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Monetary transmission and bank lending: is the single monetary policy homogenous across euro area countries?

Transmisión monetaria y préstamos bancarios: ¿Es la Política Monetaria Común homogénea en los países de la Zona Euro?



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I. INTRODUCTION

Traditionally, it was assumed that the stock of loans constituted a legacy of the past and that could not be influenced by monetary policy. However, in recent times, an increasing interest has emerged about how monetary policy influences current consumers' balance sheets (Garriga, Kydland and Sustek, 2015; Badarinza, Campbell and Ramadorai, 2015). The mechanism would work through disposable income instead of through the total volume of loans and the supply of money. Changes in the prevalent rates may affect the cost of servicing a loan, which will impact the disposable income of the borrower. Borrowers have uneven income levels, different propensity to consume (Carroll et al., 2015; Keys et al. 2014; Di Maggio, Kermani, and Ramcharan, 2015) and different constraints in the liquidity of their savings (Kaplan and Violante, 2014). Given these differences, consumption and investment – and, consequently, output – could be impacted by monetary policy shocks, even if the supply of money remains unchanged, depending on the specific feature of the borrowers and the loans being affected.

Inflationary effects constitute an additional channel through which monetary policy can generate income effects on borrowers. Indeed, given that mortgages are nominal contracts with long duration, cumulative inflation erodes the burden of debt service and generates positive income effects in real terms. A few recent studies point to



EXECUTIVE SUMMARY

We postulate that bank lending is affected by ECB policy via new loans and via the stock of existing loans. In this context, this paper documents a wide diversity in borrowers' features, loan features and price developments across euro area Member States that produces heterogeneous impacts in bank lending. Thus, countries with higher (lower) inflation, higher (lower) stock of loans longer (shorter) maturities, and higher (lower) proportion of adjustable rate loans are affected more (less) when ECB changes its policy rate. The significant differences in these factors across euro area Member States can distort a homogeneous transmission of the single monetary policy and generate asymmetries in bank lending.

RESUMEN DEL ARTÍCULO

Postulamos que los préstamos bancarios se ven afectados por la política del BCE a través de nuevos préstamos y a través del stock de préstamos existentes. En este contexto, este trabajo documenta una amplia diversidad en las características de los prestatarios, las características de los préstamos y la evolución de los precios en los Estados miembros de la zona euro que produce impactos heterogéneos en los préstamos bancarios. Por lo tanto, los países con mayor (menor) inflación, mayor (menor) stock de préstamos con vencimientos más largos (más cortos) y mayor (menor) proporción de préstamos de tipo variable se ven más afectados (menos) cuando el BCE cambia sus tipos. Las diferencias significativas en estos factores en todos los Estados miembros de la zona del euro pueden distorsionar una transmisión homogénea de la política monetaria única y generar asimetrías en los préstamos bancarios.

these effects either through mortgage loans (Garriga, Kydland and Sustek, 2015), more widely through the overall private debt (Adam and Zhu, 2016) or even through government (public) debt (Hilscher, Raviv and Reis, 2014).

In this context, the aim of this paper is twofold. First, to document how the stock of loans can be as relevant for monetary transmission as the flow of new loans. And second, to document structural differences across countries which can jeopardise a homogeneous transmission of the single monetary policy producing an asymmetric influence in bank lending. The paper focuses on the euro area as a whole as well as the four largest euro area countries: Germany, France, Italy

and Spain. However, the relevance of heterogeneity across countries goes beyond the euro area; this is because global interest rates have moved in a coordinated manner in the last few decades even if not formally under a monetary union (Henriksen, Kydland and Šustek, 2013).

Several factors explain this renewed interest on the impact of monetary policy on existing loans. Firstly, the total volume of mortgage debt has significantly increased over the past years. This can be explained, to a large extent, by a continuous increase in real estate prices beyond increases in nominal wages (Hilbers et al., 2008). To afford the monthly instalments linked to more expensive real estate, borrowers have been asking for longer maturities and larger indebtedness.

Secondly, a trend towards a high concentration of income and wealth is observed since the 1960s (Frank and Cook, 1996; OECD, 2011; Galbraith, 2012; Stiglitz, 2012; Lakner and Milanovic, 2013; and Piketty, 2014). Confronted with relatively declining salaries, consumption levels of the lower and even the middle class have artificially been maintained by resorting to credit. This has led to the sub-prime crisis and the phenomena of debt overhang, over-indebtedness and the increasing non-performing loans observed in a number of countries (Homar, Kick and Salleo, 2015).

Thirdly, once existing loans are considered to be relevant for monetary policy, the specific features of the loan play a very important role. There is not only a diversity of borrowers, but also a great variety of loans: from fixed-rate mortgages to perpetual mortgages paying interest only; similarly, commissions and fees, both at inception of the loans as well as throughout the lifetime of the mortgage may vary from one contract to the other (ECB, 2013; Drudi et al., 2009;

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Hall et al., 2015; Nouy, 2015). On the wake of the financial crisis, the ECB has been confronted with a “broken” transmission mechanism: lending rates across countries show very heterogeneous reaction to the single monetary policy. The prevalence of certain types of mortgages in some countries but not in others may explain some of this heterogeneous transmission.

Finally, on the wake of the financial crisis, interest rates declined from about 5 percent to virtually zero, a drop of an unprecedented magnitude. However, inflation did not increase as it would be predicted by conventional central banking wisdom. Williamson (2016) argues that a Fisher effect would explain the collapse of inflation to zero. With virtually no inflation, the income effects linked to the erosion of value are eliminated and mortgages become in fact more expensive even if monetary authorities aimed at easing credit conditions.

The rest of the paper is organised as follows. In Section 2, we compare loan origination with the stock of loans in terms of volumes and in terms of the cost of debt service. In Section 3, we document the heterogeneity in mortgage contracts across countries. In Section 4, we discuss how inflation can influence the disposable income of indebted borrowers in real terms. In Section 5, we review borrowers’ features in terms of income level and indebtedness and its potential impact on the effectiveness of monetary policy. Finally, Section 6 concludes.

2. THE RELEVANCE OF THE STOCK OF LOANS FOR MONETARY POLICY

2.1. Volumes: stocks vs mortgage origination

Data show very different patterns when the stock of mortgages is compared against loan origination (**Chart 1**). In Germany, both stocks and new mortgages have remained stable throughout most of the period, with an upward trend appearing from 2013. In France, a secular increase in the stock of loans contrasts with a cyclical behaviour of new loans. In Italy, the crisis led to a halt in the expansion of stocks, which is driven by a certain credit crunch in loan origination observed since 2012. Since 2015, new loans have started to increase again, but this does not seem to be reflected in the stock of loans yet¹. Finally, in Spain, a strong expansion of both stocks and new loans is observed

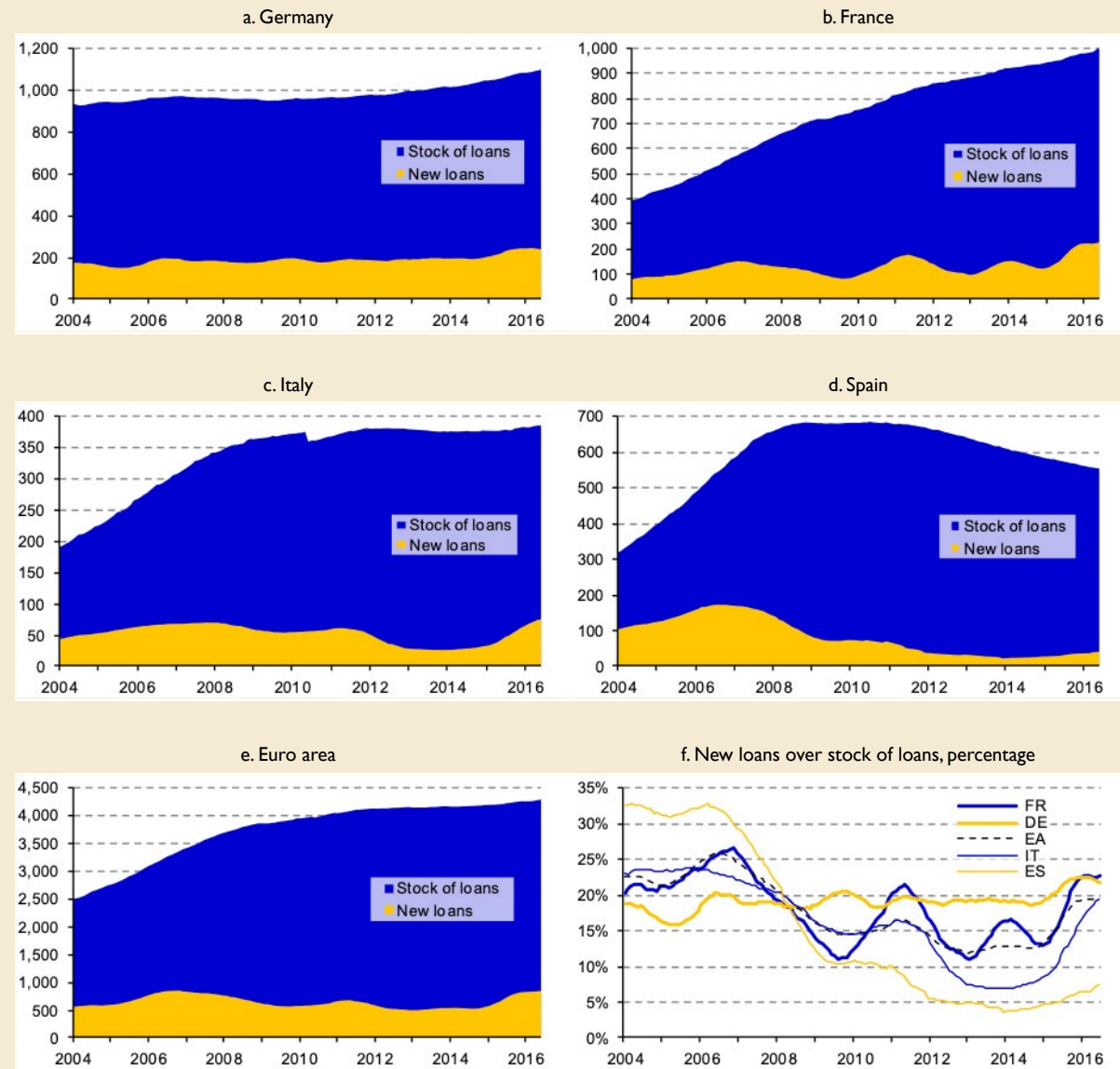
KEY WORDS

Euro area, monetary transmission, income effects, lending channel, mortgages.

PALABRAS CLAVE

Zona Euro, transmisión monetaria, efecto renta, canal de préstamo, hipotecas.

Chart I. Volume of loans: new loans vs stocks, credit for house purchase, € billion



Notes: New loans: 12-month moving sum.
Source: ECB and own calculations.

at the beginning of the 2000s followed by a significant impact of the crisis. The credit crunch in loan origination is observed since 2007 with further deepening at each new wave of the crisis (in 2009 and in 2012). The strong impact of the crisis in Spain led to an actual and significant decrease in the stock of loans. Despite these differences observed across countries, a common feature seems to be a recovery on both new loans and outstanding loans since 2015 (although only very timidly in the case of Spain).

To better compare the relative importance of new mortgages and the stock of mortgages, we have calculated the ratio between both magnitudes (**Chart 1, panel f**). In the last 5 years, annual loan origination represented only 20 percent of the stock of mortgages in the upper end (Germany) and as little as 5 percent in the lower end (Spain). The crisis has increased the importance of “old” loans in the balance sheet of banks as the proportion of new loans has, in general, declined since the mid-2000s. The increases observed since early 2015 are explained, to a large extent, by the refinancing of existing loans due to the prevailing very low interest rates².

2.2. Loan origination vs cost of debt service

Given that past decisions cannot be changed, a potential impact of monetary policy on existing loans would work through the cost of debt services (i.e. repayment instalments) or through inflation effects. The former effect can be illustrated through the instalment plan for a stylised annuity mortgage of €150,000 and a maturity of 25 years when lending rates drop from 6 to 2.5 percent (**Chart 2**)³.

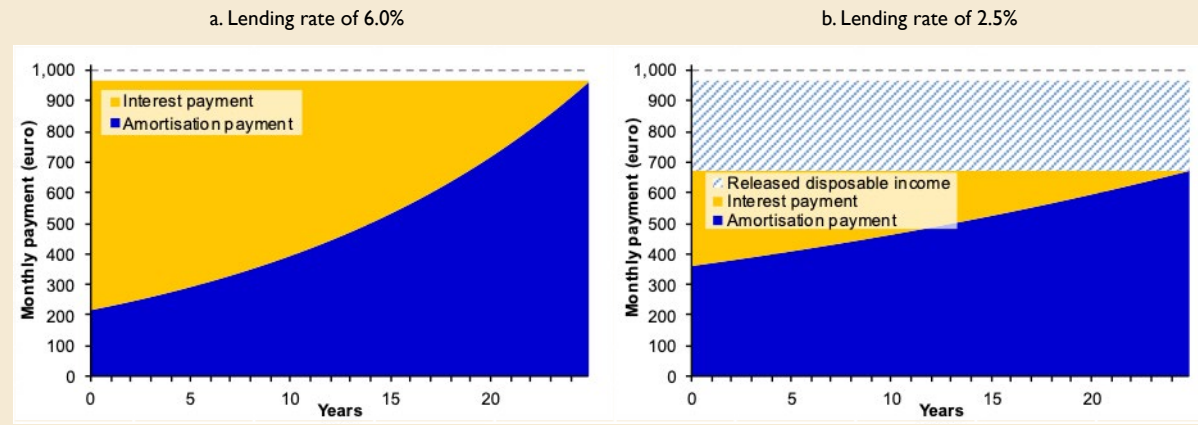
Two key features stand out from this illustration. Firstly, there is a non-linear relation between the interest payment and the amortisation payment. Secondly, changes in the lending rate impact total interest payment and, consequently, total monthly payments. However, changes in the lending rate generate only a redistribution of the amortisation payments throughout the maturity of the loan as total amortisation is always equal to the initial capital.

The traditional view of monetary policy maintains that an expansionary monetary shock that is ultimately transmitted to lending rates would foster new lending by making loans more affordable and leading to more borrowers being able to apply for loans.

We argue that an expansionary monetary shock can also impact existing loans via resets through income effects. In our example, borrowers could have up to €300 more disposable income a month.

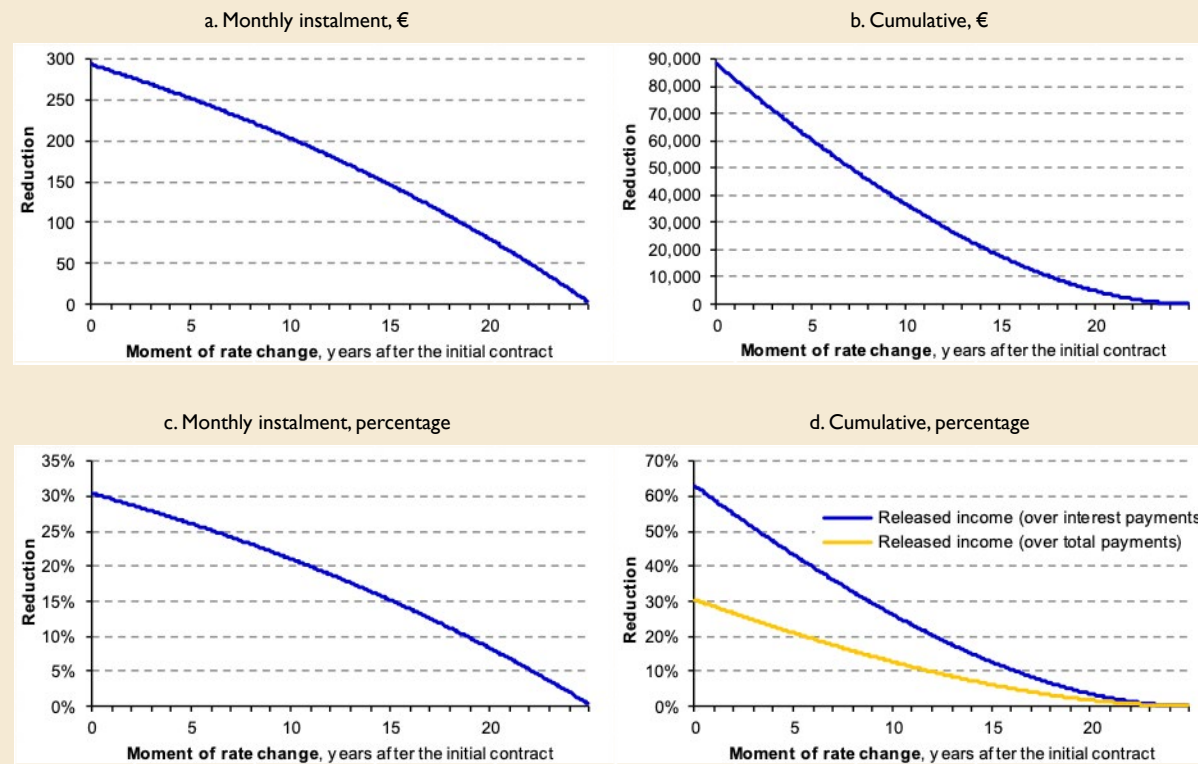


Chart 2. Cost of debt service for an annuity loan with 25 years of maturity and €150,000 of initial capital



Note: An “annuity loan” is a redemption scheme with monthly fix payments.
Source: Own elaboration.

Chart 3. Reduction of the cost of debt service when lending rate decrease from 6.0% to 2.5%



The chart illustrates the effect of a reset in lending rates on the disposable income of the borrower, depending on the moment of the reset. If the reset occurs 5 years after loan origination, the monthly instalment will decrease by €250 (panel a) and will mean a cumulative increase of €60,000 in the borrower’s disposable income throughout the remaining 20 years of the mortgage (panel b). In relative terms, the monthly instalment will decline by 25 percent (panel c); the cumulative mortgage payments, by 20 percent; and the overall interest payments, by 40 percent (panel d).

Note: The simulation is based on an annuity loan with 25 years of maturity and €150,000 of initial capital.

Source: Own elaboration.

This sum up to non-negligible €88,000 more disposable income throughout the lifetime of the mortgage available for increased consumption (**Chart 3**). This being said, the impact of a monetary shock on an existing loan depends on its age. For instance, when the reset occurs after 15 years (instead of immediately), the increase in the disposable income is reduced from €88,000 to less than €20,000. Comparing the cost of debt service against loan origination seems a better benchmark to assess the importance of monetary transmission through the stock of loans because it is where monetary shocks impact. Given data limitations, we use interest payments as a proxy for the cost of debt service. On top of that, we have made an estimation of a corridor for the total mortgage payments based on a standard mortgage as the one presented above (**Chart 4**).

The cost of interest payments, although much smaller than the stock of loans, still represents about 20 percent of the volume of new loans, or up to 35 percent for a certain period in the case of Spain. Moreover, our estimate of the corridor for total mortgage payments indicates that the latter are similar in size to loan originations. The dynamics are very heterogeneous across countries (**Chart 4**).

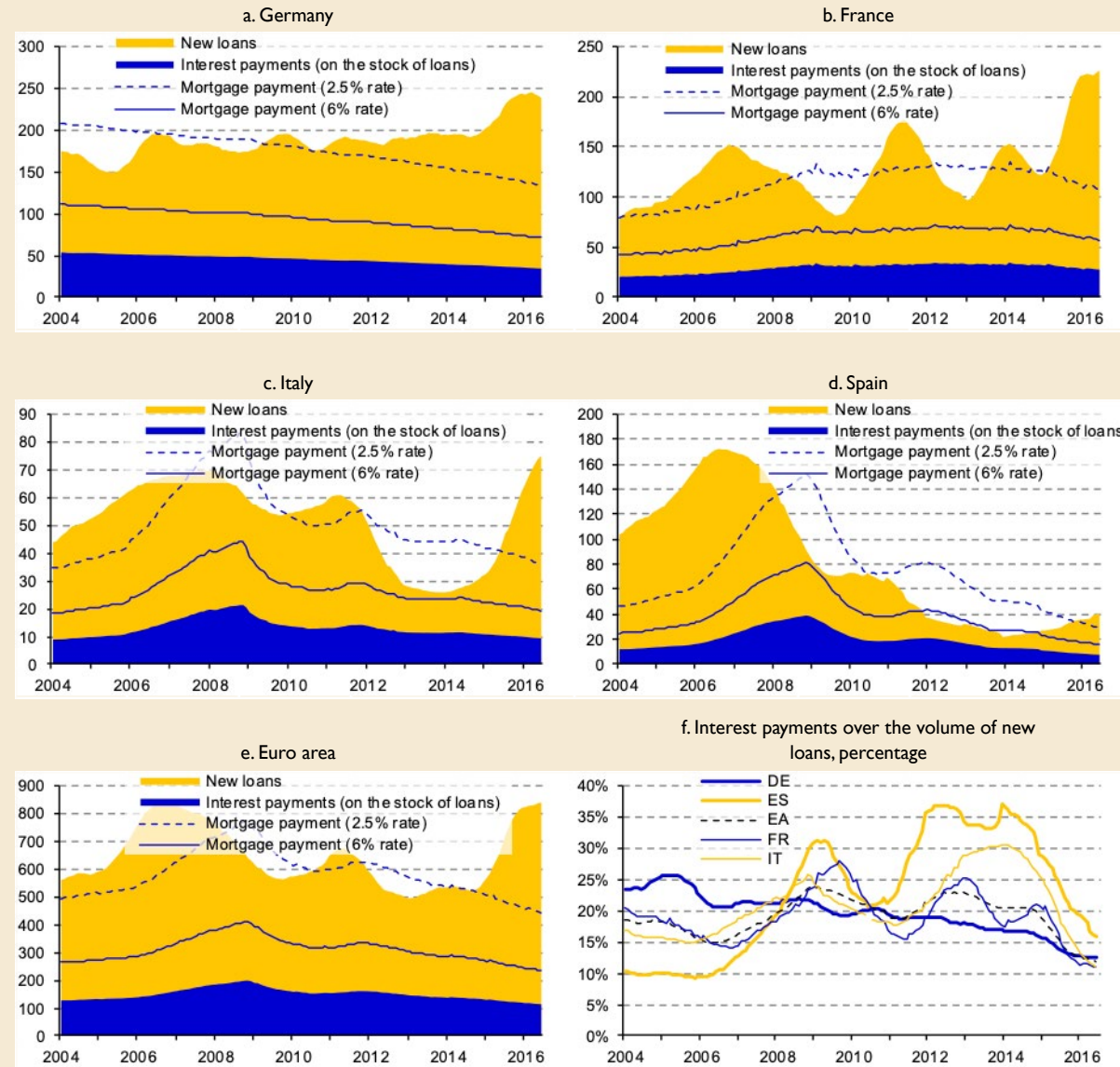
Given the lack of direct information about amortisations, it is not possible to calculate total mortgage payments. Therefore, we have compared net flows of loans (i.e. gross new loans minus redemptions) against interest payments, as a robustness check. Net flows of loans appear to be similar in size to interest payments (**Chart 5**). This supports the hypothesis that monetary transmission through existing loans can be as large as through new loans. Moreover, net flows can somehow be considered as a better indicator of the potential impact of monetary policy decisions on the supply of money than gross loan originations.

3. LOAN FEATURES AND MONETARY POLICY

A mortgage contract includes features such as the initial commissions and fees, the total amount to be lent, the maturity, the amortisation scheme, the benchmark used to calculate the lending rate, how often the lending rate is reset, potential floors or ceilings in the rate, potential grace periods, penalties for late payments or early repayments, etc. These many features can make loans complex and very different from each other. Moreover, additional factors, such as the requirement to use notarial deeds or the national tax system can influence the



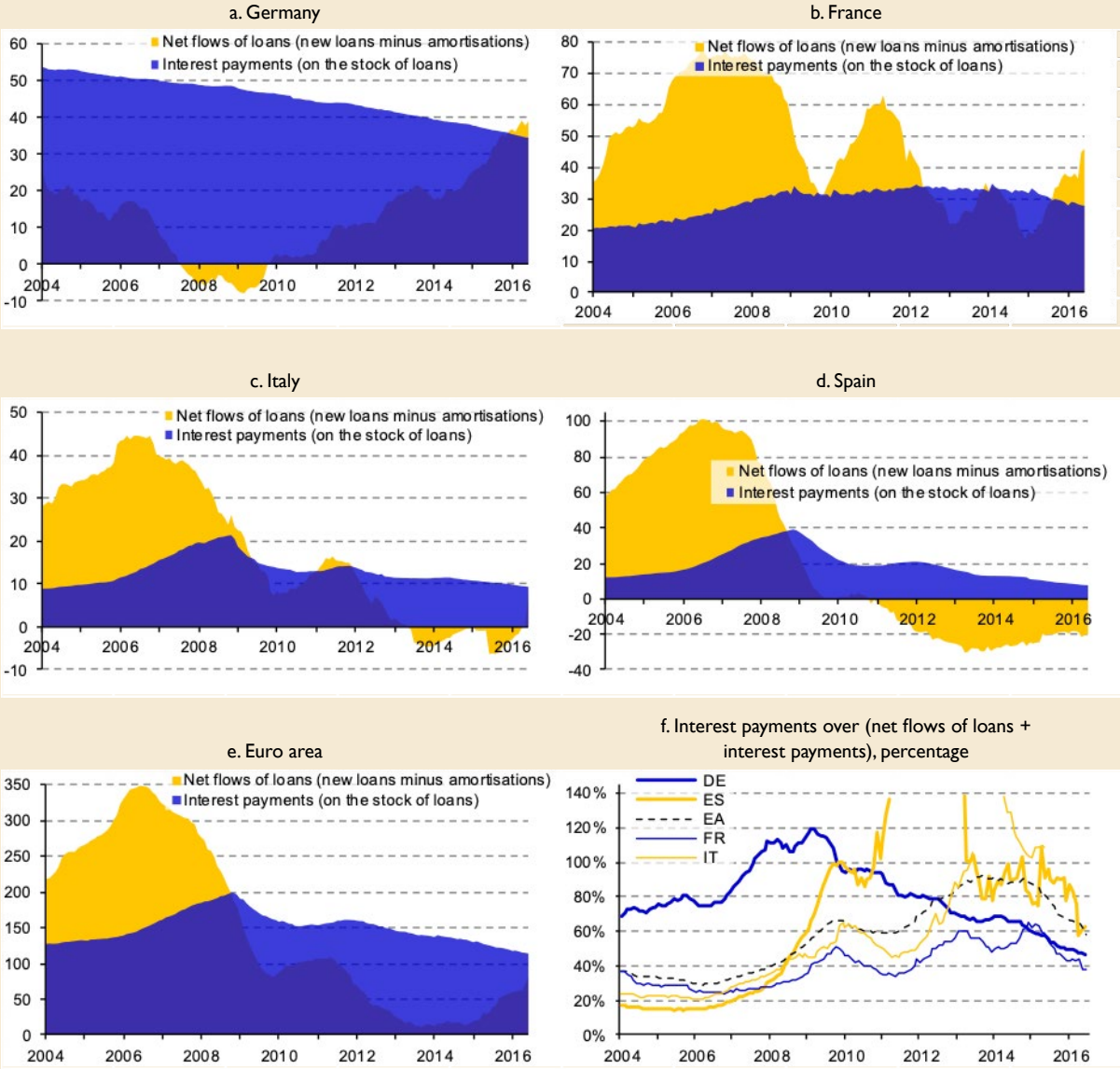
Chart 4. Volume of new loans vs interest payments on the stock of loans, credit for house purchase, € billion



Notes: New loans: 12-month moving sum. Mortgage payments are based on a standard loan with 25-year maturity and €150,000 of initial capital for lending rates of 2.5 and 6 percent. Given the actual evolution of interest rates, mortgage payments are estimated to be closer to the continuous line towards the beginning of the period and to the dotted line towards the end.

Source: ECB and own calculations.

Chart 5. Net flows of loans vs interest payments on the stock of loans, credit for house purchase, € billion



Notes: Net flows of loans correspond to new loans minus amortisations (12-month moving sum). Net flows can be positive or negative; as a consequence, the ratio in panel f can go beyond 100%. Negative net flows of loans in Spain become larger than interest payments on the stock of loans.

Source: ECB and own calculations.

MONETARY TRANSMISSION AND BANK LENDING: IS THE SINGLE MONETARY POLICY
HOMOGENOUS ACROSS EURO AREA COUNTRIES?
TRANSMISIÓN MONETARIA Y PRÉSTAMOS BANCARIOS: ¿ES LA POLÍTICA MONETARIA
COMÚN HOMOGÉNEA EN LOS PAÍSES DE LA ZONA EURO?

effective cost of a mortgage for a borrower. A very important finding in different surveys (Hall et al., 2015; Drudi et al., 2009; ECB, 2003) is that mortgage features tend to be homogeneous within a country but can vary widely across countries.

For monetary policy, the fixation period of lending rates (i.e. how often the rate is reset) represents one of the most relevant features of mortgage contracts. In the so-called fixed-rate mortgages (FRMs), the borrower pays the same rate – and therefore, the same nominal instalment – throughout the lifetime of the mortgage. In adjustable-rate mortgages (ARMs), the rate is reset regularly (at least once a year) against the evolution of a benchmark – usually the Euribor or a similar market rate. Intermediate cases (i.e. “mix-rate mortgages” or MRMs) with rate resets after 5 or 10 years are also possible.

Data indicate that countries tend to have a clear preference for either FRMs (e.g. Germany and France) or ARMs (e.g. Spain). Italy, with a mix of both FRMs and ARMs, seems to be a special case. This has been confirmed by Nouy (2015) and studied from a theoretical point of view by Campbell and Cocco (2003). It is unclear what drives the preference for one or the other type of mortgage, but inertia and cultural factors seems to play an important role.

With the outbreak of the crisis in 2008, the policy rate and lending rates decreased significantly. These very low interest rates have eroded the interest rate margin and the profitability of banks, particularly where ARMs are prevalent. However, it is striking to observe that ARMs have remained predominant in Spain and Italy until late 2015 or early 2016. The fixation period determines whether or not a monetary shock will impact existing loans through rate resets. Indeed, a change in the monetary policy stance after a loan has been agreed will affect ARMs but not FRMs. Thus, the choice between FRMs and ARMs affects borrowers’ indebtedness and debt burden from the onset as FRMs tend to be more expensive than ARMs (Greenspan, 2004). Then, a monetary shock will affect more countries with ARMs, like Spain, than countries with FRMs like Germany. Monetary shocks can still affect mix-rate mortgages but with a long lag – and therefore a smaller impact.

Large declines in the policy rate could also impact FRMs as borrowers would have an incentive to refinance their loans, but these effects seem limited. The various constraints and rigidities such as refinancing penalties, deed fees or informational costs contribute to explain the low refinancing shares of FRMs, to a certain extent.



Andersen et al. (2015) argue that a majority of borrowers with FRMs do not refinance even when there are positive incentives to do so. In any case, one should not overestimate the impact of the interest rate on the debt burden on borrowers, particularly in the current environment of very low interest rates. Indeed, a substantial chunk of the monthly instalments are allocated to amortisation of principal and only a marginal part corresponds to interest payments. Moreover, the older the mortgage, the less interesting the refinancing becomes even for significant declines in lending rates (cf. **Charts 2 and 3**). Moreover, the relationship is asymmetric as the refinancing of a mortgage can only be triggered by the borrower and not by the bank. Therefore, monetary authorities could count on the potential effects of refinancing when reducing the policy rate, but not when increasing it.

4. BEYOND INTEREST RATE: INFLATION AS A POLICY TOOL

Given that the impact of monetary policy on existing loans with long fixation periods can be very limited, inflation is an alternative channel for monetary policy to influence old borrowers. Loans are denominated and repaid in nominal terms. Therefore, inflation erodes the value, in real terms, of the debt – and mortgage payments – and releases disposable income. Given the long maturity of mortgages – up to 20 or even 30 years – the effect of (even low) inflation can still be significant.

We observe a wide range for inflation rates across euro area countries. Although high volatility is observed in inflation over time, countries tend to stand on the upper side of the range (e.g. Spain and Italy) or on the lower side of the range (e.g. Germany and France). Consequently, a divergence in the cumulative inflation across countries is clearly observed. For instance, between 1999 and 2013, cumulative inflation was just above 25 percent in Germany while it was 50 percent in Spain. This leads to heterogeneous effects of inflation across countries.

From the point of view of a borrower, inflation deflates the burden of mortgage payments in real terms. Thus, inflation can be used as a proxy for the evolution of borrower income by assuming that wages are indexed to inflation. In fact, the real value of the instalments should be compared against the evolution of salaries or income rather than against consumer prices. However, given potential career developments and promotions, even a wage index will fail to capture

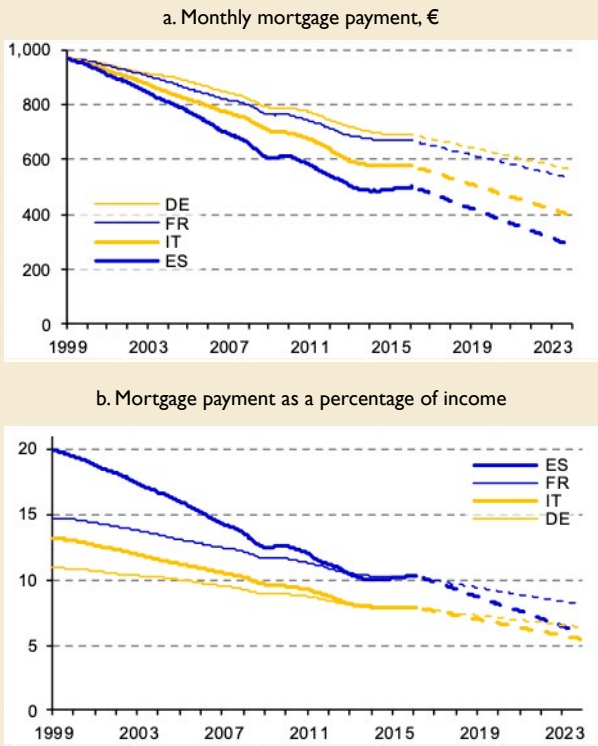


MONETARY TRANSMISSION AND BANK LENDING: IS THE SINGLE MONETARY POLICY HOMOGENOUS ACROSS EURO AREA COUNTRIES?
 TRANSMISIÓN MONETARIA Y PRÉSTAMOS BANCARIOS: ¿ES LA POLÍTICA MONETARIA COMÚN HOMOGÉNEA EN LOS PAÍSES DE LA ZONA EURO?

the real evolution of a borrower’s income over a period of 25 to 30 years because, throughout the professional career, salaries increase well beyond the standard indexation of salaries. For instance, if our standard mortgage had been issued in Germany, the monthly mortgage payment in real terms would have declined from €960 in 1999 to €660 by early 2016. On the other hand, if the same mortgage had been issued in Spain, the real monthly mortgage payment would have declined from €960 to €490 in the same period (**Chart 6, panel a**). However, borrowers’ finances, in terms of income and mortgage size, vary enormously across countries and, therefore, also the actual debt burden and the monthly instalment. As an illustration, we have applied the actual inflation erosion since 1999 to the average debt burden of each country⁴ (**Chart 6, panel b**). In this case, one can observe

30

Chart 6. Inflation effect on debt burden



Notes: The illustration in panel a is based on a standard mortgage (annuity mortgage, 25 years, €150,000 of initial capital, 6 percent of interest) and actual inflation through 1999-2016. The illustration in panel b is based on the median debt service to income ratio and actual inflation. In both panels, projections are based on the average inflation for 1999-2016 in each country.

Source: ECB and own calculations.

that the debt burden in Spain would have decreased from 20 to 10 percent of borrowers' income between 1999 and early 2016; while for Germany, debt burden would have decreased from 11 to 8 percent of borrowers' income during the same period.

These simulations indicate that, even in an environment of relatively low inflation rate, income effects can become substantial over time. Then, ECB single monetary policy will have a heterogeneous influence on lending within the euro area because the higher (lower) inflation rate, the higher (lower) income effect and the higher (lower) decrease in debt burden.

5. BORROWERS' FEATURES AND MONETARY POLICY

The income effects depend on the response of borrowers: if borrowers are wealthy and unconstrained, the macroeconomic impact would be limited. On the other hand, income shocks on borrowers without savings or with illiquid assets will be translated into consumption behaviour to a large extent (Kaplan and Violante, 2014). In other words, the microeconomic structure of borrowers determines the potential macroeconomic impact of the above income effects.



31

5.1. Who are the borrowers?

The outstanding volumes of mortgages represented 38 percent of euro area GDP on average in 2015. In the four largest countries, it ranged from 23 percent (Italy) to 51 percent (Spain). The average size of the mortgage loan was almost €70,000 for the euro area as a whole, €80,000 in Germany and about €55,000 in the other three countries (Spain, France and Italy). Therefore, monetary policy decisions through existing loans would potentially have a larger impact in Spain than in Italy.

Borrowers' indebtedness shows heterogeneous dynamics across countries. In France, indebtedness has increased up to mid-2014 and then stagnated. In Italy, the stagnation is observed already since late 2010. Data for Spain show a very fast expansion in indebtedness up to 2007; thereafter, the indebtedness has not only stagnated but even declined, particularly after 2013. In Germany, the trend is clearly opposite to the other countries: a secular decline in indebtedness since the early 2000s. These dynamics are the result of a combination of the evolution of interest rates, amortisations and real estate prices.

Borrowers' income is relevant for two reasons. First, lenders decide whether or not to grant a loan depending on the credit worthiness of the potential borrower, which in turn depends on her income level. Second, income ultimately defines the burden of mortgage payments and influences some features of the loan such as the duration. However, income is not homogeneous across euro area countries. ECB data show that, on average, annual income was significantly higher in Germany (€43,500) than in Spain (€31,000), while in France and Italy it was slightly below the euro area average (€38,000). In terms of distribution, there are also significant divergences. Income is slightly more unequally distributed in Germany and slightly less unequally distributed in Spain and in France.

5.2. The effort for the borrower

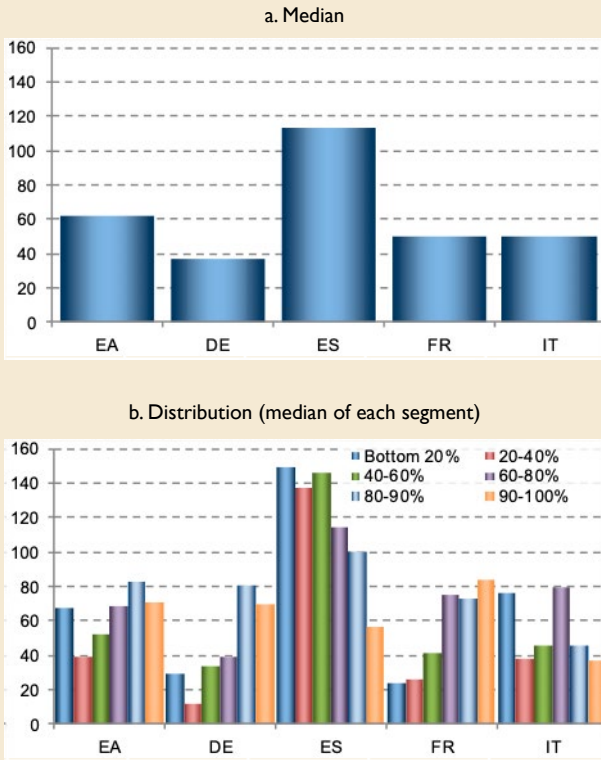
ECB data show striking differences in the level of indebtedness across countries and income strata. Firstly, the median indebtedness is considerably higher in Spain than in Germany (113.5 percent and 37 percent, respectively). Secondly, the distribution of indebtedness throughout income strata in Spain appears to be the opposite of the distribution in countries like Germany or France. In Spain, the economic agents in the lowest income quintiles are the ones with the highest levels of indebtedness (with a debt to income ratio above 140 percent), while richer economic agents are much less indebted (with a debt to income ratio below 60 percent). In Germany and France, richer economic agents are more indebted than poorer ones. Italy appears in an intermediate position (**Chart 7**).

The debt service burden derives from the indebtedness level. Data show that debt service burden is twice as high in Spain (where indebted borrowers allocate almost 20 percent of their income to mortgage payments) as in Germany (where they only allocate slightly above 10 percent); France and Italy appear in an intermediate position. In terms of distribution, in the euro area as whole as well as in Spain and Italy, the debt service burden is higher the lower the income of the borrower. However, in Germany and France, the debt service burden is very similar across income segments.

Poorer and more indebted borrowers tend to have a higher propensity to consume (Carroll et al., 2015; Keys et al. 2014; Di Maggio, Kermani, and Ramcharan, 2015). Moreover, income shocks may have different effects depending on the liquidity constraints of economic agents' wealth (Kaplan and Violante, 2014). Given these differences in the



Chart 7. Indebtedness: Debt to income ratio, indebted households, percentage, 2013



Source: ECB

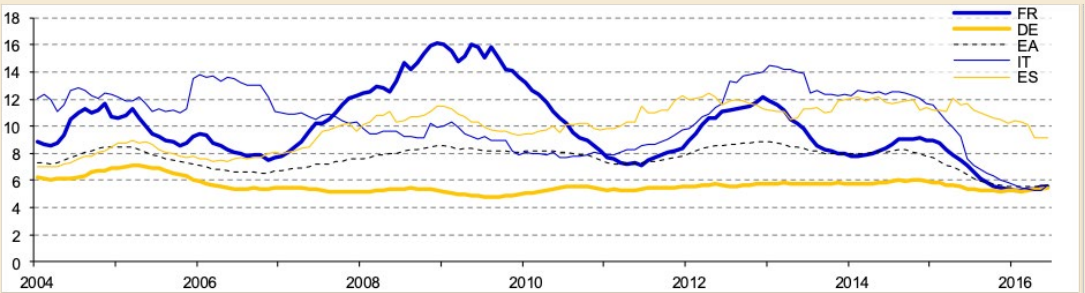
propensity to consume and in liquidity constraints, a redistribution of disposable income between borrowers and lenders is not neutral with respect to output. The heterogeneous distribution of indebtedness and debt service burden across countries implies that monetary policy shocks will necessarily have uneven effects in the different countries. To assess the significance of the debt burden, we have constructed an indicator of “implicit maturity” as the ratio between the stock of loans and annual amortisation. This ratio indicates in how many years the stock of debt would be repaid if amortisation payments were to continue at current levels⁵. Once again, data show heterogeneous dynamics across countries (**Chart 8**).

Implicit maturity of mortgages in Germany seems rather stable hovering at around 6 years. In the other three countries, a much

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TRANSMISIÓN MONETARIA Y PRÉSTAMOS BANCARIOS: ¿ES LA POLÍTICA MONETARIA COMÚN HOMOGÉNEA EN LOS PAÍSES DE LA ZONA EURO?

more volatile evolution is observed. In Spain, it increased from 7 to 12 years between 2004 and 2012. The need to increase the duration of mortgages can be explained, to a certain extent, by increasing real estate prices, which almost doubled between 2003 and 2008. Increasing unemployment rates and the difficulties for many borrowers to confront the mortgages payments may also be playing an important role since the outbreak of the crisis⁶. Logically, these phenomena affected particularly the population at the lowest end of the income distribution, who were already confronted with the highest relative debt burden. A significant rise in the implicit maturity is also observed in France between 2007 and 2010. The drop in the maturity observed across the board since early 2015 reflects, to a large extent, the statistical effect⁷ of the increasing refinancing of loans to take advantage of the very low rates.

Chart 8. Implicit maturity (years), credit for house purchase



Notes: Implicit maturity: annual amortisation over loan stocks.
Source: ECB and own calculations.

6. CONCLUSIONS

In this paper, we present a series of factors that explain why the single monetary policy of the ECB is having a heterogeneous effect in lending among euro area countries. First of all, we document that the stock of loans can be as relevant for monetary policy purposes as the flow of new loans. This is because the ratio between the stock of loans and loan origination can be as large as 20 to 1 as in the case of Spain. Secondly, we show that monetary policy transmission works through income effects stemming from the reset of lending rates and from inflation. The first process impacts only ARMs. Thus, it is inexistent

in countries like Germany or France, where 90 percent of mortgages are FRMs, while it is very significant in Spain, where 90 percent of mortgages are ARMs. However, income effects resulting from inflation impact both ARMs and FRMs. Even under a low inflation environment, the erosion of value through inflation appears to be very relevant to eventually impact aggregate output. For instance, between 1999 and 2013, the inflation erosion meant that indebted borrowers increased their real disposable income by 50 percent of their mortgage payments in Spain.

The impact of monetary shocks through the lending channel varies widely across countries within the monetary union. For instance, mortgage loans represent as little as 23 percent of GDP in Italy and as much as 51 percent in Spain. In a similar fashion, low income borrowers devote up to 40 percent of their income to service their debts in Spain but only 12 percent in Germany.

This paper documents a wide diversity in borrowers' features, loan features and price developments across euro area Member States. Significant differences in these factors across euro area Member States can distort a homogeneous transmission of the single monetary policy and thus the access to credit in the different countries and possible the competitive positions of companies.



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NOTES

1. This is probably explained by price effects: since they peaked in 2009, prices of residential real estate have declined by 20 percent in Italy.
2. Loan renegotiations are included in the statistics of new loans but are not translated into stock increases.
3. A decline in lending rates from 6.0 to 2.5 percent was observed in Spain and Italy between 2008 and 2010.
4. We use the data on debt service to income ratio of the ECB 2013 Household Finance and Consumption Survey by assuming that they have remained stable over time. This assumption does not fundamentally affect the takeaways of the illustration.
5. Note that this implicit maturity refers to the remaining maturity of the stock of loans in banks' balance sheet. Early repayments and loan renegotiations may reduce the effective maturity.
6. Some banks responded to this situation through loan renegotiations by prolonging the maturities or by providing a grace period to avoid provisioning and to conceal potential losses (Homar, Kick and Salleo, 2015).
7. Statistically, when a loan is refinanced it is recorded as a full amortisation of the old loan and a withdrawal of a new loan.

