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Abstract

Basic lesson from recent financial crisis has been that monetary policy based on inflation targeting and focused on consumer inflation and based on inflation targeting does not automatically guarantee financial stability. As a response, new kind of economic policy called macro-prudential policy has been created to safeguard financial stability. Monetary policy principles have remained unchanged and firmly focused on inflation targets. The decade of ultra-loose monetary policy has been driven by low output, low productivity and threat of deflation as being justified by policy makers. At the same time, during previous decade, the notion of fourth industrial revolution (digital revolution) has been increasingly discussed. Once this phenomenon is at least partly accepted, the problems with measurement of macroeconomic indicators have been gaining on importance. Under new economic circumstances, output and productivity may be undervalued shedding different light to the nature of too low inflation and growth.

The phenomenon of deflation should be revisited in modern macroeconomics with special attention paid to how address the issue of present quite low inflationary environment in current monetary policy frameworks without side effects. Such a deeper understanding would help to strike a delicate balance between the risk of overreaction, on the one hand, and of insufficient preemptiveness, on the other one. The debate about whether monetary policy should or should not "lean against the wind" had started as early as in Seventies and might be useful to be revisited as well. At the same time, monetary policy rule incorporating at least some monetary or financial stability indicators may be more efficient than the current status quo.

Key words: monetary policy, inflation targeting, financial stability, macroprudential policy, digital revolution

JEL Code: E31, E52, G01

Introduction

The decade of the pre-crisis period suggested that monetary policy makers had, in inflation targeting, truly discovered a system that not only had safeguarded inflation under control, but also stabilised the overall macroeconomic environment in the long run. At this time, the prevailing view was that price stability safeguarded by inflation targeting presupposed lower occurrence of financial disturbances. This also implied that price stability was considered to be sufficient condition for financial stability (Bernanke et al. , 1999 or Bernanke and Gertler, 2001).

As of mid-2007, however, this myth has collapsed gradually, and the debate on "leaning against the wind or cleaning afterwards" going back to Seventies, summarized e.g. by (Ceccheti, 2005) moved into its second round. The debate has also turned back to the question of what role asset prices, which are generally not included in consumer price inflation indicators, should play in monetary policy, as well as the related problem of whether and how monetary policy should respond to credit expansion. The fact that asset prices are not usually included in the targeted indicators of inflation was addressed previously by (Goodhart and Hoffman, 2000, or Cechetti, 2005). Another lesson from the crisis is the need to look beyond short-term inflation stabilization to ensure overall financial and macroeconomic stability (Borio, 2015).

The fact that inflation targeting does not guarantee financial stability exposed by the financial crisis has posed new challenges for policymakers. As a response to this problem, governments, regulators and central banks have preferred to keep monetary policy unchanged and create new kind of economic policy called macro-prudential policy. Therefore, monetary policy and financial stability have become separate issues, even though they have much common in principle. Whatever measure that affects the price and/or availability of banking loans must be regarded as a monetary policy step, even though the label is different. In many countries, the financial stability has become a part of central banking with macro-prudential measures in the central bank toolkit.

Two main caveats of inflation targeting will be discussed in this paper: measurement of inflation and product at the age of digitalization and financial stability risks posed by ultra-loose monetary policy. These problems seem to be intertwined as biases stemming from improper measurement of macroeconomic variables go in the direction that may lead the

monetary policy makers to accommodative monetary policy even though financial instabilities already appear on the horizon. Last section of the paper brings some suggestions how to address bottlenecks in the current conduct of monetary policy under the regime of inflation targeting.

1 Measuring Output, Productivity and Inflation at the Age of Digitization

Mainstream economists have labelled recent macroeconomic environment characterized by low growth, low productivity, low inflation a "new normal". At the same time, low inflationary environment has been considered as non-favourable being attributed to low aggregate demand justifying thus long period of ultra -loose monetary policy and various kinds of non-standard monetary policy measures as a cure. However, the question asked in this paper is whether the monetary policy has reacted to properly labelled challenges.

The puzzle of so-called productivity paradox, asking why productivity growth could have slowed during the 1970s and 1980s in the face of phenomenal technological improvements has been discussed over 30 years with pressing urgency in previous couple of years. The reason is that productivity growth has been disappointing even more since the global financial crisis. Important part of the debate has been concentrated to questions of measurement, predominantly about the ability of present statistical system to keep up with a changing economy.

Product innovation and quality improvements have always been difficult to estimate; however, this challenge has been increasingly gaining importance during the last one or two decades when quality improvements and product innovation have been combined with rapidly changing business environment. The availability of inexpensive technological services has enabled businesses to do their work in new ways and has led to the creation of new companies and even entire industries. New industries or business models are difficult to be captured by standard statistical methodology. Therefore, the measurement or estimation of macroeconomic variables has become a very challenging issue in the era of digitalization, new technologies, electronic commerce, new kinds of financial services, shared economy, etc. As Bean (2016) has pointed out, measuring the economy has never been harder. This applies even more in the area of services.

Measuring the output and prices of services has always been more difficult than was the case for goods as sometimes it is difficult to define the basic unit of production. The service sector

has been developing rapidly offering rich spectrum of new activities that are difficult to be labelled and quantified - new financial services, electronic commerce, new methods of inventory and product distribution to name a few. On top of that own possibility of an individual to produce a service traditionally provided by intermediaries has been complicating measurement of the real output of services. In some cases, digital services have been replacing traditional providers of services or purchase of goods (online news versus newspapers, streaming media versus CDs or DVDs, online booking of holidays versus travelling companies,– to name but a few examples of new forms of consumption). These kinds of services had been traditionally paid ones and the fact that nowadays they are disposable at negligible (or zero) price makes a difference in measuring their output and productivity. Services have been more and more often customized which makes the quantification of volume and price more difficult. Technological innovation underscores the role of customization, leading to even higher variability and thus higher bias.

Official data on economic activity are thus suspected to be understated - see also Bean (2016). The higher is the share of services in the gross value added (supply side) and in the gross domestic product (demand side) in the respective country, the higher may the bias be. In the most developed economies services account for around 75 % of gross value added. This bias is also important for estimates of consumer demand as services make up for at least half of household consumption. It certainly seems likely that official statistics underestimate economic activity to some degree and consequently productivity increase is underestimated as well. For example, a recent review concluded that productivity growth in the UK might be under estimated by around half of percentage point per year, as a result of the failure to capture properly elements of the digital economy (Bean 2016). Similar observations leading to similar conclusions have been stressed by Feldstein (2016). According to his paper, the underestimation resulting from poorly captured contributions of changes in quality, contribution of new products and services in official statistics may amount to "two percent or more a year" for the US economic growth. The hypothesis of mismeasurement, however, has posed a big challenge for statisticians as not only new techniques but mainly new attitudes will be necessary to adopt to capture new trends in a better way.

One of the conclusions of this paper is that once the notion of "fourth industrial revolution" or "digital economy" is accepted, it is also necessary to accept that macroeconomic indicators as the consumption of households, output of services, GDP and the productivity have been most

probably undervalued. At the same time, measurement of inflation by standard consumer price indicators may be biased as well. On top of that, if the output and productivity growth are underestimated, the nature of low inflationary environment seems to be quite different than under the narrative of "new normal". Therefore, the inflation measured by consumer price index in standard way may not deliver proper signals not about price developments but mainly about the reasons behind. Hence, the direct association with the monetary policy conduct is evident. Moreover, the perception of present low-inflationary environment (or even threat of deflation) may have been overstated in the summarized context of anti-inflationary episodes from the past.

Studies focused on evaluation of the risks of low inflation or even deflation from historical perspectives send clear message downplaying the mainstream attitude (Borio et al.,2015, Atkeson and Kehoe, 2004). The supply side factors like technological progress and productivity growth have played an important role in the deflationary periods linked to industrial revolution.1 Technical and technological progress has resulted in improvements in productivity, greater competition in the goods market, cheaper and more abundant inputs. These factors have led to rising productivity and output and declining prices of goods and services. To sum up, convincing and hardly deniable historical observations have been indicating that low inflationary or even deflationary episodes that were tied to periods of rapid technical and technological progress may be labelled as "good times" from most points of view.

At the same time, it is crucial also to distinguish between deflation of consumer goods or services and deflation of the assets. If deflation concerns prices of goods and services, the outcomes are very improbable to be destroying (Borio at al 2015). This applies also for deflations where weak demand plays role – as indicated by benign periods of deflation which were not driven by technological progress. Some authors (Borio et. al.,2015 and Atkeson and Kehoe, 2004) argue convincingly that the Great Depression in the US was an outstanding observation, stemming from coincidence of a unique combination of adverse factors. Unfortunately, this one off historical episode was strong enough to embody convincingly in the literature the paradigm that deflation and depression are linked (Bernanke and Carey, 1996). Concerns about deflation have thus been very deeply rooted in the minds of central

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[1] Statistical evidence shows that in the US alone, GDP annual average growth between 1870 and 1914 amounted to around 10 per cent with price level more or less stagnating. The same applies for the Twenties when US GDP growth amounted to almost 5 per cent annual growth under 2 per cent annual deflation.

bankers who are consequently obsessed with fulfilment of the respective inflation targets without broader assessment of the whole macroeconomic and financial picture.

2.RISKS OF CURRENT ARRANGEMENTS

Central banks have primarily loosened their monetary policies as a preventive action against disruption of the financial system which was in line with the role of "Lender of Last resort". After getting rid of immediate threats, later on they were concerned with unconvincing nature of economic recovery together with low inflationary pressures. Mainly due to low inflation, monetary policy has stood extremely loose for extremely long period of time during 2008 – 2017. In majority of developed economies interest rates have been kept extremely low and new non -standard policy measures going far beyond standard boundaries have been applied in order to raise inflation up to the inflation targets.

However, the near-zero interest rates and quantitative easing have proven to be limited in supporting stable and solid economic growth and achieving inflation targets (BIS 2012, 2013). Besides this, loose monetary policy has also had its "side effects" (or unintended consequences), some of which are turning into potential risks for financial stability in the medium and long term (BIS 2012, 2013 or White, 2013). Potentially dangerous side effects of "too loose monetary policy for too long" have been ignored by policy makers – asset price inflation, incentives for excessive financial risk-taking, funding deficits in pension schemes and erosion of bank profits, to name but a few. These risks are naturally connected through a network of weaker or stronger relationships. It goes beyond the scope of this paper to discuss all of the respective risks, thus the main attention will be paid to asset prices inflation which embodies the risk of future bust followed by deflation of asset prices. As discussed in the first part of the paper, while deflation of goods and services may be mostly labelled as benign, asset price deflation is much more dangerous case for both macroeconomic and financial stability.

The deflation of asset prices makes the consumers to feel themselves poorer which may consequently limit their spending, in particular in case that they got indebted for the purchase of the respective asset. Under this type of deflation, the real value of loan increases and at the same time the banks are forced to decrease the value of collateral. And this was exactly the channel that made the Great Depression in the US so destroying. Undeniably, this scenario

was partly the case in the US subprime mortgage crisis. However, the US Fed showed little alarm before the housing crisis hit.

As for asset prices, it is crucial to distinguish between real estate and stocks. Real estate ownership is widespread and changes the behaviour of households. On the other hand, ownership of securities is limited to a smaller set of wealthier households and does not alter their consumption behaviour. Cecchetti (2005) demonstrates that household consumption responds twice as intensively to property changes than to changes in stock prices. Reinhart and Rogoff (2009) have convincingly shown that housing prices are nearly at the top of the list of reliable indicators as for the financial instability expectations. At the same time, Borio at al (2015) also stress that particularly housing price deflations have been especially damaging in the post-war era. Therefore, it is quite embarrassing to observe visible signs of overheating housing markets in some developed countries.

The growth of housing prices in 2017 compared to 2015 amounted to more than 10 % in 19 countries out of EU 28. Annual growth amounted to more than 6 % in half of the EU 28 countries at the third quarter of 2017. In 12 countries the house prices are by more than 20 % higher than in 2010, in 9 countries even by more than 30 %. The increases have thus been quite strong in many countries, where housing bubble seems to be a future risk. One of additional reasons of concern is that the boom on real estate markets has been strongly contrasting with low inflation and concerns on undershooting the inflation targets. Just in 7 countries out of 28, the HICP index in 2017 compared to 2015 exceeded 3 %, while in 15 countries it was below 2 %.

In most countries where population is traditionally conservative and prone to savings the consumers feel their savings to be devalued under low interest rate environment even though the inflation measured by HICP is low. With zero interest on deposits, their search for yield has been often focused to real estate market, especially under eroding pension schemes. Relatively cheap mortgages have been supporting the demand for housing with obvious result of rising housing prices even though in most EU countries macroprudential measures concerning mortgages already were introduced2. And the fact that housing price increase in

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[2] The list of measures is disposable at
https://www.esrb.europa.eu/national_policy/html/index.en.html

some countries has not been calmed enough by adopting macroprudential measures is a subject of concern for policymakers.

To sum up, the main weak points of inflation targeting are intertwined. Measurement of product and inflation in the present circumstances with possible bias may lead to excessively accommodative monetary policy the consequence being excessive growth of asset prices. Consequently, boom in asset prices, in particular housing prices has been containing risks for financial stability if macroprudential policy itself is not able to prevent or address these booms. Macroprudential policy and monetary policy thus send inconsistent signals to economic agents, which leads to conflicts between these two kinds of policies.
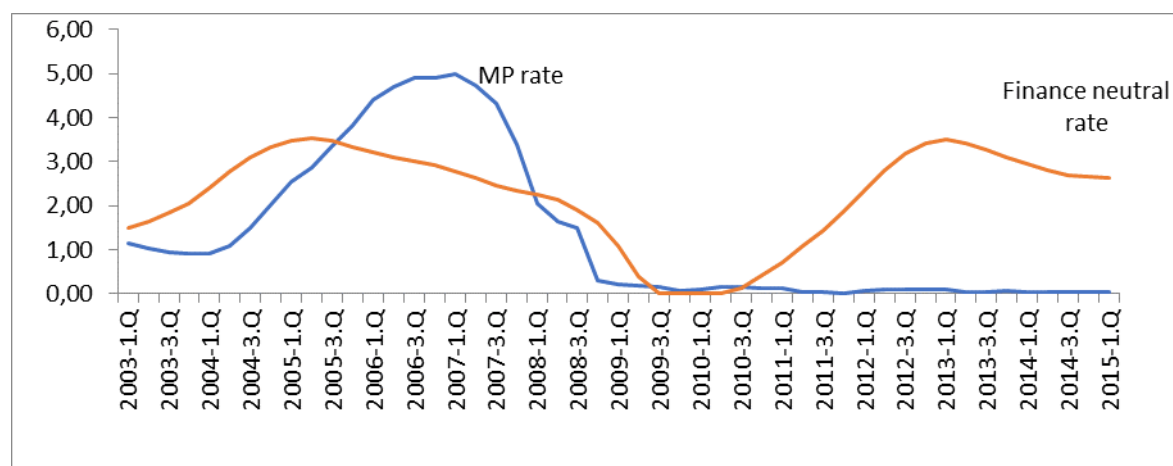
The caveats appearing in current arrangements have started to raise question how to address them in a proper way by economic policy instruments. A second round debate about monetary policy "leaning against the wind" presented in the next section seems to be a promising way how to go forward.

3. In Search of New Paradigms: Financial Stability Oriented Monetary Policy

As a response to weaknesses in current monetary policy state-of-art, new approaches are being tried to address the issue that monetary policy might or even should respond to the financial cycle, see BIS (2016), Borio (2015), Filardo and Rungcharoenkitkul (2016). First, the natural interest rate concept is revisited. The basic hypothesis is that low and sustainable inflation does not guarantee that output is moving along sustainable path as financial imbalances may already accumulate on the horizon. Therefore, relying on the standard inflation measurement may be misleading and may generate distorted estimates of the natural interest rate. The alternative approach is adding financial-cycle proxies to estimate the (finance-neutral) output gap and natural rate. Those financial proxies suggested by BIS (2016) are the deviations of leverage and debt service burden (of the non-financial companies and household) from their respective long-run values. These indicators affect expenditures and output and provide an indication of the distance from financial equilibrium. According to the BIS (2016) research focused on the example of US, finance-neutral estimates of the natural rate differ significantly from conventional measures – see Figure 1.

On average, the policy rate is 1 percentage point higher until mid-2005, declining after that and increasing again in Q3 2010. In the period of 2012 – 2015, the finance neutral rate is considerably higher than standard monetary- policy rate.

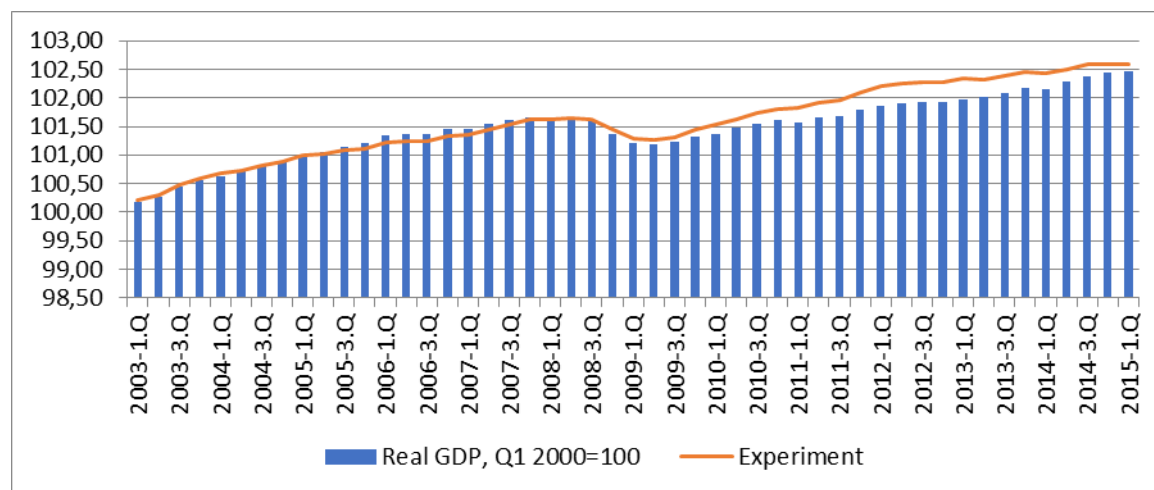**Figure 1:US monetary policy rate and finance neutral rate**

Source: Bank for International Settlements, 2016

A lot can be derived from this experiment, the most important being perhaps the fact that if financial factors are taken into account, the estimates of natural rates are higher than commonly thought in good times. This is because financial factors, better than inflation, provide useful information about cyclical fluctuations of output around potential. In the US, inflation was low and stable before the crisis, and it was the financial boom of all kinds, that made the economy running above its potential. Another question is the response of the output to finance-neutral interest rate. This is illustrated by counterfactual experiment provided by BIS (2016) on US data in the period 2003 – 2015 – see Figure 2.

On average, economic downturn is estimated to have been lower in the case of using finance-neutral interest rate. Losses in the form of lower output in the short run are estimated to be more than offset in the longer run. According to the simulations, implementing the policy starting in 2003 could have resulted in output gains of roughly 1% per year, or 12% cumulatively. The medium-term gain exceeds the near-term cost during the leaning phase, which amounts to about 0.35% per year until 2007. The benefits become fully apparent after the September 2008 Lehman shock, which probably could have been avoided if monetary policy would have taken into account the build-up of financial imbalances from the same beginning. Leaning early to prevent the debt service burden from getting too far out of line

could foster more stable financial conditions; a late response, once the signs of financial imbalances are all too evident, could precipitate a bust and a costly recession.

Figure 2: Monetary Policy Experiment on US Data

Source: Bank for International Settlements, 2016

The counterfactual policy rate path indicates that policy leans early against the build-up of the imbalances and, as a result, gains considerable room for manoeuvre after the bust. In other words, smaller debt overhang would have resulted in a much shallower recession and would have allowed policymakers to start normalising policy as early as 2011. This experiment indicates that monetary policy rule that responds systematically to the financial cycle using the neutral-finance interest rate can improve macroeconomic outcomes in the long run.

It seems that the approach of finance-neutral interest rate may be able to cure or at least mitigate most of the inflation targeting caveats discussed above. The alleged bias of mismeasurement of output, output gap or inflation will be given less weight in the decision making monetary policy process. Data on loans and indebtedness are evidently „hard data "not subject to biases similar to those discussed in the first section.

Conclusion

Thirty years of inflation targeting has shown that this monetary policy regime is not able to guarantee financial stability as had been presupposed before 2008. This bottleneck has been solved by policymakers by creating a new kind of economic policy to safeguard financial stability. Macroprudential policy has come to existence recently evolving new tools in the regulatory and supervisory pool.

Price stability and financial stability thus have become separate policy issues being addressed by different tools of policies nowadays. Inflation targeting has continued to be firmly focused on consumer prices of goods and services. Consequently, the fulfilment of the inflation target to be achieved at any cost has led many central banks to adopt unprecedented measures, such as quantitative easing or negative interest rates.

Unintended consequences of such measures have been underplayed and left aside for newly created macroprudential policy. However, macroprudential measures may not be sufficient to address those financial instabilities that stem from long-term ultra-accommodative monetary policy. The evidence of overheating of real estate markets in countries that badly need tighter monetary policy is just one example. Therefore, an inconsistency between the two policies, monetary policy supporting loans providing, macroprudential one pedalling on the brake may emerge. On the one hand, commercial banks have been pressed to "more lending" by loose monetary policy, on the other they have to cope with new and more prudent regulation and macroprudential policy. Commercial banks are an important part of the monetary policy transmission channel and every measure that affects the price and/or availability of banking loans must be regarded as a monetary policy step, even though the label is different.

Narrow focus on monetary policy on price stability over the horizon of 12 to 24 months may pose risks to price stability in the long run, if the potential consequences of financial instability for long-term price developments are underplayed. Price stability and financial stability have probably more common than the separation principle of the conduct of monetary policies and macroprudential policy may address nowadays. Macroprudential measures may not be sufficient in addressing those financial instabilities that stem from long-term ultra-accommodative monetary policy.

Therefore, the strand of research focused on leaning-against-the-wind monetary policy seems to be very promising to address the shortcomings of present state-of-art. Permanent swings in financial booms and busts hitting the real economy afterwards support to the case for leaning. Loose monetary policy not only contributes to costly financial booms and busts, but also creates a kind of vicious circle, when low rates in the past can then be seen as one reason for even lower rates today. New kinds of financial imbalances are created even before the "mess is cleaned". Last but not least, incorporation of some financial indicators is very useful as they

are not subject to measurement biases as macroeconomic indicators like GDP and CPI or the fuzzy indicator of the output gap.

Financial stability-oriented monetary policy applied over the whole financial cycle seems promising way to go ahead. The challenge is how to measure emerging financial instability in the period when price stability seems preserved or even threatened by low core inflation measured by standard ways of price developments of standard goods and services included in HICP, i.e. how to measure the financial cycle for monetary policy guidance. First experiments in this respect indicate that measures of unsustainability of indebtedness are meaningful. In small open economies, the situation is more difficult than in large and less open ones. In the case of CR and similar catching-up economies, that still in the process of convergence to most developed market ones, the level of indebtedness gap is not a trivial task to be defined. However, this bottleneck will be evaporating over time and will be a subject to further research.

Acknowledgement

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