with weak growth.

Figures 5, 7, and 9 present the analysis of the interrelation between inflation and unemployment. Again, in the long run, the trend lines demonstrate an inverse relationship between both variables—that is, a sort of Phillips curve relationship, but not very strong. In the short term, however, the changes of both variables do not necessarily follow this pattern—that is, there are periods in which their relationship is positive (in both directions).

2.3. GDP, inflation, and unemployment in the EA economies

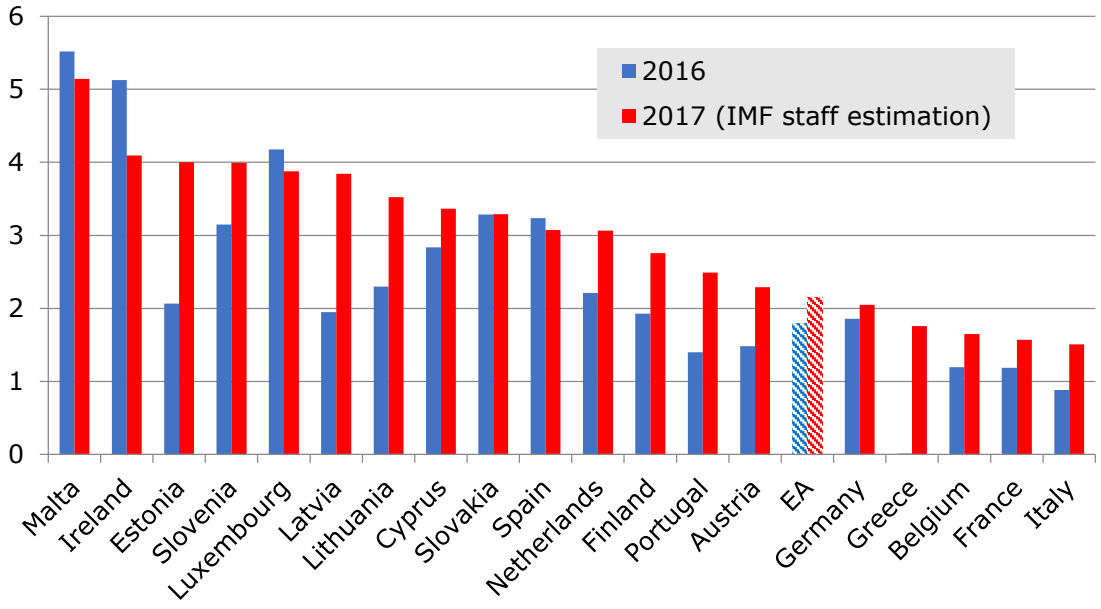
While monetary policy usually aims at stabilising average price level (sometimes also an output growth or unemployment rate) in a given currency area, in the case of the EA, which is a monetary union of largely sovereign states (Dabrowski, 2015a), the ECB cannot ignore macroeconomic developments in individual national economies. For this reason, we take a brief look at the three basic macroeconomic indicators analysed in this section (real GDP growth, inflation, and unemployment) in each EA Member State (Figures 10–12).

IMF estimations confirm that, in 2017, all EA Member States recorded positive growth and, in most of them, the rate of growth was higher (sometimes much higher) than compared to 2016 (Figure 10). While differentiation in the expected 2017 growth rate (from 1.5% in Italy to 5.1% in Malta) cannot be completely ignored, it should not be overdramatised. The highest growth rates concerned the smallest and most open economies, some of which (Ireland, Slovenia, and Cyprus) recovered from the period of recession caused by the financial crisis in the first half of the 2010s. Overall, one can say that in 2016–2017, the EA economies were on the path of economic recovery and that economic growth looked quite solid as compared to the previous half of the decade (see Subsection 2.1).

Similarly, unemployment rates were declining everywhere except Estonia (Figure 12), which could be considered as an additional sign of a solid EA-wide recovery. On the other

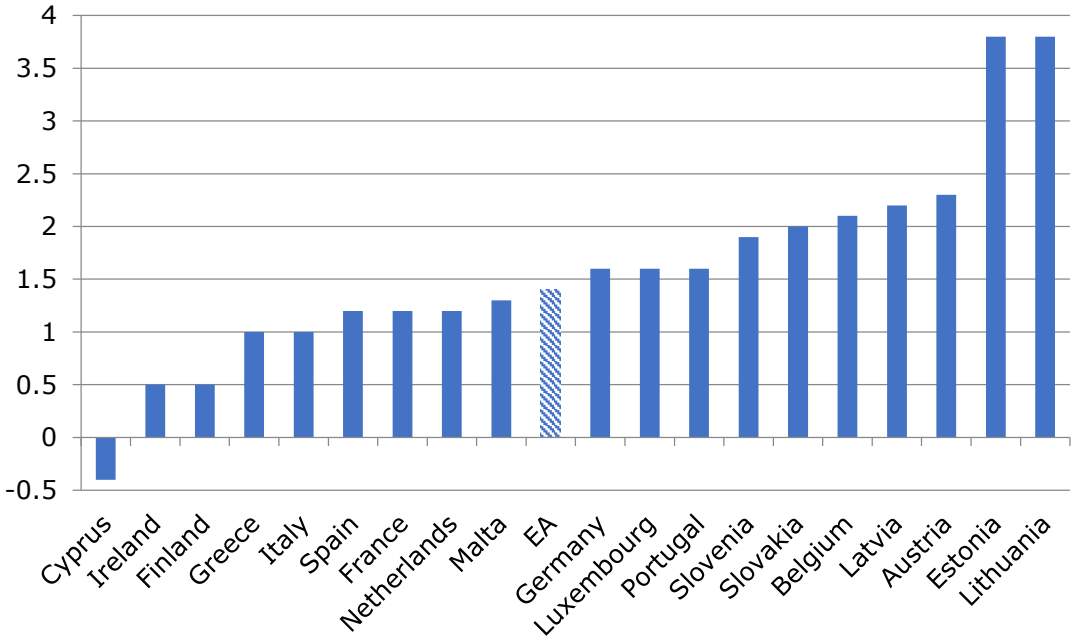
hand, large cross-country differences in unemployment rates (from 3.8% in Germany to 22.3% in Greece) suggest various degrees of flexibility in national labour markets (this is the area of economic policy that remains almost entirely in the competence of EU Member States).

Figure 10: Annual change in GDP, constant prices, EA economies, 2016–2017 (in %)



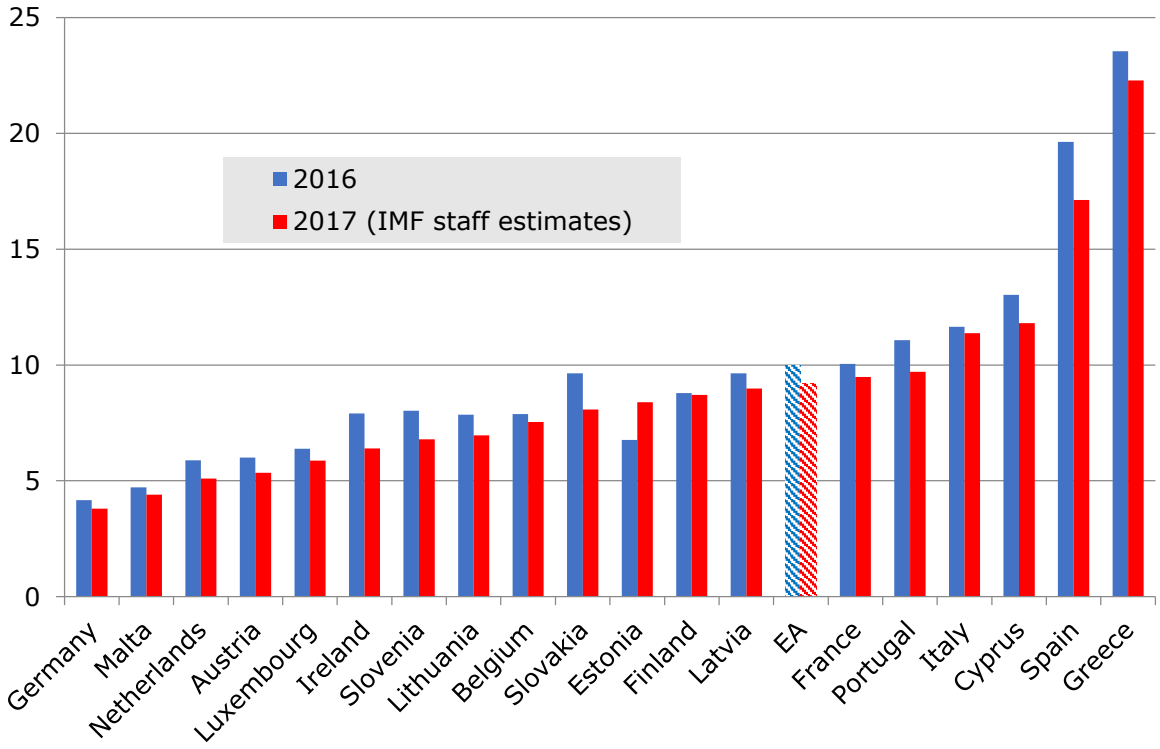
Source: IMF World Economic Outlook database, October 2017

Figure 11: Inflation (HICP), end-of-period, EA economies, December 2017 (in %)



Source: Eurostat, http://ec.europa.eu/eurostat/tgm/web/_download/Eurostat_Table_teicp-000FlagDesc_87bb6bcd-5ae3-4655-a2e3-1e6f8856b1b1.xls

Figure 12: Unemployment rate, EA economies, 2016–2017 (in % of total labour force)



Source: IMF World Economic Outlook database, October 2017

Against such institutional settings, monetary policy can do little or nothing to improve the employment situation in the countries that traditionally suffer from the highest unemployment rates (Greece, Spain, Cyprus, Italy, Portugal, and France).

Concerning the national inflation rates measured in the Harmonised Index of Consumer Prices (HICP) (Figure 11), their differentiation cannot be considered as very strong (given the various sizes and structural characteristics of individual economies) —from -0.4% in Cyprus (the only EA country with a negative inflation rate in 2017) to 3.8% in Estonia and Lithuania. Nevertheless, these two Baltic countries may soon face signs of overheating (IMF, 2017b).

2.4. Looking ahead: review of short-to-medium-term economic forecasts

According to the IMF medium-term forecast (IMF, 2017a), AE, including the EA and Japan, reached their highest growth momentum in 2017; in the case of the US, it should happen in 2018. That is, starting from 2018, the rate of growth in all AE, as well as in the EA, should gradually decrease (Figure 1). This has been caused by closing the output gap (Table 1; IMF, 2017b) and the supply-side constraints mentioned in Subsection 2.1.

In 2017, the output gap was still negative for the entire EA, amounting to approximately –0.5% of GDP (Table 1). However, it will disappear in 2018, according to the same IMF estimates. Looking at individual EA economies, in 2017, the output gap was positive only in Estonia, Germany, Ireland, Luxembourg, Malta, Netherland, Slovakia, Slovenia, and Spain; the other countries recorded a negative gap. In 2018, only Cyprus, Greece, France, Italy, and Slovakia will record a negative gap, according to the same estimates.

Table 1:Major advanced economies: output gap, 2015–2018 (in % of potential GDP)

Economy/ group of economies	2015	2016	2017	2018
Advanced economies	–0.9	–0.8	–0.2	0.1
Japan	–2.1	–1.8	–0.9	–0.7
US	0.0	–0.1	0.3	0.7
EA, of which	–1.9	–1.3	–0.5	0.0
Austria	–1.3	–1.0	–0.1	0.3
Belgium	–0.5	–0.4	–0.1	0.2
Cyprus	–5.6	–3.8	–1.7	–0.6
Estonia	–0.1	–0.2	1.1	1.3
Finland	–2.9	–1.7	–0.7	–0.2
France	–2.4	–2.2	–1.8	–1.3
Germany	0.1	0.4	0.8	1.0
Greece	–5.5	–4.9	–3.8	–2.0
Ireland	–0.4	0.6	1.1	1.0
Italy	–3.3	–2.7	–1.6	–1.0
Luxembourg	0.4	0.5	0.4	0.4
Malta	1.8	1.4	1.2	0.9
Netherlands	–1.4	–0.9	0.4	1.2
Portugal	–3.8	–2.6	–0.6	0.6
Slovakia	0.0	–0.2	0.0	–0.1
Slovenia	–2.3	–0.9	1.0	1.5
Spain	–4.5	–2.3	–0.7	0.3

Note: the source does not contain output gap estimates for Latvia and Lithuania
Source: IMF World Economic Outlook database, October 2017

Despite the sceptical attitude of the author of this paper to practical estimates of output gap (based, in most cases, on an extrapolation of past trends which does not necessarily provide a true ex-ante picture of the period's structural breaks and reforms—see Dabrowski, 2015a), the trend presented in Table 1 suggests that it is not insufficient demand that harms economic growth and that the room for both monetary and fiscal policies to boost growth has been disappearing. If one wants to think about increasing growth potential in a medium-to-long perspective, attention must be given to supply-side constraints, such as relaxing demographic constraints in the labour force supply, increasing the investment rate, and boosting productivity, which has stagnated since the mid-2000s (see Gordon, 2016, p. 602). However, the analysis of these constraints goes beyond the thematic agenda of this paper.

The World Economic Outlook Update published by the IMF in January (IMF, 2018) offers more optimistic estimates (as compared to IMF, 2017a and Figure 1) of real GDP growth for the three largest AE analysed in Subsection 2.1—2.3% for the US instead of 2.1%, 1.8% for Japan instead of 1.5%, and 2.4% for the EA instead of 2.1%. Furthermore, the growth forecast for 2018-2019 is also more optimistic as compared with the October 2017 forecast—by 0.4 and 0.6 percentage points (p.p.), respectively, for the US, by 0.5 and 0.1 p.p. for Japan, and by 0.3 and 0.3 p.p. for the EA.

The Winter 2018 (Interim) Forecast of the European Commission (2018) gives the same growth estimate for the EA in 2017 as the IMF (2018)—that is, 2.4%, a slightly higher forecast for 2018 (2.3%, while the IMF (2018) forecasts 2.2%), and 2.0% for 2019 (the same as that of the IMF, 2018). This means that both the US and the EA are at the peak of the current business cycle and that they have already closed or are about to close the output gap. Hence, the US Fed should continue its monetary policy tightening and the ECB should also consider such a perspective.

The forecasts of other macroeconomic variables confirm this finding. The IMF World Economic Outlook forecast of October 2017 (Figure 3) suggests the unemployment rate will continue to decrease in the EA (though at slow pace), while it will stabilise at its low level in the US and Japan. On the contrary, inflation will continue to rise (Figure 2).

The trend of increasing inflation (up to 1.8% in 2020) has also been predicted in the ECB Survey of Professional Forecasters of January 2018[3]. However, the European Commission (2018) offers a different perspective of inflation for 2018–2019—namely, that it will stabilise around 1.5-1.6%.

3 See: https://www.ecb.europa.eu/stats/ecb_surveys/survey_of_professional_forecasters/html/table_hist_hicp.en.html

3. Factors having an impact on inflation level

In this section, we will analyse the factors that have had an impact on the inflation level since the beginning of the global financial crisis in 2007—namely, changes in financial intermediation and monetary policy instruments, which led to a decline in the money multiplier (Subsection 3.1), changes in money velocity (Subsection 3.2), and supply-side shocks (Subsection 3.3). This will be followed by remarks related to the inflation measurement problem or, more precisely, the imperfection of the CPI as an inflation measure (Subsection 3.4).

3.1. Decreasing money multiplier

The money multiplier is defined as the ratio between the broad money aggregate (i.e. money created by commercial banks and non-banking financial institutions) and the central bank's base money (also called reserve money, the monetary base, or high--powered money). While there are various definitions of broad money, ranging from the sum of cash in circulation, demand, and time deposits (M2) to broader aggregates which also include various quasi-money instruments (M3, M4, or M5)[4], this does not change the basic characteristic of the money multiplication mechanism of a fractional-reserve banking system.

A higher money multiplier increases the broad money created by a unit of the central bank's base money. On the contrary, a lower money multiplier decreases broad money, other things being equal (see Dabrowski, 2015b).

Figure 13 shows that the money multiplier collapsed dramatically in the three major currency areas since the beginning of the global financial crisis. Between 2007 and 2016,

4 These definitions vary between monetary jurisdictions. The ECB uses aggregates of M1 (the sum of currency in circulation and overnight deposits), M2 (the sum of M1, deposits with an agreed maturity of up to two years, and deposits redeemable at a notice of up to three months), and M3 (the sum of M2, repurchase agreements, money market fund shares/units, and debt securities with a maturity of up to two years) – see http://www.ecb.europa.eu/stats/money/aggregates/aggr/html/index.en.html. While the M1 represents "narrow" money, the M2 and M3 are two various measures of "broad" money.

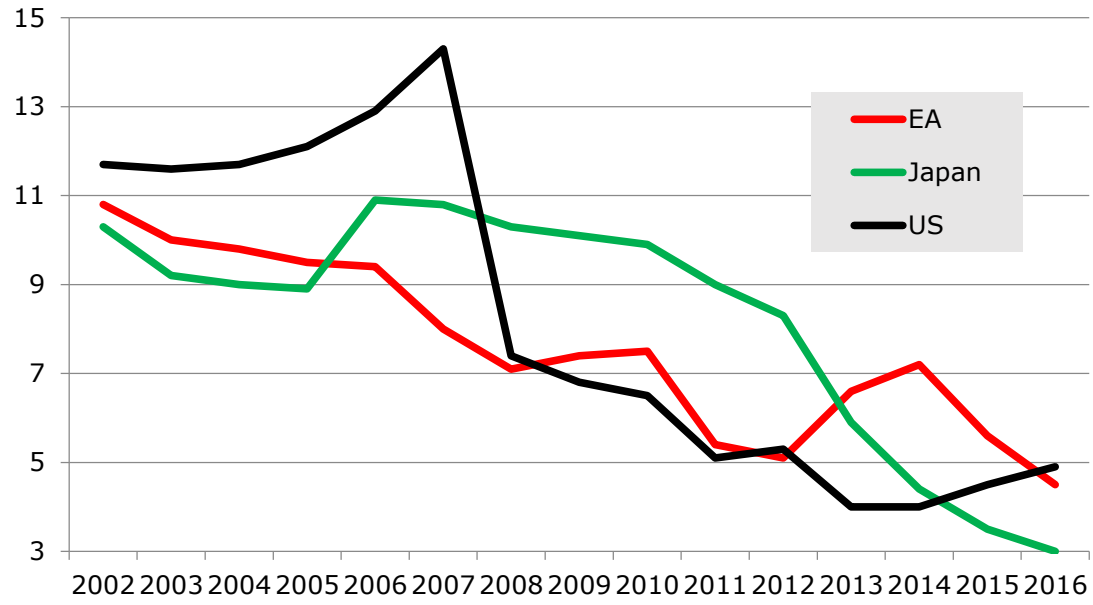
it decreased from 14.3 to 4.9 in the US (during this period, in 2014–2015, it reached an even lower level of 4.0), from 10.8 to 3.0 in Japan, and from 8.0 to 4.5 in the EA.

There are various factors that contributed to such a decline.

First, the financial crisis damaged the entire process of financial intermediation for several years. Banks, other financial institutions, non-financial enterprises, and households had to repair their balance sheets, which made them cautious towards fresh borrowing and lending. In particular, commercial banks followed a more "conservative" business model, preferring to retain additional liquidity and capital margins (beyond what was required by prudential standards—see below) rather than become engaged in risky lending.

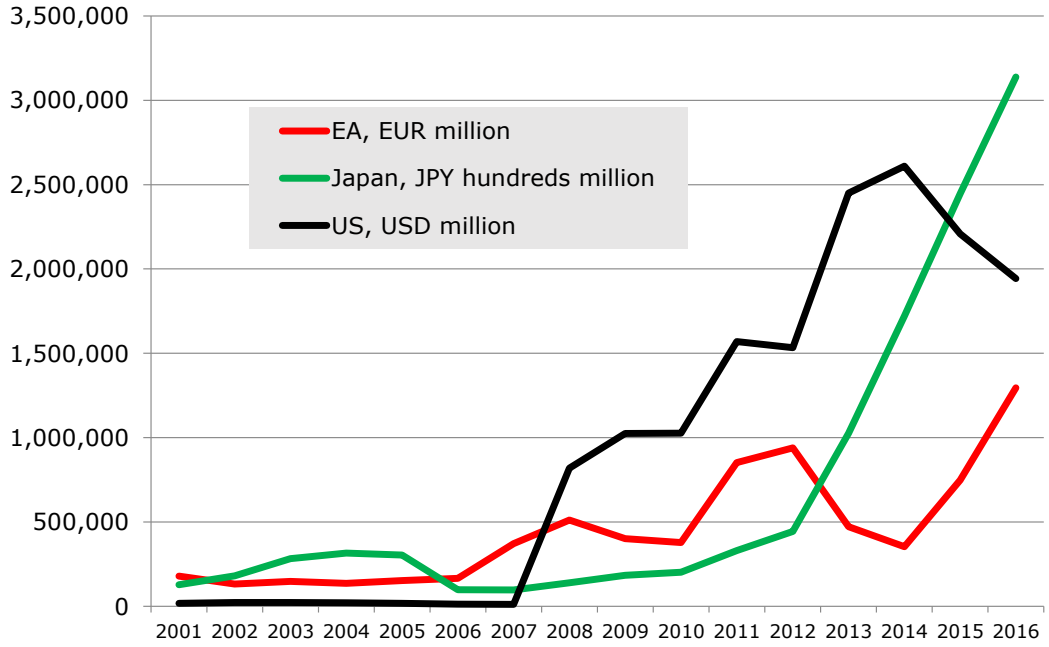
Second, following the crisis, the regulatory environment for commercial banks and non-banking financial institutions was seriously tightened. This concerned, among others, increasing the capital adequacy ratio (CAR) and liquidity coverage ratio (LCR). In particular, increasing the LCR has a similar (negative) effect on the money multiplier and broad money creation as increasing the mandatory reserve requirement (MRR)—an instrument rarely used by central banks in AE. Increasing the CAR can also suppress the money multiplier at least in the short term until commercial banks supplement their capital. The same concerns the fiscal instruments, such as taxes on banking transactions, which were introduced in several countries.

Figure 13: Money multiplier in the US, EA, and Japan, 2002–2016 (broad money / base money)



Source: IMF International Financial Statistics (www.data.imf.org) and author's own calculation

Figure 14: Central bank liabilities to other depository corporations, the US, EA, and Japan, 2002–2016



Source: IMF International Financial Statistics (www.data.imf.org) and author's own calculation

Such conservative behaviour can explain the phenomenon of the large excess voluntary reserves kept by commercial banks in central banks (Figure 14). In monetary policy terms, this means a lower money multiplier as compared to when banks work at full lending capacity (i.e. within the limits set by regulatory norms).

The third factor that could dampen the money multiplier is unconventional monetary policy and the various central bank interventions on financial markets. For example, providing additional lending opportunities to commercial banks and accepting their deposits on a mass scale did not help in rebuilding the interbank market.

Furthermore, Figures 13 and 14 suggest that periods of rapid declines in the money multiplier and rapid increases in commercial bank deposits in central banks coincided with periods of quantitative easing (QE), while stopping or slowing down direct asset purchases by central banks (e.g. by the Fed since the second half of 2013 and the ECB in 2012–2013) stabilised or even somewhat increased the money multiplier (and decreased banks deposits with central banks). Probably, QE has absorbed so many low-risk liquid securities from the financial market that commercial banks have had to increase their voluntary

deposits in central banks to manage their liquidity. If this hypothesis is correct, it can mean a sort of vicious circle where the instrument aimed at increasing the money supply has the opposite effect.

Overall, in the crisis and post-crisis period, the decline in the money multiplier has been a powerful deflationary factor in the three analysed AE. This single factor is sufficient to explain the continuous low inflation environment in which these economies operate. However, it is unlikely to expect a further decline in the money multiplier in the coming years. Rather, as result of the gradual normalisation of monetary policy and the revival of financial intermediation (once banks fully adjust to a new regulatory environment), it can start to increase, as already observed in the US. Furthermore, one cannot exclude that the successful pressure of the financial lobby, especially in the US, can lead to a partial relaxation of the post-crisis regulatory corset.

3.2. Decreasing money velocity

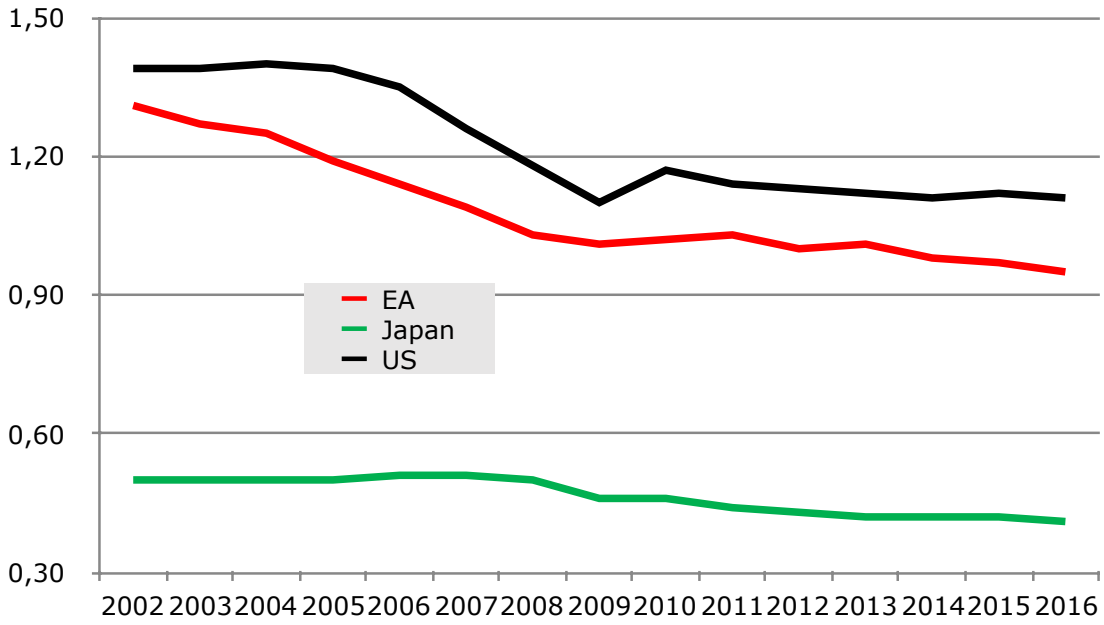
In parallel to the decreasing money multiplier (Subsection 3.2), broad money velocity also decreased in the analysed currency areas (Figure 15). That is, demand for broad money increased. However, the degree of change was not as large as in the case of the money multiplier[5]. Nevertheless, it also had a deflationary character.

Part of the increasing demand for broad money has come, most probably, from outside (i.e. from non-residents), given the global role of all three currencies and the tendency to more intensive currency substitution in other currency areas (especially in EMDE) during the period of prolonged financial turmoil and associated macroeconomic uncertainty. Another part of this increased demand can be explained by deleveraging and the precautionary saving of residents at the time of the financial crisis and economic stagnation.

While it is hard to forecast broad money velocity in the future, one cannot exclude the partial reversal of the trend observed in the last decade. This may be caused by an expected normalisation of monetary policy and a revival in financial intermediation (see Subsection 3.1).

5 Obviously, taking into consideration changes in the money multiplier, demand for reserve money increased much more.

Figure 15: Broad money velocity in the US, EA, and Japan, 2002–2016 (nominal GDP / broad money)



Source: IMF International Financial Statistics (www.data.imf.org) and author's own calculation

3.3. Supply-side shocks

In addition to the changes in money supply and demand for money caused by the decreasing money multiplier and decreasing money velocity, the analysed economies have also had to deal with supply-side shocks, especially those originating from commodity markets. That is, domestic inflation has been affected by the change in prices of imported energy, food, and other commodities such as metals, minerals, and agriculture raw materials. Figure 16 shows that, in the analysed period, there were two periods of commodity price booms (2003–2008 and 2010–2013) and two periods of price decline (2008–2009 and 2014–2016).

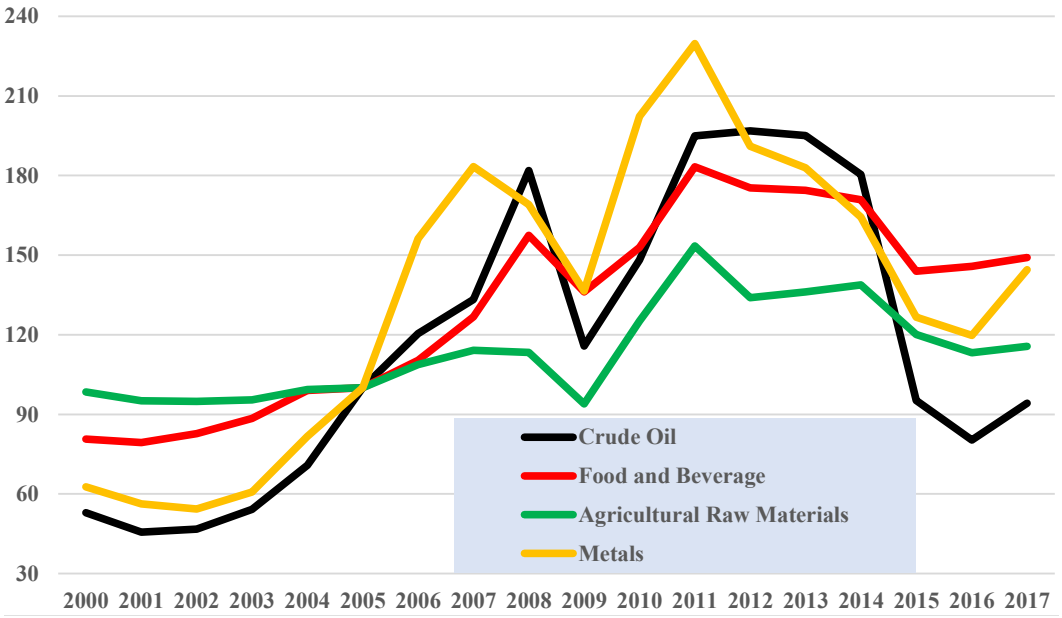
To be precise, fluctuations in commodity prices are influenced not only by supply-side factors, but also by changes in global demand (this could be observed, in particular, between 2007 and 2010). Nevertheless, for the individual economies, even large economies like those analysed in this paper, fluctuations in commodity prices can be considered as external supply-side shocks.

Figure 17 presents the impact of changes in energy prices on the EA's HICP. The choice of energy prices is justified by the fact that this is a largely imported item and, therefore, independent from domestic demand-side factors.

A comparison of headline HICP with that in which changes in energy prices have been deducted suggests that external supply-side shocks had an impact on EA inflation—positive in 2008, 2010–2012, and 2017 and negative in 2009 and 2013–2016. The HICP without the energy component presents less volatility than the headline inflation.

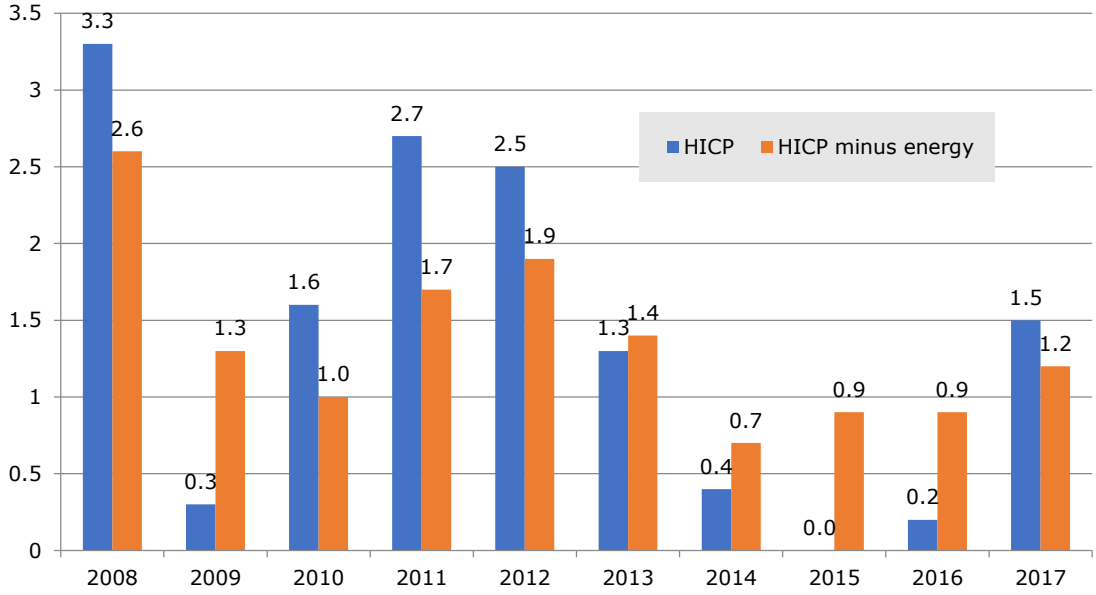
Looking ahead, it is important to notice that commodity prices, including energy, are on the rise since 2017 and, most likely, this trend will continue, although at a moderate pace (IMF, 2017a). This means that, in the near future, the external supply-side factors will, most likely, push EA headline inflation up (the same can be expected in Japan and the US) rather than moderate it.

Figure 16: Indexes of commodity prices, 2000–2017 (2005=100)



Source: IMF World Economic Outlook database, October 2017

Figure 17: Inflation (HICP and HICP minus energy), annual average, EA, 2008–2017 (in %)

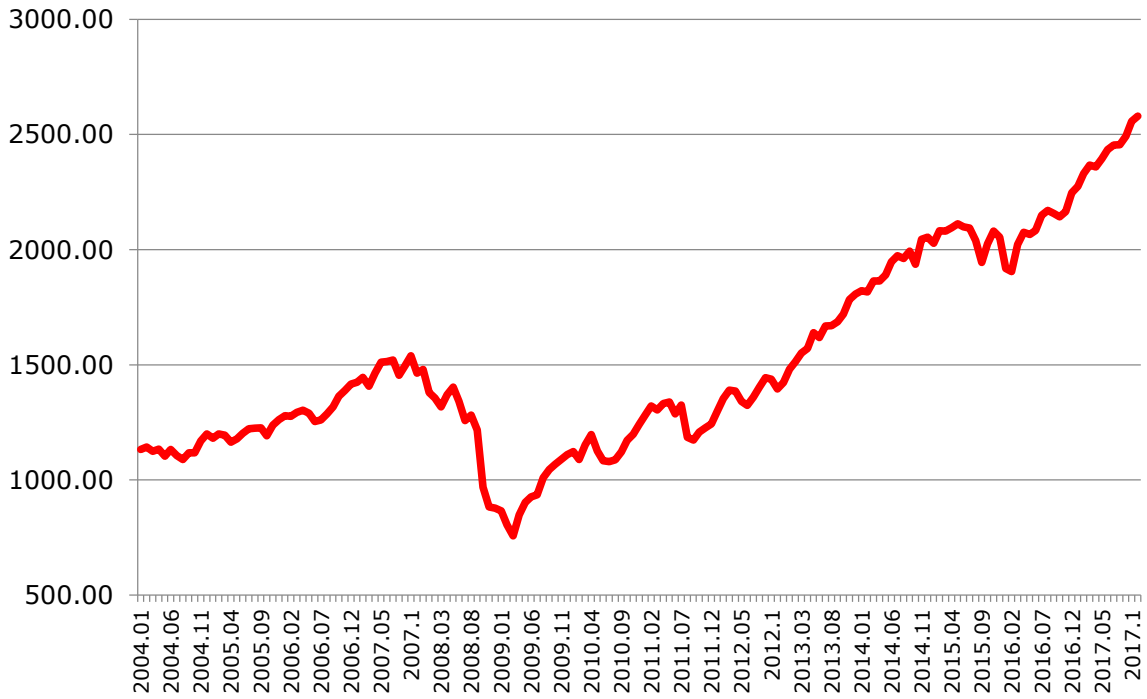


Source: Eurostat, http://ec.europa.eu/eurostat/tgm/web/_download/Eurostat_Table_teicp-000FlagDesc_87bb6bcd-5ae3-4655-a2e3-1e6f8856b1b1.xls

3.4. CPI and asset prices

Due to its composition limited to consumer goods and services, the CPI has never been a perfect measure of inflation pressure. The latter is not always seen on the consumer market. Quite often the excessive liquidity is absorbed, in particular, by asset markets —the stock market, real estate markets, and commodity markets. This happened in Japan in the 1980s and in the US in the second half of the 1990s and then again in 2003–2007. These episodes ended with bubbles bursting, which had negative consequences for financial stability, especially when one led to the global financial crisis of 2007–2009.

Figure 18: The US stock market composite S&P index, 2004–2017

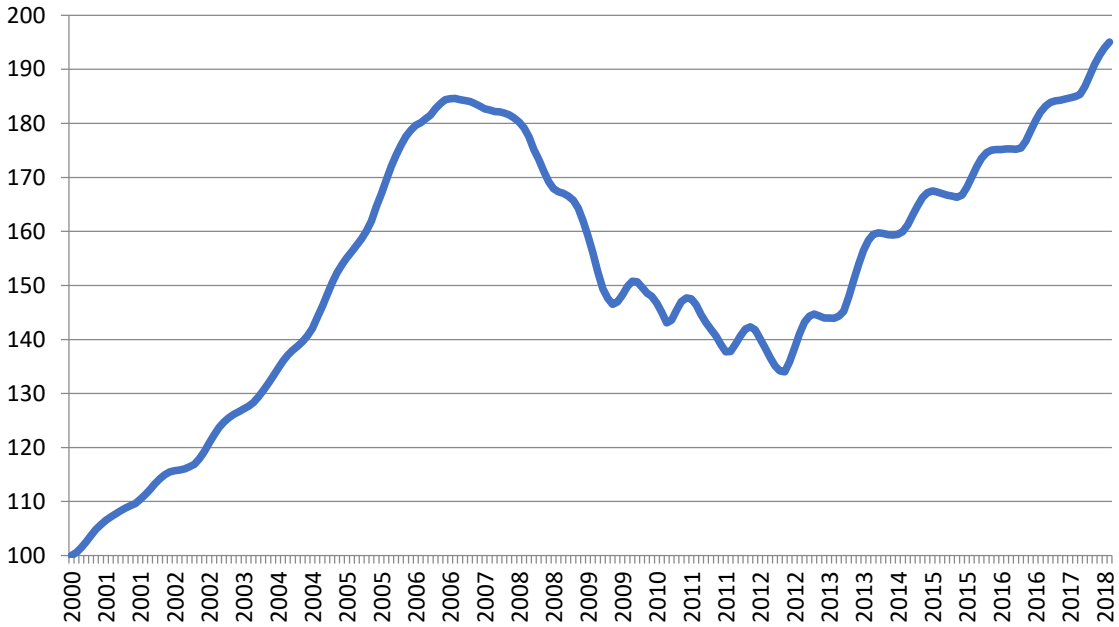


Source: Online data Robert Shiller, http://www.econ.yale.edu/~shiller/data/ie_data.xls

Figure 19: The Boerse Frankfurt stock market index, 2004–2017

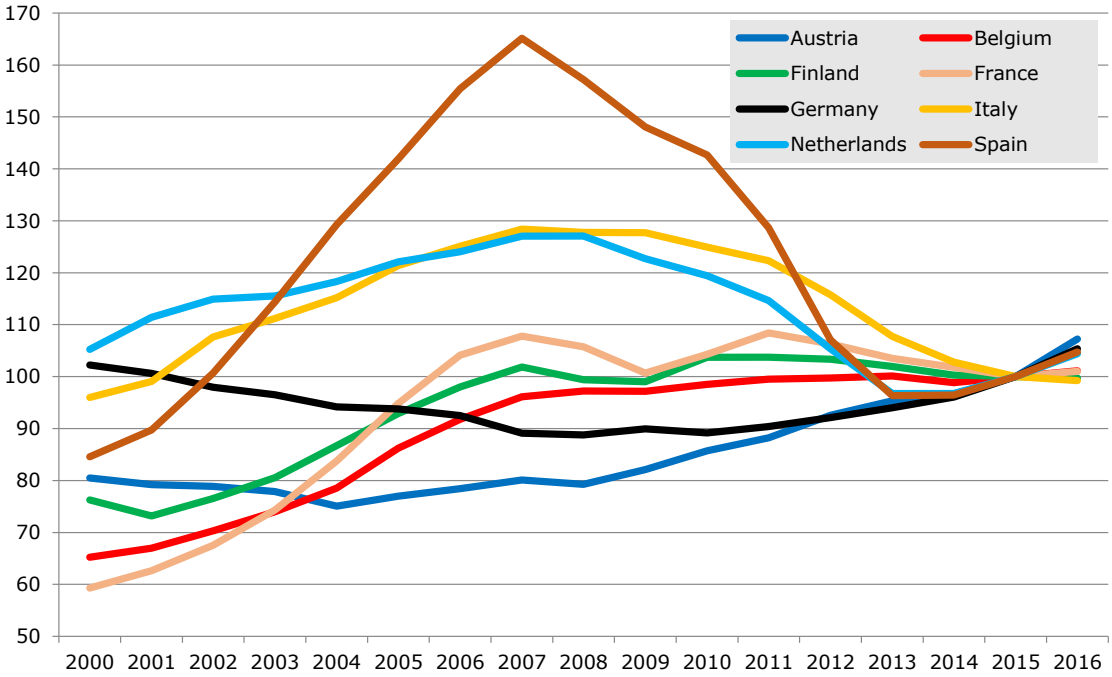
Source: Boerse Frankfurt, http://en.boerse-frankfurt.de/index/pricehistory/DAX/1.1.2004_31.12.2017#History

Figure 20: The US Nominal Home Prices Index, 2000–2018 (01.01.2000=100)



Source: Online data Robert Shiller, http://www.standardandpoors.com/indices/sp-case-shiller-home-price-indices/en/us/?indexId=spusa-cashpidff--p-us----

Figure 21: The Real Home Price Index, selected EA countries, 2000-2016 (2015=100)



Source: Eurostat, http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tipsho10

The pros and cons of including asset prices into the price index were discussed extensively in the literature in the 1990s and early 2000s (see e.g. Goodhart, 2001; Bryan, Cecchetti, and O'Sullivan, 2002; Andersson, 2011), but with no implications for statistical practice. Many central banks take into consideration changes in asset prices in their monetary policy making[6], but a broader public concentrates its attention on changes in CPI.

After the dramatic burst of bubbles in 2007-2008, the stock and real estate market indices have gradually recovered to the previous level, which again can be considered as dangerous for financial stability (Figures 18-21). Besides, they signal that actual inflationary pressure in the US and EA is higher than suggested by the CPI measure.

6 For example, the ECB follows the stability-oriented two-pillar strategy based on economic and monetary analysis (ECB 2011, p. 69-72). Apart from CPI inflation, it observes changes in monetary aggregates which allows for the detection of potential credit or asset bubbles in their early stages (see Issing, 2003).

4. Implications for monetary policy

Our analysis in the two previous sections suggests practical implications for monetary policy making, which will be discussed below.

Let us start from the question of officially recorded inflation versus actual inflationary pressure addressed in Subsection 3.4. The traditional concept of inflation measurement based on CPI proved too narrow, especially in the era of the rapid development and increasing sophistication of financial services. It misses price changes in asset markets, which can absorb a large part of the changes in money supply and the resulting changes in domestic demand. As result, it can mislead both policy makers and the general public by suggesting low CPI inflation while inflationary pressures cumulate on asset markets. Such a dichotomy was observed in AE several times in the past, and, in particular, in the period preceding the global financial crisis of 2007-2009. A similar situation has been observed recently with stock and real estate markets booming both in the US and EA.

This has two practical implications, the first for the right diagnosis of the current macroeconomic situation and the second for the methodology of price statistics.

As for the first implication, it is important to understand that actual inflation is higher than that recorded by the CPI/HICP measure, precisely because of the parallel rapid increase of asset prices. What the difference is between both (that is, the CPI/HICP and the hypothetical broader index which would also include asset prices) is a matter of statistical estimation going beyond the agenda of this paper[7]. Nevertheless, ignoring this factor can lead not only to wrong perceptions on the actual inflation but, more importantly, to wrong policy conclusions, like continuing to fight a supposed danger of deflation which no longer exists. In the extreme case, if the increase in asset prices is not given sufficient attention, the AE can face another financial crisis with unforeseeable consequences.

Going beyond the current policy debate, central banks, statistical agencies, and the academic community should return to work on constructing a broader price aggregate which would also include asset prices. This is not an easy task, but one worth trying.

7 Bryan, Cecchetti, and O'Sullivan (2002) came to the conclusion that the US CPI in the 1990s might be underestimated by roughly 0.25 p.p. annually due to a failure to include asset prices in the aggregate price statistics.

Of course, its successful completion does not mean abandoning the CPI, which will still have an important role to play (not only in monetary policy making, but also in income and social policies).

The right perception of the actual inflation pressure (including asset markets) is only the first step in the right diagnosis of the current macroeconomic situation. Regardless of the inflation measure used, it is clear that all major AE have finally emerged from the recession and stagnation caused by the global financial crisis (see Section 2). Furthermore, except for Japan, they have already closed or are about to close the output gap—that is, they are on the top of the business cycle. In such a situation, monetary policy can do little or nothing to further stimulate the growth of output and employment; rather, this is a task for micro-economic and structural policies. On the contrary, it should avoid the risk of overheating, especially in the US (where expansionary fiscal policy adds to macroeconomic expansion) and in smaller EA economies. A related task concerns taking care of potential asset bubbles, a high priority in the US and several parts of the EA (see Subsection 3.4).

A more general lesson concerns the weakening of the interlinks between inflation, on the one hand, and output growth and unemployment, on the other, especially in the post-crisis macroeconomic environment. One can see that low inflation can coexist with growth and employment recovery, which puts under question the traditional Phillips curve type of interdependence (see Subsection 2.2). At least a temporary lack of such a relationship has been confirmed by the recent experience of many countries in Europe and outside, in which periods of very low or even negative inflation coexisted with a solid growth record. This concerns, among others, Ireland (2013–2016), Slovakia (2013–2016), Slovenia (2014–2016), Lithuania (2014–2015), Germany (2014–2015), Spain (2014–2015), Poland (2013–2016), Romania (2014–2016), Hungary (2013–2015), Switzerland (2011–2016), Macedonia (2014–2016), Israel (2014–2017), and Singapore (2014–2016).

Regarding the monetary and non-monetary factors that had an impact on the inflation level in the analysed period of 2007–2017, one should take into consideration changes in money supply, demand for money, and external supply-side shocks. Both changes in money supply (via a decreasing money multiplier) and changes in the demand for broad money (an effect of decreasing money velocity) had a deflationary impact, but with various strengths. The decrease in money velocity was moderate and so was its impact on monetary conditions. On the contrary, the rapid and far-reaching collapse in the money multiplier in all analysed currency areas had a profound impact on money supply. It resulted from far-reaching financial deleveraging during both the crisis and post--crisis periods and was caused by the more conservative behaviour of both lenders and borrowers and by the much tighter micro- and macro-prudential regulation of the financial sector in the post-crisis area.

A long-term lesson from this experience points to the interlinks between monetary policy and financial regulation, which are often overlooked or even neglected by the policy makers responsible for both areas (even if they are housed at the same institution —the central bank), the academic community, and the general public.

Unconventional monetary policy aimed at overcoming the negative consequences of the declining money multiplier for the money supply caused, in fact, its further decline by discouraging financial intermediation and the absorption of low-risk financial assets. This hypothesis requires, however, further empirical examination.

The external supply-side shocks—mainly changes in imported commodity prices (Section 3.3)—also had impact on inflation. In the analysed period, they worked in various directions. In the EA, they pushed up the headline HICP inflation in 2008, 2010–2012, and 2017, while they pushed it down in 2009 and 2013-2016. In the near future, they will add to inflation pressure rather than moderate it.

The coincidence of several deflationary factors, in particular those related to profound changes in financial intermediation, put downward pressure on inflation. However, such a pressure will not last forever (which is already seen in the US). Even if we assume that the financial sector learned lessons from the financial crisis of 2007-2009 and will continue to follow more conservative market practices (this does not necessarily have to be true) and that the new more restrictive financial regulations remain in place for a long period of time (there is also no political guarantee for this), financial deleveraging and disintermediation will not progress further. That is, the money multiplier will not continue to decline. Instead, there is the probability that it will recover somewhat following the adjustment of the financial sector to a new regulatory environment, the heightened interest of market participants to lend and borrow as result of their optimistic assessment of business perspectives, and central banks' withdrawal from unconventional monetary policy measures.

The same concerns money velocity, which may increase as result of economic recovery and external price shocks, which will be positive rather than negative in the near term.

Given all the above-analysed circumstances, central banks should not continue pushing inflation up to the officially-targeted level. There is nothing wrong if inflation remains below 2% (the level targeted by central banks in all three analysed currency areas), so long as the economy is growing and a country's negative output gap is disappearing. Instead, central banks should reflect on how to resist the forthcoming inflationary pressures, avoiding the further building of asset bubbles (one of the consequences of low interest rates) and overheating their economies.

The so-called normalisation of monetary policies—that is, the termination of QE (in the EA and Japan)—followed by a gradual reduction of central bank balance sheets and a gradual increase of interest rates seems to be the inevitable outlook in all AE. It will not be an easy process because of its potential consequences for financial markets (changes in the profile of yield curve) and governments (pushing up the price of government securities), but this is the reason to start normalisation sooner rather than later.

5. Summary and conclusions

Our analysis has demonstrated that the period of low inflation and the various deflationary pressures will, most likely, come to an end soon. These deflationary pressures originated from the powerful shock generated by the global financial crisis of 2007–2009 and the turbulence that followed—for example, the public debt and banking crisis in some parts of the EA (2010–2014). The most powerful deflationary shock came from the collapse of financial intermediation and the far-reaching financial deleveraging in most AE. In monetary terms, this led to the decline of money multiplier in all major currency areas.

However, the post-crisis policy reactions made the situation worse. First, to prevent similar crises in future, financial regulations were seriously tightened, which made financial intermediation more expensive and forced banks and non-banking financial institutions to limit their operations (at least temporarily) to meet the new prudential standards (Dabrowski, 2015b). Regretfully, this deflationary side effect of the new regulatory regime was rarely understood and recognised by those who were in charge of setting the new standards and the timetable of their adoption. We do not question the necessity of conducting a deep overhaul of financial regulation and the political economy rationale of using the window of opportunity for such reforms, just the aftermath of the financial crisis. However, in some cases, setting longer timetables for the adoption of new standards could soften their deflationary impact.

Second, concerning monetary policy, central banks had to compensate for the decline in the money multiplier with the rapid expansion of their reserve money (monetary bases) to avoid a deflationary spiral and a deep depression of the kind experienced in 1929–1933. In the environment where interest rates had already hit the zero-level bound and commercial banks were reluctant to expand their credit actions, the only reliable solution was direct purchases of government and commercial securities on the secondary market (QE).

This strategy proved effective and the goal of avoiding a deflationary spiral was accomplished. However, it produced several side effects, some of them rather unexpected and definitely undesirable. These side effects included further discouraging financial intermediation and a further decline in the money multiplier.

While the rationale of QE cannot be questioned, it came too late in the EA and Japan and has continued for too long. The US Fed, which began tapering its QE in the last quarter of 2013 and then started to hike interest rates, finally declaring its willingness to gradually reduce its balance sheets, still has a long way to go to normalise its monetary policy. The ECB and the Bank of Japan are even further from this perspective.

Other deflationary factors such as the decreasing money velocity and the collapse of commodity prices in 2014–2015 must be mentioned; although, their impact was smaller than that of the decline in the money multiplier.

However, in 2016–2017, economic and monetary conditions started to change: most AE, including the EA, entered a path of economic growth and have either already closed or are about to close the negative output gap. There are signs of rising inflationary pressures, in particular, on asset markets. The post-crisis deflationary factors are gradually disappearing. Commodity prices have started to increase again, although moderately. The money multiplier and money velocity are unlikely to continue their decline and may start recovering soon, reflecting greater consumer and investment optimism and faster credit growth (on the back of higher growth).

This means that major central banks, including the ECB, should prepare themselves to deal with potential inflationary pressures, which were largely absent in the last decade, and intensify their work on departing from unconventional monetary policy measures.

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