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Extending QE: Additional risks for financial stability?

IN-DEPTH ANALYSIS

Abstract

The ECB's decision to extend its quantitative easing (QE) programme for another 9 months is not a game changer but grosso modo "more of the same for longer". Thus, the time dimension plays a crucial role for assessing the risks of unintended side-effects of QE policies designed to stimulate the economy. We widen the view beyond the purely macroeconomic perspective and highlight the importance of the level of interest for the production structure (rather than the level of production) and the distortive consequences of artificially low interest rates. Based on theoretical deliberations linking distortions in the real economy to financial stability, empirical evidence is explored with respect to more aggressive maturity transformation, "zombification" and the eagerness to push through structural reforms and fiscal consolidation in times of easy access to financing by governments.

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CONTENTS

EXECUTIVE SUMMARY

- Despite some modifications in terms of monthly purchasing volumes and eligibility criteria, the ECB's extension of its quantitative easing (QE) type 2 programme is basically a "more of the same for longer". Thus, the time dimension is the crucial factor in assessing the riskiness of this policy approach. Any risk assessment in this respect is necessarily of a qualitative nature. All that economic theory and empirical evidence can provide is to indicate the direction of maladjustments. The 9-months extension of the ECB's QE programme as such is not a game changer in terms of financial stability but it feeds into risks that evolve with the length of the extraordinary monetary policy stance.
- The bottom line of the ECB's QE approach is to reduce capital market rates below the levels that would otherwise prevail. The underlying rationale sees the level of interest primarily as an instrument of macro-management. However, as the key coordination mechanism between the present and the future, the level of interest plays an important role in shaping the production structure of an economy (rather than just the level of production that a purely macroeconomic perspective would suggest).
- The distortive allocative side-effects of artificially low interest rates grow with the time span during which expansionary monetary policy interventions like the ECB's QE programme are maintained. As each specific price in the market system contains an interest component that depends on the specific good's temporal distance from its use for final consumption, the production structure in the economy tends to be skewed towards longer durations. When interest rates normalize later, substantial parts of the production system may turn out to be not sustainable as they cannot earn the yields that have then to be paid as refinancing costs to continue the investment projects started in the period of extremely low interest rates.
- In a bank-based economy like the euro area, discrepancies in the temporal production structure have far reaching repercussions on financial stability and the monetary system. If – in a short-sighted response to flattening yield curves – commercial banks engage in more aggressive maturity transformation, future rising interest rates will directly erode the value of their assets calling their solvency into question. If the maturity transformation takes place by investing firms, future rising interest rates will negatively affect their solvency which might also spill-over to the banking sector in the form of significantly higher non-performing loans.
- Financial institutions in the euro area are increasing the duration of newly originated loans. For non-financial corporations, the share of new loans with a maturity of ten or more years now stands at about five percent which is roughly twice as large as their share five years ago. Mortgage loans, too, exhibit increasing time to maturity: by now, more than half of all new loans will run for more than ten years. While the trend towards longer durations did not kick-start with the implementation of QE policies (but had started earlier already) the latter might have accentuated it in the most recent past.
- "Zombification" describes a mechanism by which a loose monetary policy hinders the reallocation of capital towards its most productive use. If interest rates are very low, banks may be more inclined to extend further credit to legacy customers that are de-facto insolvent, especially if the bank itself is financially distressed and wants to avoid write offs on non-performing loans. As a result, old, less productive firms stay in business, while potential new, more productive firms face considerable entry hurdles. There is some empirical evidence for zombification being a problem in the euro area.

- An extended period of cheap credit constitutes a prolonged window of opportunity for fiscal consolidation and structural reforms. However, the empirical evidence rather suggests that fiscal discipline became less ambitious as soon as the immediate threat of sovereign default vanished. Also, structural reform progress seems to have slowed down as soon as severe macroeconomic troubles appeared less pressing.
- As the willingness to implement reforms appears to be proportionate to economic troubles and refinancing restrictions, the introduction of QE in 2015 did certainly not induce Euro area countries to refocus on structural causes of the crisis; thus, an extension of QE is most likely no suitable way to trigger additional structural reform eagerness.

1. INTRODUCTION

In its December 2016 meeting, the Governing Council of the European Central Bank (ECB) has decided to extend the horizon of its ongoing QE programme for another 9 months until the end of 2017. From April 2017 onwards, the amount of monthly asset purchases will be reduced from 80 billion euro to 60 billion euro. In its communication, the ECB stressed that its QE operations are open-ended and that the reduction in its monthly asset purchases shall not be interpreted as tapering. While the ECB has somewhat relaxed the purchasing criteria to extend the pool of eligible assets (the maturity range has been extended to 1-30 years after 2-30 in the current programme, and bonds yielding below the deposit rate are also eligible in the extended programme) the overall approach is basically a "more of the same for longer". Therefore, this paper focuses on the time dimension with respect to the risks that coincide with an extraordinarily expansionary monetary policy stance.

QE programmes are broadly categorized as either emergency liquidity provisions in the eye of the storm of a financial crisis (QE type 1) or as macroeconomic stimulus programmes in the aftermath of a financial crisis (QE type 2). While there is vast consensus among economists that QE type 1 measures are necessary to prevent a confidence crisis within the financial sector from causing systemic illiquidity, the effectiveness of QE type 2 programmes is much more controversial (Gern et al 2015).[1] Clearly, the ongoing Asset Purchase Programme of the ECB falls into the QE type 2 category. The bottom line of this monetary policy approach is to reduce capital market rates below the levels that would otherwise prevail. This raises the question to what extent the unintended side-effects of such a monetary policy stance depend on the very time span during which this policy is maintained. Given the complexity of the economic system, this question cannot be answered in a crisp numerical sense. Consequently, the risks involved with the extension of the ECB's current QE programme are not specific to it being extended by (at least) nine extra months. All that theory and empirical evidence can provide is to highlight the nature of the risks that increase as the ultra-expansionary monetary policy stance continues.

The time dimension is also relevant for the indirect intended consequences of QE type 2 policies. The ECB has declared over and over again that she can only "buy time" for structural reforms and fiscal consolidation to be pushed through by national or European policy makers, but that she is unable to take any action that would make these reforms dispensable. Clearly, these reforms take time to be implemented which would suggest not to stop QE support to governments prematurely. However, this approach is a double-edged sword as lower refinancing costs for governments thanks to the ECB's QE interventions may also dampen the political willingness to carry out unpopular structural reforms as pressure from capital markets eases.

This paper first presents some theoretical insights with respect to the role of interest in a market economy below the macroeconomic surface stressing the linkages between the real economy and the financial sector (section 2). Section 3 discusses increasing risks for the latter arising from more aggressive maturity transformation and extended zombification. Section 4 looks at whether the intended window of opportunities that the ECB constantly urges policy makers to make use of has been seized already or whether so far the opposite response dominates.

[1] Apart from empirical evidence, the different assessment of the two types of QE policies reflects also theoretical considerations. By means of QE type 1 programmes the central bank takes action against short-term liquidity shortages within the financial sector, something that a central bank can effectively do as in today's monetary system she is the ultimate producer of liquidity. By contrast, stimulating economic activity is much less straight-forward for a central bank as the monetary authority exerts her influence only indirectly and in a much less predictable way. Plus, there are obstacles to economic activity (like structural discrepancies or a dysfunctional regulatory framework) that are completely out of reach for monetary policy makers. The attitude towards the effectiveness of QE type 2 programmes therefore depends crucially on the diagnosis for the underlying reasons causing unsatisfying macroeconomic dynamics.

2. MONEY, TIME AND CAPITAL

In the prevailing monetary policy debate, the interest rate is primarily considered as an instrument of macro-management. In line with this view, the market interest rate should be lowered by expansionary central bank interventions whenever the economy is in a recession to stimulate aggregate demand (accordingly, in a boom phase the opposite monetary policy response applies). Apart from this mechanism being typically less reliable in a post-crisis environment (Bech et al. 2014; Jannsen et al. 2015), the macro perspective overlooks far reaching implications of artificially low interest rates for the production structure (rather than for the overall level of production) in the economic system (Garrison 2001).

These implications stem from the fact that

(1) in a market economy, the allocation of resources depends on relative price signals for all goods (including services and production factors) and that

(2) the value of any economic good or activity is derived from its contribution to final (private or public) consumption however indirect this link may be.[2]

Consumption marks the end of each production chain and is thus the ultimate source of value. Therefore, the appreciation of consumer goods is the starting point of all economic valuation: The prospective importance that consumers attach to various consumer goods is pushed backwards through the production process and thus determines at every stage the value of intermediate products and the inputs of primary production factors (inverse value imputation). As long as a good has not been absorbed for consumption it remains part of the capital stock of the economy. This capital stock is not a homogenous fund, but rather constitutes a structure of the as-yet-unfinished intertemporal plans (Lachmann 1956, Kirzner 1966).

Within the price mechanism of the market system, the level of interest plays the key role for the time profile of the production portfolio by coordinating the time preference of households and investment opportunities of firms. Each individual price in an economy contains an interest component. The further away an economic good is from its contribution to final consumption, the higher is the share of interest in the price of that good and the more responsive its price is to changes of the interest rate.[3] The lower the interest rate, the higher the relative price of long-term capital goods. This shifts the production structure towards a profile that will serve temporally more distant consumption needs. Thus, it is not only the aggregate level of investment but also the composition of investment that matters with respect to the interest rate. These allocative consequences are not limited to the physical capital stock as the structure of human capital is also affected to the extent that qualifications are specific to the production of goods whose valuation varies with the interest rate.[4]

Clearly, adjustments of the production structure to a modified level of interest do not happen overnight. Physical capital formation is a time-consuming process that progresses

[2] The term “final use” as applied in the National Accounts refers to the use of goods from the perspective of the reporting period only, not to the underlying position of a good in the value creating production process. E.g. a rolling mill that is produced in period t is accounted for as “final use for investment” in the National Accounts of the same period, but it is valuable only to the extent that it directly or indirectly supports the production of consumer goods in the future. If there was no such channel to final consumption this rolling mill would be worthless.

[3] For this reason, house prices are particularly responsive to changes in interest rates. As it takes typically several decades until dwelling capital goods are transformed into housing services (i.e. final consumption) the interest component in the price for construction goods is much higher than for those goods whose useful life is markedly shorter (like cars or TV sets).

[4] To continue the example of the previous footnote, a higher valuation of dwelling capital goods (induced by lower interest rates) gives incentives to shift more production factors into the construction industry thus also affecting the product-specific skill composition of the labor force.

at a pace limited by what gross investment can be financed out of depreciation and (domestic as well as foreign) savings. Alike, the skill-structure of the labor force adjusts only gradually. Therefore, distortive allocative side-effects of monetary policy are normally considered as less important. As long as the central bank responds to short-term business fluctuations (and, ideally, only mimics market interest rates) no serious misallocations are to be expected. However, in the case of a prolonged period of massive monetary interventions targeted at lowering interest rates and flattening their term structure the risk of a deformation of the production structure gains weight. This is particularly true as a long-lasting period of poor economic performance does not fit the pattern of a cyclical phenomenon but rather points to serious structural economic discrepancies (depressed aggregate production due to pervasive mismatch problems, not because of a lack of demand).

Given the complexity of the micro-economic system, structural maladjustments are hard to gauge (even more so in real-time) as the counter-factual is unknown. What is known, however, is the direction of maladjustments and that the harmful misallocations are all the more severe the longer the period of ultra-low, policy-induced interest rates prevails.

In a bank-based economy like the euro area, the dependency of the temporal production structure (i.e. the capital structure) on the level of interest has repercussions on financial stability. In fact, a serious financial crisis can be interpreted as the flipside of a pervasive capital stock distortion of the affected economy that has developed in the run-up to the financial crisis due to excessive credit creation (and, accordingly, a subdued interest rate). Once it becomes evident that the investment projects carried out in the past are to a large extent not in line with the preferences of the consumers (as their profitability depended on an artificially low interest rate), the solvency of the investors comes under pressure because those projects can no longer earn the yields in the real economy that are necessary to satisfy the financial claims once issued to finance these projects. If the counterparty of these financial claims (bonds and loans, in particular) is the banking sector a serious financial crisis results. While commercial banks can deal with idiosyncratic mal-investments of individual investors (which are perfectly normal in a market economy) by calculating adequate risk premia in their credit business, they cannot cope with systemic risks that stem from the fact that a large number of investors has been systemically misled to non-sustainable investments. As these (now non-performing) financial claims belong to the assets that back up outstanding deposits of the banking sector, the crisis threatens the stability of the monetary system. Financial imbalances are therefore deeply rooted in the production structure of an economy that to a substantial degree responds to the monetary environment. If this monetary environment influences the interest rate as the most important relative price in the capitalist system (price of present goods relative to future goods) for a prolonged period of time, the likeliness of distortions in the production structure and a subsequent financial crisis increases (or, as Roger Garrison once phrased it, "capital gives money time to cause trouble").

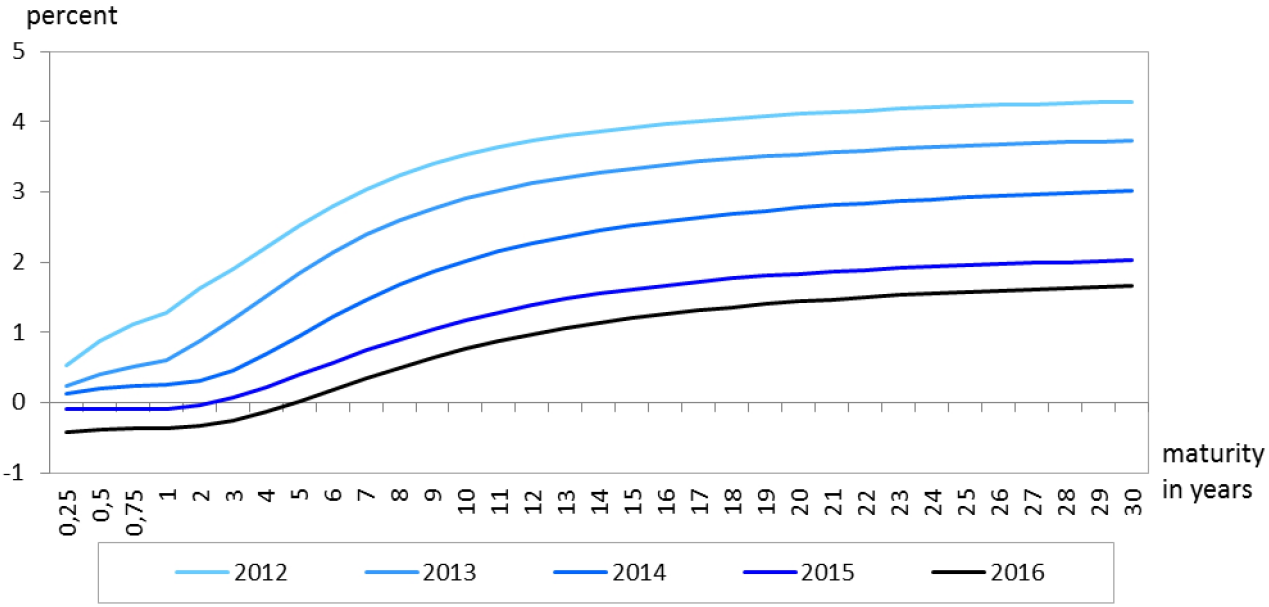
3. RISKS IN THE EURO AREA FINANCIAL SECTOR

3.1. Maturity transformation

One of the ways in which banks generate earnings is maturity transformation, that is by repeatedly borrowing money short-term and lending it out over longer periods of time at higher interest rates. However, in conjunction with the prolonged period of monetary policy easing by the European Central Bank (ECB), interest rates have shifted in recent years. Figure 1 shows yield curve data for euro area government bonds.[5] While interest rates have come down across the whole range of maturities, the effect was most pronounced at the longer end of the spectrum: in 2016, average interest rates on ten-year bonds were just 1.1 percent higher than those on one-year bonds – less than half the spread of only three years ago. One important reason for this flattening of the yield curve is that the short end of the curve is increasingly pressed against the effective lower bound of nominal interest rates.

Figure 1: Euro area government yield curve

(par yield in percent, bonds of all ratings)



Source: ECB Statistical Data Warehouse

For banks, this development poses two problems: first, a flatter yield curve means that the margins that can be earned through maturity transformation will be lower. Second, when the turn-around comes such that interest rates rise again, banks will have locked in the current low long-term rates but will have to refinance at the then higher short-term rates.[6] To prop up their earnings potential, banks may decide to increase the degree of maturity transformation, either by a reduction of the average maturity of their liabilities or an increase in the average maturity of their assets. There is some evidence that this has been

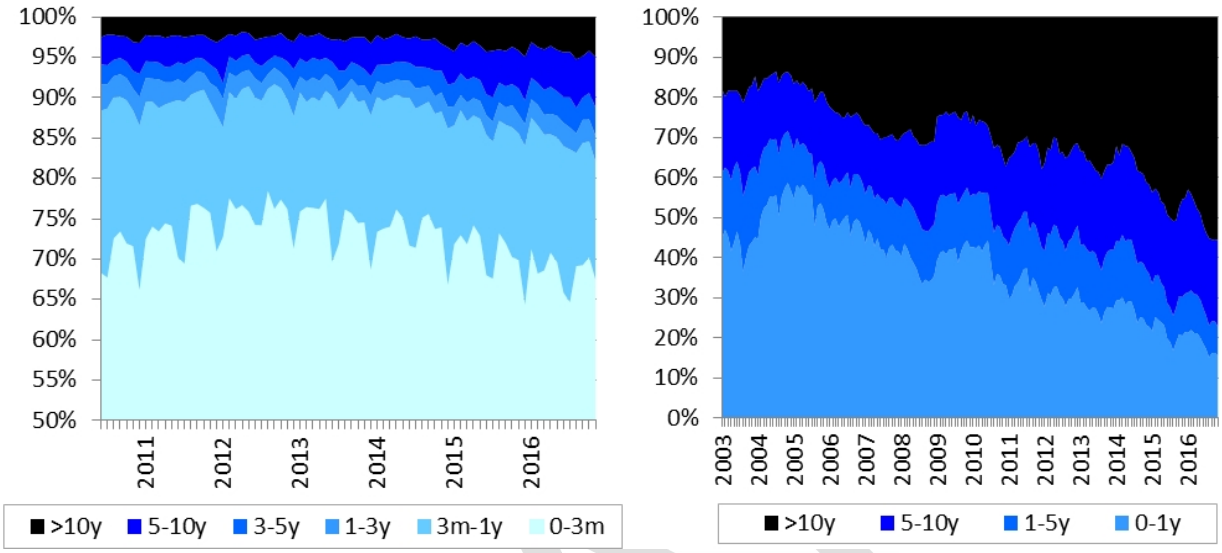
[5] Government bond yields are taken as the benchmark rates for the whole economy. While yields for private debt issuers also fell in recent years, full yield curve data is less readily available for them.

[6] It could conversely be argued that banks have in the past profited from their holdings of legacy high-yield assets when interest rates fell. However, these one-off windfall profits fade out the longer the period of low interest rates prevails.

happening for some time now: figure 2 shows new loans[7] to non-financial corporations (NFC) and to households as mortgage loans.

Figure 2: Loans by maturity – new business

(left panel: loans to non-financial corporations, right panel: loans for house purchases; share of new loans by maturity)



Source: ECB Statistical Data Warehouse

In recent times, financial institutions in the monetary union have increased the duration of newly originated loans. For NFCs, the share of new loans with a maturity of ten or more years now stands at about five percent which is roughly twice as large as their share five years ago. Mortgage loans, too, exhibit increasing time to maturity: by now, more than half of all new loans will run for more than ten years. However, the increase in the maturity of housing loans seems to have been an ongoing trend that started well before the financial crisis. In addition to loans, the distribution of bonds also shifted towards more long-term instruments recently (figure 3, left panel). But here, there was a visible break in trends: for the whole time between 2006 and 2014 the duration[8] of euro area government bonds remained quite close to about 6.5 years. Since then it has increased rapidly and now stands at 7.5 years.

A further risk factor is the decreasing share of floating rate loans (figure 3, right panel). This trend has been especially pronounced for housing loans where it has been ongoing for more than a decade: while ten years ago, about half of all loans for house purchases in the euro area came in the form of floating rate contracts, nowadays they make up less than one sixth. Insofar as the introduction of the Euro stabilized inflation and nominal interest rates in a number of euro area countries, the increased reliance on fixed rate loans might

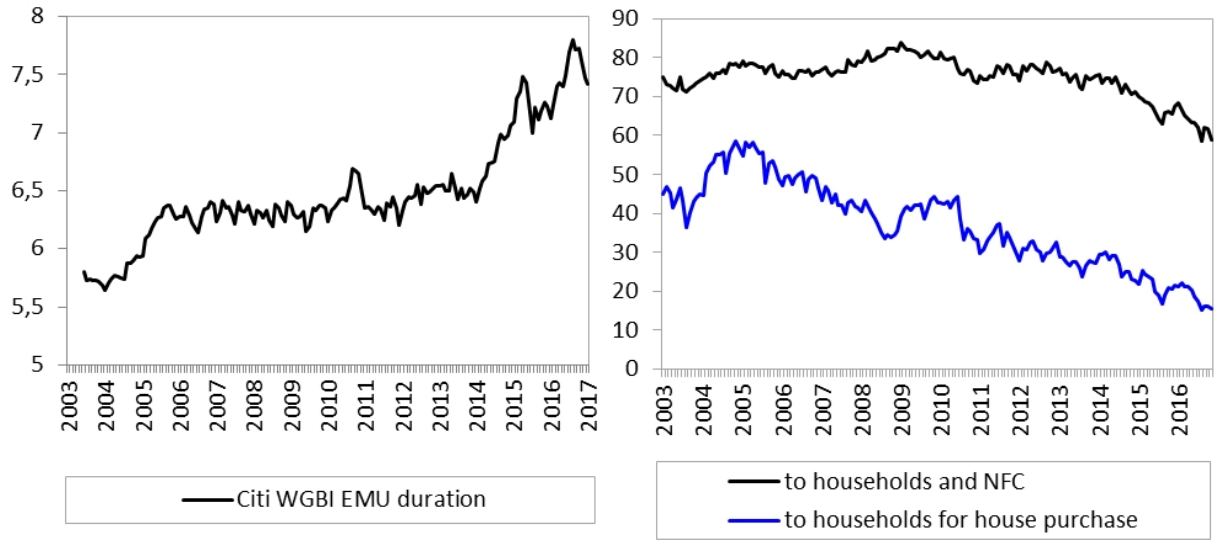
[7] Note that data on new business cannot be converted one-to-one into information on outstanding stocks of loans. For example, an investment of size x with a horizon of 10 years could be financed by one loan of size x that also has a maturity of 10 years. Alternatively, it could be financed by loans of size x with a maturity of 1 year which are rolled over annually. In the second case, over time cumulated new business would rise by 10x. It is therefore unsurprising that loans of very short duration make up a big percentage of new business even though they make up less of a share in the balance sheet volume of banks.

[8] Duration is a slightly different concept than maturity: while maturity only looks at when the final payment on a bond will be made, duration weighs all payments. Since interest payments received before the maturity date can be reinvested at conditions prevailing in the future, duration should give us a more accurate picture when considering the interest rate risk associated with maturity transformation. In any case, the presented developments in government bond duration are broadly in line with the data on their maturity.

seem justified. Nonetheless it exposes banks to higher risks because the lower the share of floating rate loans, the harder it will be for them to adjust once interest rates start to rise again.

Figure 3: Government bond duration and variable rate loan shares

(left panel: duration of euro area government bonds in years, right panel: share of floating rate loans of total loans in percent)



Sources: Citigroup World Government Bond Index, ECB Statistical Data Warehouse

All in all, both the reduced current earnings potential due to the flatter yield curve and the risks associated with a reversal of interest rate developments pose challenges to the banking sector. The relevant increase in government bond duration that coincided with the QE interventions pronounced these risks for the financial sector, as well as those risks that stem from trends that precede it, such as the increasing reliance on long-term fixed-rate housing loans. These factors exacerbate the problems that banks would have to face in any case should short-term refinancing rates rise again in the future after having now locked in very low long-term rates on their assets. Thus, from the perspective of financial stability, an exit from the ultra-expansionary monetary policy stance becomes more difficult the longer this period lasts.

3.2. Zombification

Zombification describes a mechanism by which a loose monetary policy can hinder the reallocation of capital towards its most productive use. If interest rates are very low, banks may be more inclined to extend further credit to legacy customers that are de-facto insolvent ("evergreening"), especially if the bank itself is in financial trouble and wants to avoid write offs on loans to distressed companies: the "zombie bank" takes a "gamble for resurrection" on the "zombie firm". This means that old, less productive firms stay in business while potential new, more productive firms face considerable entry hurdles. This impairs an economy's ability to produce the types and quantities of goods that would best satisfy consumer preferences.

While accommodative monetary policy can support balance sheet repair in the short term, it can also, if prolonged too much, cause problems by reducing the incentives to deal with banks' impaired assets, reducing the opportunity costs of carrying non-performing loans,

and potentially distorting banks' assessments of repayment capabilities (Bank for International Settlements 2012).

The Extended Asset Purchase Programme (EAPP) is only one of the more recent entries in the list of easing measures adopted by the ECB since the crisis. Albertazzi and Marchetti (2010) already found some evidence for evergreening by small Italian banks very shortly after central banks reacted to the Lehman event. Later, Acharya et al. (2015) look at the announcement of the Outright Monetary Transactions (OMT) programme. Using firm-level data, they show that peripheral countries' banks' windfall profits from this programme supported an increase in loans to those firms whose credit servicing ability was below the average and who usually already were debtors of the banks in question. Nevertheless, they were charged lower interest rates on these new loans than firms in core countries with very high credit ratings. Clearly, these loans did not provide any stimulus to the economy, as they were neither used for investment nor for job creation.

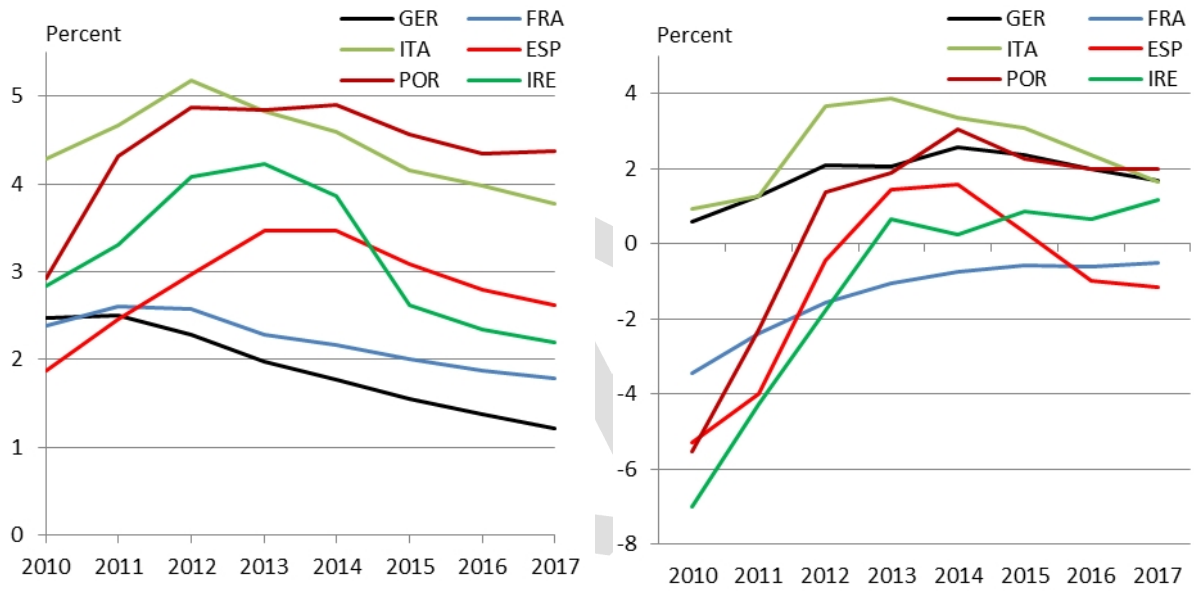
The continuation of the EAPP is likely to further contribute to those zombification side-effects.

4. A WINDOW OF OPPORTUNITY FOR REFORMS

For governments, an extended period of cheap credit constitutes a window of opportunity for consolidation and structural reforms. Zero interest rate policy in combination with central bank purchases of public debt translates into favourable financing conditions for governments. Figure 4 (left) shows that interest payments on public debt have been on a decreasing trajectory over the last few years, despite the fact that in most countries, debt ratios have increased considerably at the same time. Availability of cheap credit gives euro area governments time to fix their problems in calmer waters, in particular to consolidate public finances without the need to rely on harsh spending cuts, to retain low financing costs for some time and to conduct proper structural reforms that put their economies back on solid ground.

Figure 4: Interest Payments (left) and Structural Primary Balance (right)

(In percent of GDP at current prices)



***Source*:** European Commission, AMECO, own Calculations.

However, fiscal discipline weakened as soon as the immediate threat of sovereign default vanished. There is no mechanism ensuring that governments actually take the opportunity brought about by an extended period of cheap credit for consolidation. Instead, governments often use reduced interest payments to cover additional expenditures (Tkavecs and Vilerts 2016). Such lack of fiscal discipline is even more likely to occur if the impression is popular among decision makers – rightly or wrongly – that the economy suffers from weak demand, so that available money is immediately spent rather than used to repay debt. Figure 4 (right) depicts structural primary balances (i.e. the cyclically adjusted fiscal balances without interest payments) of several euro area countries. After a period of rigorous fiscal tightening until 2012/2013, structural primary balances deteriorated in Italy, Spain and to a lesser extent also in Portugal. Although the French balance continued to improve slowly, it remained on a rather high level judged by applicable fiscal rules. Only Ireland managed to hold the structural primary balance fairly stable since 2013, while considerably reduced interest payments kept on consolidating their budget. Germany saw its structural primary balance deteriorate a bit, but given its surpluses, the increase in spending is in line with requirements of the fiscal framework.

Retaining favourable financing costs by issuing long-term debt securities can be beneficial to fiscal sustainability, but creditors bear the consequences. Generally, fiscal sustainability can be improved with reduced interest payments on the stock of debt. Whenever government bonds reach maturity, they can be rolled over with new long-term issues of securities at currently very low yields, so countries can preserve favorable financing conditions for the future. This way, governments act like a sponge for cheap liquidity and can benefit from extending QE. Once monetary policy normalizes, interest payments remain on a fairly low level for some time. Obviously, the flip-side of the coin is that those economic players who tend to hold large amounts of government debt (e.g. banks, pension funds, life insurances, and also central banks) will have to deal with continuously weak flows of revenue out of these assets, combined with losses to the book value of securities once interest rates are back on the rise. Financial sector players may run into severe problems if interest rates remain longer on the current level, as long as their business model requires a steady flow of non-negligible interest revenue. Apart from such problems of creditors, governments may nevertheless be able to benefit from locking-in cheap financing conditions. If, however, government spending is increased in parallel, this behavior will probably backfire in the future. Once monetary policy is normalized and interest rates are back to "normal", each debt instrument that reaches maturity will have to be refinanced at higher interest rates. Given the vastly increased debt levels in some countries, this continuous process of debt rollover will probably be accompanied by a steady need for consolidation to maintain fiscal sustainability. If fiscal discipline is suspended today, a continuous and repeated process of spending cuts probably awaits in the future.

Similar to weakening fiscal discipline the structural reform progress slowed down as soon as severe macroeconomic troubles appeared less pressing. Conventional wisdom argues that a three-pillar approach is required to boost long-term growth in the euro area: supportive monetary policy, careful fiscal consolidation and structural reform (OECD 2015). However, political pressure and support to conduct unpopular structural reforms is weakened immediately once the deep crisis appeared to be over. Has the window of opportunity for structural reforms been wasted? This question is obviously difficult to answer in general terms, since reform progress can hardly be assessed on a strictly numerical scale, and since the political support to implement reforms differs from country to country. Nevertheless, an attempt to capture the pace of reform progress among country groups is the reform responsiveness index (RRI) (OECD 2016). The RRI is based on the share of OECD "going for growth" recommendations that have been addressed by economic policy makers during a certain period, so that it ranges between 0 and 100 per cent. According to this proximate assessment, the pace of reform implementation for a group of "euro area deficit countries" (France, Estonia, Greece, Ireland, Italy, Portugal, Slovak Republic, Slovenia and Spain) has decelerated considerably. In 2011/2012, the reform pace for this country group was very high at more than 60 percent, went down to about 40 per cent in 2013/2014 and fell further to roughly 25 per cent in 2015. Reform progress in "surplus countries" (Austria, Belgium, Germany, Finland, Luxembourg and the Netherlands) was considerably slower over all three periods considered and also decelerated further to less than 20 per cent in 2015. Therefore, willingness to implement reforms appears to be proportionate to economic troubles, and there is a clear correlation between unemployment and reform responsiveness as measured by the OECD. Overall, the introduction of QE in 2015 did certainly not induce euro area countries to refocus on structural causes of the crisis; and an extension of QE is most likely no suitable way to trigger additional structural reforms.

5. CONCLUSION

Time matters. The time dimension is the crucial factor in assessing the riskiness of the most recent extension of the ECB's quantitative easing (QE) programme. The 9-months extension as such is not a game changer in terms of financial stability, but it feeds into the accumulation of risks that evolve with the length of the extraordinary monetary policy stance in the euro area. While the nature of the risks can be demonstrated, they are extremely hard to quantify. Also, it is impossible to say within what time horizon they might materialize.

Allocative distortions escape the radar of macro-management. The ECB's QE strategy aims at reducing capital market rates below the levels that would otherwise prevail to stimulate aggregate demand. The effectiveness of this macro-oriented approach is limited in a post-crisis environment. By contrast, the unintended distortive side-effects of artificially low interest rates grow with the passing of time. As the level of interest affects relative prices, the production structures tend to be skewed towards capital formation with longer durations. When interest rates normalize later, substantial parts of the production system may turn out to be unsustainable. A bank-based economy like the euro area is particularly prone to see its financial sector being destabilized as the discrepancies in the temporal production structure stress the solvency of debtors in a systemic way. In an extreme case, another financial crisis could result.

Flatter yield curves trigger more aggressive maturity transformation. Maintaining the regime of extremely low interest rates challenges the business model of commercial banks. As their margins are squeezed from the revenue side, banks might engage in a more pronounced maturity transformation. In that situation, future rising interest rates will directly erode the value of their assets calling their solvency into question. If maturity transformation is done by investing firms, future rising interest rates will negatively affect their solvency which might also spill-over to the banking sector in the form of a rising share of non-performing loans. And indeed, data indicates that financial institutions in the euro area are increasing the duration of newly originated loans. The share of new loans with a maturity of ten or more years now is considerably higher than five years ago, both for mortgage loans and loans to non-financial corporations.

Cheap credit hampers the liquidation of uncompetitive firms. There is some empirical evidence that "zombification" is a problem in the euro area, a mechanism by which loose monetary policy can hinder the reallocation of capital towards its most productive use. If interest rates are very low, banks may be more inclined to extend further credit to legacy customers that are de-facto insolvent, especially if the bank itself is financially distressed and wants to avoid write-offs on non-performing loans. As a result, less productive firms stay in business, while potential new, more productive firms face considerable entry hurdles.

"Buying time" lets fiscal discipline and structural reform efforts wane. An extended period of low interest rates constitutes a prolonged window of opportunity for fiscal consolidation and structural reforms. However, the empirical evidence rather suggests that fiscal discipline became less ambitious as soon as the immediate threat of sovereign default vanished. Also, structural reform progress seems to have slowed down as soon as severe macroeconomic troubles appeared less pressing. As the willingness to implement reforms appears to be proportionate to economic troubles and refinancing restrictions, the introduction of QE in 2015 did certainly not induce Euro area countries to refocus on structural causes of the crisis; thus, an extension of QE seems to be unsuitable to trigger additional structural reform eagerness.

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