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Approaching non-performing loans from a macroprudential angle

by
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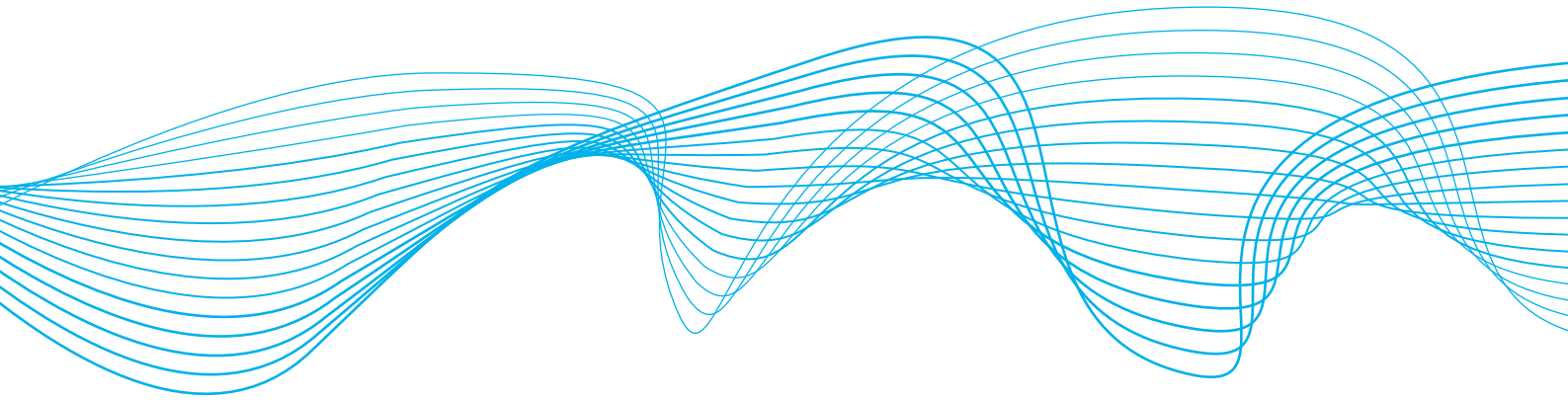

ESRB
European Systemic Risk Board
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Executive Summary

The emergence and accumulation of non-performing loans (NPLs) on banks' balance sheets is commonly considered a microprudential issue. NPLs come to the attention of macroprudential authorities when they weaken a significant part of the financial system, threatening its stability or impairing one or more of its core functions, such as the provision of credit to the real economy. On a conceptual level, various imperfections may call for policy actions on the management of NPLs. These include unaddressed externalities, economies of scale and coordination failures, institutional distortions (stemming from the accounting, regulatory and tax treatment of NPLs or the judicial and market structures needed for their efficient resolution) and moral hazard vis-à-vis the providers of the banks' safety net.

Externalities arise when banks neglect part of the social benefits or costs of actions affecting the origination and management of NPLs when individually deciding on such actions. For example, individual banks and society as a whole may differ in their assessment of the benefits and costs of generating more credit in a boom, with the potential implication of having to cope with a larger NPL problem in a bust (potentially damaging credit supply during the bust and the subsequent recovery). Externalities may be due to the way an unresolved stock of NPLs impairs investors' perceptions of the health of the financial system or prolongs a debt overhang problem, making bank funding more expensive and discouraging banks from taking up new lending opportunities. Other externalities may operate through the impact of the sale of foreclosed assets on prices of similar assets or through a generalisation of forbearance and evergreening strategies damaging banks' reputation as debt collectors and producing a deterioration in borrowers' payment culture.

Coordination and collective action problems emerge in the presence of technological or strategic complementarities between agents' decisions. They are conceptually related to externalities and increasing returns to scale. In the absence of a coordinating institution, agents acting in a decentralised manner in their own best interests may become blocked into an inefficient allocation. For example, if creating a secondary market for NPLs requires setup costs that can only be recovered if the volume of trade in such a market is sufficiently large, the economy may be trapped in a situation in which such a market never gets started because it is always too small for the individual agents deciding at the margin whether to establish it. A similar argument has been applied to justify policies promoting the creation of (public and private) asset management companies (AMCs) specialised in buying and managing NPLs.

In some cases, an NPL problem may grow large and take too long to be resolved because of individual banks' responses to incentives coming from institutions (accounting, regulation, taxes, judiciary procedures, market structures) that, possibly unintendedly, discourage banks from undertaking more expeditious recognition and resolution of their NPLs. Such distortions may include accounting standards that allow the recognition of interest income on NPLs, or provisioning practices implying that, after a secondary sale potentially involving large haircuts, the provisions associated with similar NPLs are upwardly adjusted based on losses experienced on those sold. Related distortions may come from the way asset risk weights or credit risk parameters relevant for the assessment of minimum required capital must be updated if a sale or resolution implies losses larger than those previously considered in the internal models. Finally, inefficiently slow or congested courts may erode the attractiveness of actions directed at resolving NPLs by seeking to foreclose the collateral owned

by the defaulted borrowers. The combined effect of these distortions may be that banks prefer to keep NPLs on their balance sheets for a long time (in the hope that the impaired borrowers will be cured or the collateral value will rise), instead of seeking to resolve them swiftly and potentially more efficiently.

Moral hazard in banking is generally associated with the combination of high leverage and high opacity over the actions that guarantee proper management of bank assets (or the determinants of such actions). High leverage and opacity allow bank shareholders to profit from excessive risk-taking. The problem is aggravated if, in the presence of a generous safety net or bail-out expectations in any form, bank supervision does not fully compensate for the absence of the market discipline that uninsured investors would otherwise exercise (e.g. by forcing institutions to remain well capitalised). When the accumulation of NPLs is very severe, the losses stemming from resolving these quickly might make the affected bank insolvent, while keeping the NPLs unresolved may prolong its existence. In such circumstances, the bank's managers and shareholders may prefer to "gamble for resurrection" because, for example, there is a small probability that the future will turn benign enough for the bank to regain its solvency.

Bank strategies involving gambling for resurrection may be accompanied by evergreening and inadequate forbearance tactics vis-à-vis their borrowers, i.e. keeping distressed firms afloat by refinancing unpayable loans as they mature, without addressing their true underlying problems via restructuring or liquidation. The result may be a "zombification" of the real economy (e.g. as in Japan during the 1990s). The aggregate implication can be an inefficient continuation of unviable investments and insufficient funding of new loans; in sum, a misallocation of credit. In addition, having banks interested in hiding loan losses by means of undue forbearance may weaken borrowers' incentives to repay their loans, feeding a default spiral among certain classes of borrowers.

The relative importance of the identified imperfections is expected to be heterogeneous, potentially varying across jurisdictions, loan portfolios, classes of borrowers, banks and time periods. Nonetheless, in view of the Advisory Scientific Committee (ASC), there are a number of imperfections which, if unaddressed, are likely to contribute to systemic NPL problems under virtually any circumstances. These are the institutional distortions, externalities and moral hazard issues that sustain the overvaluation of collateral and underprovisioning of NPLs, the late recognition of NPLs, and the delayed or inadequate restructuring of impaired borrowers. These imperfections are highlighted without downplaying the significance of other such imperfections, which should be judged in the light of the particular circumstances of each NPL-related situation.

Policy actions to prevent the emergence and persistence of NPL problems should be aimed at addressing these and other imperfections identified above. The complexity and variety of the factors behind NPL problems mean that a broad range of potential policy responses can be identified. On the more structural front, the possible responses include changes to taxation, improvements in bankruptcy law or in the efficiency of the judicial system, and the refinement of the infrastructure needed for liquid secondary markets for NPLs to exist. Possible policies on the regulatory and supervisory front include promotion of prudent lending standards, proper application of accounting standards, resolution of NPLs in the most appropriate form and speed from an overall system-wide perspective, and the existence of buffers sufficient to absorb the losses associated with an efficient resolution of the NPLs. The report offers a tentative (not one-to-one) mapping between the identified imperfections and the available policies and argues for the need to set intermediate objectives for both preventive and corrective policies on systemic NPL problems.

As with other problems in the macroprudential domain, the tools needed to address the emergence and persistence of NPL problems may not be exclusively macroprudential. Nevertheless, the trade-offs that must be struck when using such tools (taxation, legal institutions, accounting rules, regulation and supervision) have an important macroprudential component. As such, addressing NPL problems requires active involvement by macroprudential authorities – not least as assessors of the overall consistency and cumulative systemic impact, in normal times but also during crises and in their aftermath, of the policy actions undertaken on various fronts by multiple authorities.

Part of the policy action on NPLs must have a preventive nature, starting before any loss materialises, during periods of calm or expansion. Possible actions in this regard would be: (i) promoting sound lending practices and the application of adequate loan affordability tests; (ii) encouraging the build-up of loss-absorbing capital buffers in good times, with expectations and incentives for their release in downturns; (iii) developing the legal and institutional infrastructure (bankruptcy laws, legal support for the operation of an efficient secondary market for NPLs, etc.) needed for the system to cope with future NPL problems in a more timely and effective manner; (iv) ensuring that expectations of public support, should NPL problems become systemic, do not imply any ex ante subsidisation of excessively risky loans.

If and when a systemic NPL problem arises, remedial or corrective policies should promote the prompt recognition and adequate provisioning of problem loans and the implementation of a resolution path that is consistent with the social benefits and costs at stake. The crux of the matter is to induce the resolution of the NPLs at a socially efficient speed and form of resolution, and achieving this goal involves several complex trade-offs. The most appropriate speed for NPL resolution is not necessarily the quickest, and the most appropriate form of resolution is not necessarily the sale of the NPL or repossession of the associated collateral.

Measures that could address existing distortions to the efficient resolution of NPLs include: (i) full implementation of the prescriptions in IFRS 9 regarding the accrual of interest on impaired exposures on a net carrying amount basis; (ii) the proper treatment of unexpected losses on NPLs in capital regulation under both the standardised and internal ratings-based approaches; (iii) amendments to the internal governance of banks aimed at prioritising NPL management from an early stage.

Introducing calendars for the full provisioning and write-off of NPLs might make sense as a backstop for cases in which the lighter-touch measures above are insufficient to address the problem at the right speed.

Much like in other fields of policy action, there may be a time inconsistency between the course of policy action which is most desirable ex ante (taking into account the incentives that need to be provided, for instance in connection with new loan origination standards) and that which is more desirable ex post (once NPLs have already materialised). The severity and implications of this time inconsistency can be reduced through a combination of commitment to rigorous recognition and provisioning of impaired loans, realistically ambitious resolution arrangements and sufficient loss-absorbing capacity throughout the system.

From a macroprudential perspective, it is crucial that the policies addressing NPL problems after they arise take account of relevant side effects, such as short-term effects of asset foreclosure on asset prices or on borrowers' activity, or the impact of NPL disposal on banks' capital and hence on

their lending capacity. Externalities transmitted in the form of fire sale prices or the disruption potentially caused to the foreclosed borrowers (or their customers, suppliers, workers, etc.) must be considered:

- when calibrating the speed of the calendars for NPL resolution;
- when promoting or designing AMCs (which might work as bridges permitting the temporal separation between the disposal of the NPLs at bank level and the final recovery of payments from the defaulted borrowers or their foreclosed assets);
- when establishing codes of conduct for the buyers of portfolios of NPLs.

Similarly, if the speedy resolution of NPLs precipitates the need for bank recovery and resolution, it will be also important to take into account any bottleneck effects regarding the raising of new capital and the restructuring of banks, the market alarm possibly created by failing banks, and the credit crunch effects that might occur if banks are unwilling or unable to address their recapitalisation needs.

It is hoped that the effective development and implementation of the current agenda for policy action on NPLs in the EU – which envisages a combination of many of the preventive and corrective policies above – will ensure that NPL problems in future crises are less severe, and also less painful and lengthy to resolve.

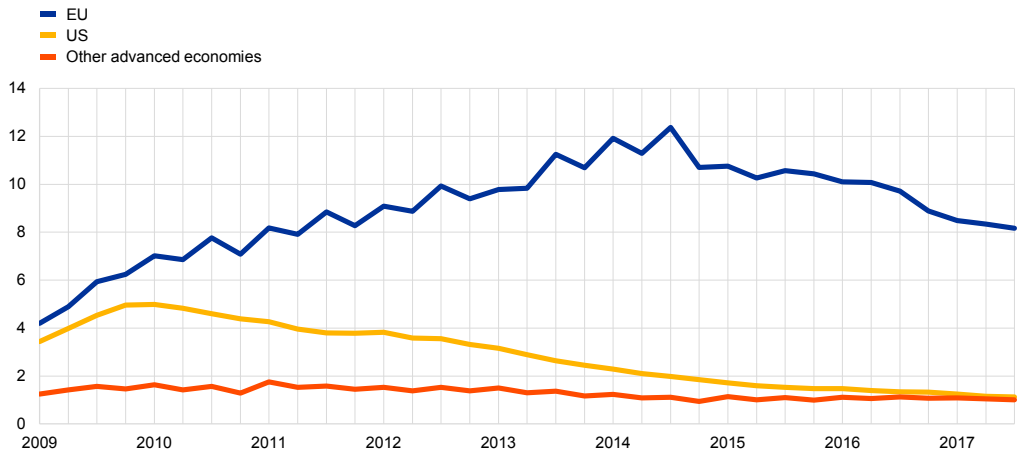
1 Introduction

The accumulation of NPLs on the balance sheets of EU banks in the aftermath of the global financial crisis has caught the attention of European authorities in the last few years. There have been concerns about the abnormally high proportion of NPLs accumulated on EU banks' balance sheets during the crisis and their very high persistence even after the crisis has receded and the recovery has gained ground (see Charts 1 and 2). The persistence of a high stock of NPLs on banks' balance sheets is typically regarded as a source of vulnerabilities and a potential sign of deeper troubles. In this regard, the unsolved NPL problem still affecting many countries in the EU is an obstacle to the completion of the banking union, as the financially healthier partners fear that this problem exposes burden-sharing arrangements such as the single deposit guarantee scheme to pre-existing losses. Initiatives developed by European authorities in the microprudential, macroprudential and political domains to diagnose and address the problem include those of the European Banking Authority (2016), the European Central Bank (2017a), the European Systemic Risk Board (2017a) and the Council of the European Union (2017).

Chart 1

NPLs to total gross loans

(percentage)

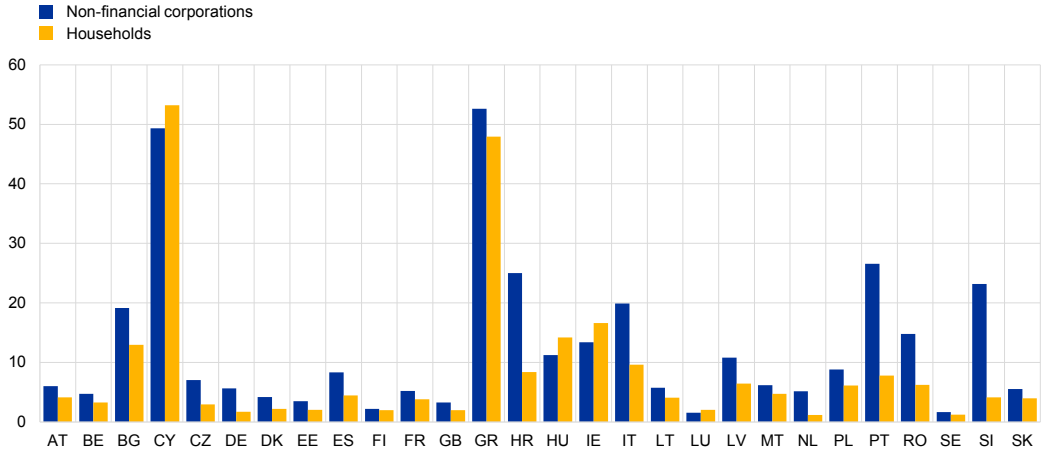


Sources: IMF Financial Soundness Indicators.
Notes: Within the EU, data for Germany are not available. Other advanced economies comprise Australia, Canada, Hong Kong, Israel, Japan, Korea, Norway and Singapore. For the EU and other advanced economies, a simple average is calculated over an unbalanced sample, as some data points, particularly before 2011, are missing.

Chart 2

Gross NPLs and advances as a percentage of total gross loas by sector

(percentage)



Sources: Consolidated Banking Data (ECB).
Notes: The reference date is the third quarter of 2017. The data cover domestic banking groups, stand-alone banks, and foreign branches and subsidiaries applying IFRS.

When worries about the accumulation of credit losses in the recent global financial crisis became widespread, there was not a commonly accepted definition of NPLs in the EU. This was a source of uncertainty in judging the relative severity of the problem across EU banks and countries and a practical obstacle to the adoption of common policies on the issue. To overcome the difficulty of harmonising concepts that are named and defined differently across a wealth of national legal, accounting and supervisory traditions, the European Banking Authority adopted a common definition in 2013 according to which NPLs (or more precisely "non-performing exposures") are those "[…] that satisfy either or both of the following criteria: (a) material exposures which are more than 90 days past due; (b) the debtor is assessed as unlikely to pay its credit obligations in full without realisation of collateral, regardless of the existence of any past due amount or of the number of days past due" (European Banking Authority, 2013).[1] The lack of a common EU-wide definition before 2013 also makes it difficult to perform a time series analysis covering multiple (still less all) EU Member States over a long period.

A sizeable stock of NPLs on a bank's balance sheet hampers its profitability, efficiency, allocation of resources and lending, and may even render the bank unviable. NPLs are assets with low and highly uncertain future returns, that are hard to value, costly to manage and costly in terms of capital resources, including in relation to provisioning needs (Aiyar et al., 2015). Banks with high NPL ratios are regarded by investors as highly vulnerable. In fact, a high NPL ratio has traditionally been found to be a key predictor of individual bank failure (see, among many others, Martin, 1977; Bovenzi et al., 1983; Kaminsky and Reinhart, 1999; Kolari et al., 2002; Lu and Whidbee, 2013). Consequently, high NPL ratios increase bank funding costs. In addition, it has

[1] At the same time, a common definition of "forborne exposures" was introduced, based on the notion that forbearance occurs when a bank makes concessions to a debtor that faces, or may face, difficulties in meeting payments. Forborne exposures, based on the adopted definition, can be identified within both the performing and the non-performing exposures of a bank.

been argued that large NPL ratios distract bank managers and feed debt overhang problems, with negative consequences for efficiency and new lending (Berger and DeYoung, 1997; Caballero et al., 2008; Tracey and Leon, 2011; Cucinelli, 2015; Blattner et al., 2018).

The excessive accumulation of NPLs can lead a bank to resolution. Resolution may be triggered by fundamental losses in asset value and the inability or unwillingness of the bank's owners to raise the equity needed to restore its solvency. It may also be triggered by a generalised lack of confidence among investors about the viability of the bank, making it unable to roll over its debt or to raise the required funding. Banks with many NPLs may arrive at a failing or likely-to-fail state via any of these channels. This makes NPLs a very closely watched variable not just for market agents, but also for microprudential supervisors, deposit guarantee schemes and the authorities in charge of resolution.

NPLs become an issue of macroprudential concern if they are a source of systemic risk and a threat to financial stability. If high NPL ratios affect only a limited number of banks or the loans are made to specific and not systemically relevant sectors (i.e. sectors whose demise is unlikely to strongly affect the overall economy or the solvency of borrowers in other sectors), the NPL problem has no macroprudential dimension and can be properly resolved in the course of normal interactions between the affected banks and the microprudential authorities. In contrast, when NPLs are sufficiently spread, abundant and persistent through the banking sector or affect critical sectors of the economy, the NPL problem may cause financial instability and generate significant system-wide costs, such as the reduction or misallocation of credit, depressed asset prices or the reinforcement of downturn spirals. It can also feed the loop between bank risk and sovereign risk and be an obstacle to the restructuring of banks and other indebted sectors of the economy. Quantitative work on past NPL experiences and advances in the use of harmonised definitions of NPLs over sufficiently long periods may allow quantitative indicators and thresholds for early identification of NPL problems of a systemic or macroprudential dimension to be developed. One might expect NPL problems to be more likely to be systemic in nature: (i) when the rise in defaults occurs in response to a large negative aggregate shock or an abrupt end to an asset price or credit boom; (ii) when a large negative shock severely damages the solvency of a highly indebted sector of significant systemic importance; (iii) when the economy experiences a deep and long recession which gradually and persistently erodes the solvency of borrowers and the soundness of banks; (iv) when there is widespread uncertainty over the extent to which each individual financial institution is affected by the rising NPL problems and has the loss-absorbing capacity to cope with them.

History provides plenty of examples of how NPL problems have risen during economic downturns and, even more severely, during financial crises, and how they have been addressed in different institutional set-ups. As documented by Laeven and Valencia (2012), most systemic financial crises (and not just those in Europe) feature sizeable increases in NPLs. However, to a large extent, NPLs increase as a consequence of a change in the cyclical situation of the economy or the end of a boom, typically triggered by internal or external shocks (Woo, 2000; Beck et al, 2015; Ghosh, 2015; Dimitrios et al., 2016). Analysis of historical experiences might enable one to learn about the genesis of the NPL problem and the multiple approaches available to tackle it at a bank level and at an economy-wide level (see, among the most recent studies, Baudino and Yun, 2017; European Systemic Risk Board, 2017a; Council of the European Union, 2017). However, it is hard to draw systematic lessons from these experiences (see, for example,

Claessens, 2005; Jonung, 2009; Borio et al., 2010). In general, constraints derived from the economic environment, the specificities of each NPL problem and differences in the legal and political frameworks render a one-size-fits-all approach impossible or undesirable. Therefore, instead of compiling historical experiences that can be found elsewhere, this report will focus on identifying, at a conceptual level and with reference to existing empirical evidence, the trade-offs faced when designing possible policy responses.

A previous ASC report discussed the macroprudential consequences of forbearance in banking, touching on issues related to the recognition and resolution of NPLs and policy action on banks that accumulate many of these (European Systemic Risk Board, 2012). That report covered both bank forbearance towards borrowers and supervisory forbearance towards banks. For the latter, it was argued that failure to intervene early in a crisis tends to increase the costs of the crisis, and that macroprudential concerns should not be used as excuses to delay action on banks in difficulty. The report continued with an analysis of possible institutional settings for bank resolution and concluded by recommending the establishment of European bodies responsible for bank supervision and resolution.

In July 2017 the Council of the European Union mandated the ESRB "[…] to explore macroprudential approaches to prevent the emergence of system-wide NPL problems, while taking due consideration of procyclical effects of measures addressing NPLs' stocks and potential effects on financial stability".[2] On the basis of the report prepared by a dedicated sub-group of the Financial Services Committee (Council of the European Union, 2017), the Council of the European Union set out an action plan, outlining policy options to help reduce the volume of NPLs on the balance sheets of EU banks, and to prevent their future emergence. To that end, it invited several European authorities, including the ESRB, to undertake further policy work on the topic during 2017 and 2018.

The purpose of this ASC report is to contribute to the mandate assigned to the ESRB, by elaborating on the foundations for policy action in the NPL domain and some of the key elements and principles relevant for designing the policy package from a macroprudential perspective. This report complements and provides conceptual background to more specific policy work initiated at the ESRB to fulfil the mandate from the Council of the European Union. Building on discussions held at the ASC over the past few years, the first part of this report (Section 2) is devoted to identifying the imperfections (externalities, economies of scale and coordination failures, institutional distortions and moral hazard vis-à-vis the safety net) that call for policy action in relation to the NPL problem. Special emphasis is placed on the mechanisms that can turn this into a macroprudential problem. Following this diagnosis, the report establishes a mapping between the imperfections identified and the list of potential preventive and corrective policies in relation to NPLs and discusses the policy trade-offs that are relevant from a macroprudential perspective (Section 3). Section 4 concludes with a further elaboration of the trade-offs and policies that need to be taken into account in determining the optimal speed and form of resolution of NPLs once they have been accumulated. Importantly, the policy considerations contained in this report are meant to contribute to the ongoing policy discussions and should not be regarded as specific proposals for formal ESRB warnings or recommendations.

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2 See **Council conclusions on Action plan to tackle non-performing loans in Europe**.

As with other topics of macroprudential relevance, there is not a clear frontier separating the policies that belong to the macroprudential sphere from those belonging to other spheres. In fact, policies belonging to the microprudential sphere (e.g. supervisory guidance) and those affecting the legal infrastructure (e.g. bankruptcy law) or taxation (e.g. the tax treatment of provisions) can be crucial in dealing with the NPL problem and have a strong influence on determining its macroprudential dimension. Some of these policies (such as improving judicial efficiency when dealing with defaulted borrowers) are desirable in all circumstances, not merely when NPL problems reach systemic importance, but then become crucial in such cases. In this sense the report does not restrict its attention to policies that are exclusively valuable when the NPL problem is systemic or to purely macroprudential tools. Instead, it covers all potential policies in the NPL domain, seeking to clarify why they are relevant in general and especially from a macroprudential perspective.

The ASC report discusses the conceptual foundations for a macroprudential approach to NPLs on the basis of a broad interpretation of the mandate assigned by the Council of the European Union. The report is first based on interpreting the request by the Council of the European Union as referring not exclusively to policies geared towards avoiding the emergence of NPLs, but also to those that ensure that the size and evolution of NPLs in downturns involves small negative systemic consequences and is not an obstacle to banks' core functions. The reason for this interpretation is that both loan defaults and their correlation with the business cycle are unavoidable features of the lending process. Avoiding an excessive surge in defaults during recessions and, perhaps more importantly, excessively slow resolution of NPLs during and after economic downturns (like that recently witnessed in the EU – see Chart 1) is a more realistic and reasonable policy goal than trying to avoid or minimise the existence of NPLs in future crises. The report is also based on interpreting the request of the Council of the European Union as including, at the other end of the spectrum, consideration of the potential social costs of policies aimed at addressing banks' NPLs, such as inducing excessively tight lending standards at all times or causing fire sale pricing effects or a procyclical contraction in lending during bad times as a result of excessively quick resolution of NPLs. Finally, with the aim of remaining purposefully conceptual, the report does not intend to systematically review or assess policy developments already adopted or to be adopted to tackle NPL problems in the EU, including some recent policy measures which coincide or are consistent with those identified as desirable in Section 3.

2 Economic rationale

Even though the emergence and accumulation of NPLs are commonly examined and treated from a microprudential angle, some aspects are relevant from a macroprudential perspective. Typically, microprudential authorities monitor the dynamics of the quality and performance of the credit portfolios held by the banks under their jurisdiction. These authorities also have a range of tools which they can use to address possible concerns in this area. NPLs can come to the attention of macroprudential authorities when their size or evolution becomes significant from a system-wide perspective, acting as a threat to the stability of the financial system or to banks' critical functions, such as the provision of credit to the real economy.

The size and the persistence of NPL stocks may be socially excessive, especially during and in the aftermath of economic downturns, for a variety of reasons. These reasons include unaddressed externalities, economies of scale and coordination failures, institutional distortions and moral hazard vis-à-vis banks' safety net. These factors, which are listed at the bottom of Figure 1, are each described in detail in the following subsections. They are instances of market failures and institutional frictions that generally call for regulatory or government intervention to improve the allocation of resources and include some of the factors that motivate macroprudential policy (Schoenmaker and Wierts, 2011).

Market failures and institutional frictions create a wedge between the costs and benefits of NPL management relevant for banks and for society. As shown in Figure 1, this wedge can ultimately affect banks' capability to efficiently perform essential functions such as the provision of credit to the real economy.[3] Indeed, the presence of a sizeable stock of NPLs has been empirically associated with a reduction in credit supply, an increase in interest rates on new loans or a shift in lending towards riskier sectors or already impaired borrowers (O'Brien and Browne, 1992; Peek and Rosengren, 2005; Caballero et al., 2008; Aiyar et al., 2015; European Systemic Risk Board, 2017a; Blattner et al., 2018). However, establishing a causal effect of NPL ratios on credit growth is generally difficult, as the co-movement of these two variables may be driven by unobservable variables such as loan demand.[4] It is also common to attribute a negative impact on GDP growth and employment to the stock of NPLs (Espinoza and Prasad, 2010; Nkusu, 2011; Klein, 2013; Balgova et al., 2016; Constâncio, 2017).

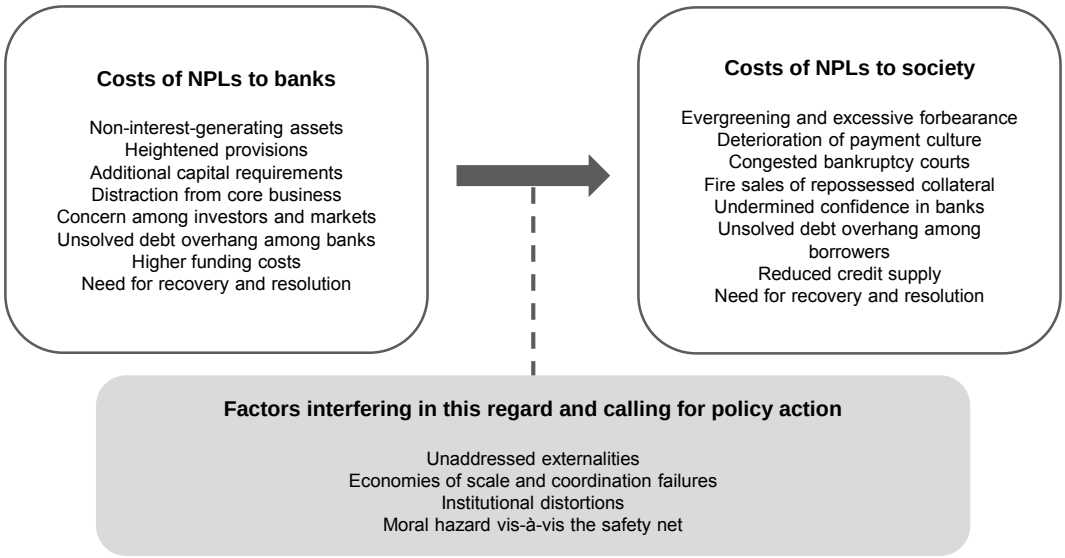
Some of the costs associated with NPLs are a consequence of the latent economic factors leading to impairment or default, making default and the recovery of value from defaulted exposures a costly and lengthy process. The mere fact that default is costly does not provide a prima facie case for policy intervention. Default is connatural to debt financing and is commonly triggered by changes in the economic circumstances of the borrower or the environment that make it too costly or impossible to continue making the repayments implied by the underlying debts. When a loan is granted, both the lending and borrowing parties must be aware that default may happen and will carry implications under the terms of the contract and existing bankruptcy law and bank regulations. Collateral foreclosure, for example, may be time-consuming and costly for both

[3] Similarly, De Marco (2018) shows that a shock to the marked-to-market value of bank exposures to euro area sovereign debt led to credit tightening in 2010-11, with negative real effects on small and young firms.

[4] Accornero et al. (2017) claim that after controlling for time-varying borrower-specific fixed effects, bank lending is not affected by NPL stocks; it is, however, affected by bank capital ratios and the flow of new NPLs.

lenders and borrowers but, leaving aside the part of the costs under control of the authorities (e.g. via prescriptions included in bankruptcy law or the efficiency of bankruptcy courts), the fact that foreclosures are costly would not in itself justify a policy intervention in this area. The need for policy would emerge here if there were frictions implying that lenders and borrowers interacting in their own best interests were failing to reach a socially efficient outcome. As in other contexts in economics, the emergence of inefficiency would require the existence of some imperfections (for instance, in the foreclosure example, externalities associated with a potential fire sale of the collateral) that cause a wedge between the marginal costs or benefits that the private agents consider when making their decisions and those relevant to society as a whole.

Figure 1
Stylised view of costs of NPLs to banks and to society

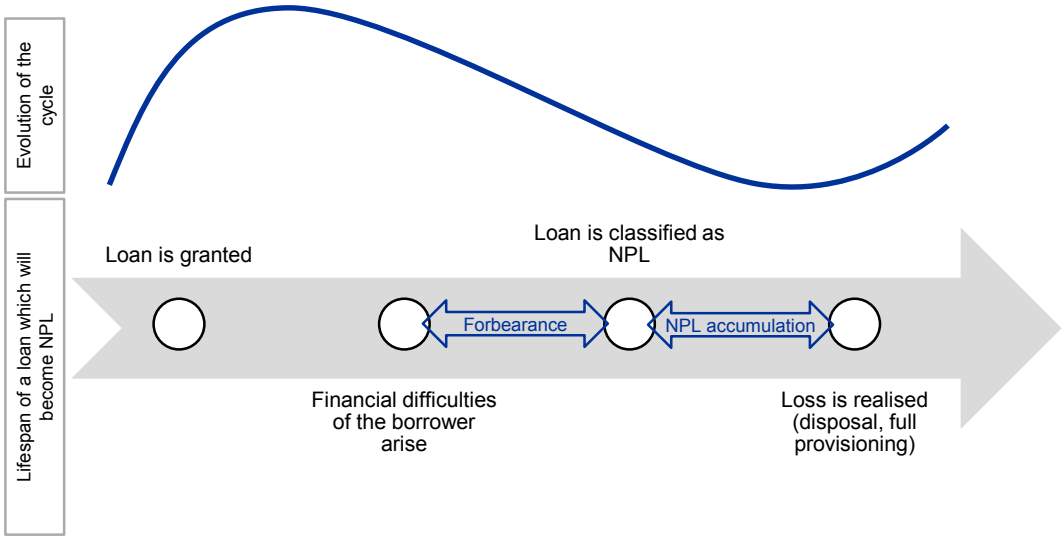


Source: Own elaboration.

Loan origination, NPL recognition and NPL resolution are three stages in the lifecycle of an impaired loan (see Figure 2), and actions taken by banks in each of these stages are crucial to the rise and persistence of NPLs in downturns. The decisions of the lender (i) when the loan is granted; (ii) when it is classified as an NPL; and (iii) when it is written down and its implied losses, if any, are fully realised determine the contribution of the loan to the size and persistence of the lender's NPL problem. Decisions at stage (i) depend on the lending standards applied by the lender. In addition to the economic environment, decisions at stage (ii) depend on accounting standards, regulatory prescriptions and the lender's capacity to mask or delay the recognition of its borrower's insolvency by means of evergreening practices and forbearance. Relevant considerations may include the possibility that recognising a loan as non-performing will push similar exposures (e.g. from the same borrower) to be treated as non-performing too, either for provisioning or for regulatory capital requirement purposes. Decision at stage (iii) depend on external factors such as the economic climate (potentially helping or delaying the recovery of value from NPLs), the judicial system (allowing collateral or other assets of the borrower to be repossessed), regulatory and supervisory pressure, and the existence and conditions prevailing in the secondary market for NPLs. Below, we discuss how externalities,

economies of scale and coordination failures, institutional distortions and moral hazard vis-à-vis the safety net can drive a wedge between a lender's private costs (or benefits) and the social costs at each of these stages.

Figure 2
Stylised lifespan of an NPL



Source: Own elaboration.

2.1 Externalities

Externalities arise when an activity generates benefits or costs to a third party whose interests are not taken into consideration in the decision-making process. Non-pecuniary externalities constitute a market failure even in situations without other financial imperfections. In addition, in a financial context, when individual actions affect asset prices and these prices interact with financial constraints or latent agency problems, pecuniary externalities may also damage efficiency and cause welfare losses (Greenwald and Stiglitz, 1986; Bianchi, 2011; Dávila and Korinek, 2018). As such, addressing externalities regarding financial stability or the tightness of other agents' financial constraints is a key role of macroprudential policy (Brunnermeier et al., 2009; Perotti and Suárez, 2011; De Nicolò et al., 2012; Gersbach and Rochet, 2012; Claessens, 2014).

When approaching NPLs from a macroprudential perspective, it is possible to identify several externalities that policies in relation to the NPL problem should address. Externalities are present at all stages of the NPL lifecycle shown in Figure 2 and also affect decisions as to how to satisfy the capital needs arising at the various stages of the NPL's life (either because of provisions, prudential adjustments and capital requirements associated with impaired loans, or because of losses emerging from NPL resolution).

At the loan origination stage, lenders may fail to fully internalise external costs that will only be realised in the next contractive phase of the business or credit cycle. When banks over-concentrate lending in a particular sector, apply lax lending standards or extend loans backed by overvalued collateral, they may not fully internalise that the NPLs they will generate in the downturn

will contribute to increasing the severity of the correction in employment, investment, growth and asset prices during the downturn (Bianchi and Mendoza, 2018). Banks may also fail to internalise externalities directly affecting the severity of the implied NPL problem, such as congestion in the bankruptcy courts and the fire sale pricing of the foreclosed assets.

Once things go awry, the decision of an individual bank to delay the recognition of NPLs may be optimal for bank owners, but not for the financial system or the economy as a whole. In line with the arguments in Brunnermeier et al. (2009) on the "fallacy of composition", when managing its problem loans, an individual bank may fail to internalise some costs relevant to society. Rajan (1994) argues that bank managers may want to mask their contribution to the bad performance of the loans by recognising their NPLs only when banks with similar lines of business do the same. This consideration may make idiosyncratic problems remain hidden for a long time and more systematic problems be recognised after a delay, only when it would no longer be credible to deny the problem. Consistently with this logic, Laeven and Majnoni (2003) document banks' tendency, in the majority of jurisdictions, to delay NPL recognition with the result that NPLs eventually accumulate mainly at the worst points of each economic downturn. The emergence and persistence of large stocks of NPLs during downturns contributes to endangering the solvency and viability of the banking system, increasing banks' funding costs and limiting their capacity to raise new capital. This may depress credit growth, making busts sharper and recoveries slower. In line with this, Beatty and Liao (2011) find that banks that tend to delay loss recognition reduce lending during recessionary periods more than banks that recognise losses more promptly.

Specific non-internalised costs to society arise if the private incentives to not recognise or to delay recognition of the NPL (in the hope of its recovery or to just to delay recognition of the corresponding loss) prevent the bank from restructuring the borrower's debt at the speed and in the way that would maximise the social value of the funded project. Evergreening, for example, may keep the borrower subject to a debt overhang problem (Myers, 1977) and hence unable to escape from distress. Depending on the circumstances, either a debt-for-equity swap or a swift liquidation of the funded project might generate greater value for society than the "zombification" of the exposure. The generalisation of these practices may lead to the emergence and survival of "zombie" banks without the capacity to finance new and profitable investments (European Systemic Risk Board, 2012 and 2017a).[5]

The massive and rapid disposal of NPLs in bad times might also raise macroprudential concerns. The market in NPLs is a typical example of a market with asymmetric information, since potential buyers tend to have less information on the quality of the NPLs than sellers. As in Akerlof (1970), buyers may be inclined to assume that the banks most willing to sell their NPL portfolios at a given price are those with the least valuable NPL portfolios. Therefore, the price that potential buyers would be willing to pay for a marginal NPL portfolio on sale may be significantly lower than its true value, with the result that potential sellers will prefer to abstain from selling (Fell et al., 2016; Barba Navaretti et al., 2017; European Systemic Risk Board, 2017a). For banks, selling the NPL at depressed prices would imply a substantial loss. In the presence of a narrow secondary market in NPLs, selling prices are likely to be further depressed if the disposal of NPLs occurs over a short

[5] Schivardi at al. (2017) find that undercapitalised banks are less likely to cut their lending to non-viable firms, but they do not find a significant negative impact on the growth of healthier firms.

timescale (fire sale pricing). By eroding banks' capital bases, the additional losses may further deepen banks' debt overhang problems and compromise the provision of credit to the real economy (De Nicolò et al., 2012).

Another externality relating to NPL resolution operates through the markets in foreclosed assets (most notably real estate) and the potential impact of their sale on equilibrium prices. When NPLs are collateralised, a clear strategy to resolve the NPLs is to foreclose the underlying collateral. The most common collateral in bank lending is real estate. As banks are unlikely to have a comparative advantage as managers of real estate, they may aim to sell the repossessed property in the market as soon as possible. However, especially during crises, real estate markets may lack depth and banks' sales of property may create externalities by contributing to depressing prices even further. Using evidence from US real estate markets, Campbell et al. (2011) and Gerardi et al. (2015) have documented the negative impact of foreclosure rates on house prices in nearby areas, although the price impacts that they find tend to fade away fairly quickly.

A sizeable stock of NPLs can also generate negative externalities by affecting borrowers' payment culture. Bond and Rai (2009) and Carrasco and Salgado (2014) consider financial intermediation models that feature multiple equilibria, some of which are characterised by borrowers defaulting on their loans because they expect other borrowers to do so. The rationale for these multiple equilibria is that banks have limited resources to impose discipline on their defaulting borrowers and that borrowers can take advantage of the fact that, if sufficiently many borrowers default, they will be individually less likely to be sanctioned for it. This point is further developed by Schiantarelli et al. (2016), according to whom healthy borrowers of a distressed bank have fewer incentives to repay their debts if they perceive that the bank is not going to be tough with its defaulted borrowers. One testable implication of this mechanism (for which Schiantarelli et al. (2016) offer supporting evidence) is that borrowers with multiple lenders may selectively decide to (strategically) default with the banks whose stocks of NPLs make them weaker.

Finally, a sizeable and persistent stock of NPLs may negatively influence investors' perception of the solvency and recovery prospects of the banking system as a whole. NPLs have negative effects on banks' profitability, solvency and lending activity. When the stock of NPLs in a number of banks remains elevated for a sufficiently long time, investors' confidence in the banking system may be eroded. Investors may fear that the observed losses are just the tip of the iceberg and that borrowers' distress is systemic, affecting a large proportion of banks in the system. They may also fear that the problem is too large to be managed with banks' existing loss-absorbing buffers, raising expectations about the likelihood of some form of intervention that implies socialisation of losses, including imposing a portion of the burden on healthier banks or even taxpayers. Distrust of banks' solvency and recovery prospects may occur even if banks formally comply with minimum capital requirements and may be reflected in discrepancies between the book and market values of their equity (e.g. in the form of price-to-book ratios below one). Such discrepancies may be fed by various factors, including insufficient recognition and provisioning of existing NPLs, but also a general distrust linked to genuine uncertainty about the scale of the NPLs that banks may continue to accumulate in the immediate future. In these circumstances, investors may apply heavier discounts to bank securities in general (Gibson, 2000; Aman and Miyazaki, 2009). That would increase banks' funding costs and hamper their profitability and their capacity to provide credit to the real economy, feeding a downturn spiral. If the extrapolation involves anticipated costs to public finances, the NPL problem might feed the feedback loop between sovereign risk and bank risk (Acharya et al., 2014).

2.2 Economies of scale and coordination failures

The disposal of NPLs represents a collective action problem, in that coordination problems prevent strategic complementarities between individuals' decisions from being exploited in the socially most profitable manner. In relation to the three stages presented in Figure 2, this problem arises in the context of NPL disposal where the creation of a secondary market in NPLs involves setup costs that prevent individual participation but society would be better off paying these. For instance, attracting potential buyers to a market typically requires them to acquire information about its legal and institutional features as well as expertise in undertaking due diligence on impaired loans. Similarly, attracting sellers to a market requires them to be persuaded of the attractiveness of a secondary market sale. These costs may be too high to be incurred by an individual agent who expects the market to feature few transactions and/or if other competitors free-ride on the unrecoverable investments made by the first of these. As such, a buyer may only enter the market if it has expectations of a sufficiently large volume of trade (at sufficiently attractive prices) in the immediate future. In these circumstances, the economy might get trapped into a situation in which such a market never gets started because the agents deciding at the margin consider the set-up costs to be too great relative to the volume of trade that they expect to be able to profit from.[6]

Lack of coordination over who pays the costs of establishing the market might explain why private AMCs appear uninterested in entering many European NPL market segments. This may also explain why many European banks consider the option of selling their NPL portfolios to be prohibitively costly. The harmonisation of the NPL definition across jurisdictions, as has been achieved, is a relevant prerequisite for addressing these coordination issues and for reducing, at least partially, information asymmetry between buyers and sellers of NPLs. A related rationale for public intervention in this area is that the public sector has an important cost advantage in the collection and sharing of information held by individual lenders about the creditworthiness of insolvent borrowers. This is exemplified by the existence of public credit registers in many European countries and the ongoing Anacredit initiative at the euro area level. The information about solvent and insolvent borrowers contained in these registers could help potential buyers of NPLs assess the likely recovery value of such loans and foster competition among them.

The absence of a thick market in which NPLs can be sold disproportionately affects banks that are smaller and have worse solvency problems, because larger and more solid banks may still dispose of their NPLs at a high cost to issue a signal of strength. The sale of NPLs in a thin market may entail significant haircuts to the net carrying amount of the NPLs sold, and hence require the selling bank to simultaneously arrange for reinforcement of its capital base. For example, the market reaction to Unicredit's successful disposal of a significant fraction of its NPL portfolio at the end of 2016 suggests that such a combined transaction might only be affordable or convenient for the strongest banks, for which the transaction would effectively work as a signal of their financial strength. This mechanism does not contradict the existence of a fundamental first-mover disadvantage among banks of comparable financial strength, and thus a potential coordination problem blocking the emergence of a sizeable and competitive secondary market for European NPLs.

[6] This mechanism resembles the thick market externalities explored by Pagano (1989, 1993) in a securities market set-up.

Somewhat paradoxically, the expectation of political initiatives aimed at improving the depth and efficiency of secondary NPL markets in the EU may at the margin encourage some banks to delay disposing of their NPLs until they can benefit from the effects of such initiatives. This argument can be similarly applied to the expectation of solutions based on the creation of government-sponsored AMCs, information repositories or trading platforms, or any initiative aimed at providing capital support to banks involved in asset disposals. To avoid a delay in solving the NPL problem, these effects call for credibly ruling out initiatives that will not be undertaken and for accelerating the design and execution of those that will.

2.3 Institutional distortions

Banks' incentives in managing NPLs can be distorted by a wide range of legal and institutional factors. Such distortions may stem from accounting standards that allow the recognition of interest income on NPLs, or from supervisory and market pressure to increase provisions for the remaining portfolio when the partial sale of an NPL portfolio reveals losses greater than those formerly provisioned for (Fell at al., 2016). On the regulatory front, distortions may come from the way asset risk weights or credit risk parameters relevant for capital requirements are updated if a sale or resolution reveals potential losses in excess of those previously estimated using internal models. Corporate taxation generally regards the increase in loan provisions as a deductible expense, thus failing to encourage swift NPL resolution as much as the rule that allows the total deduction to be made only when the NPL is finally resolved. Additionally, cumbersome legal procedures and inefficiently slow or congested bankruptcy courts may erode the attractiveness of actions aimed at resolving NPLs by foreclosing on the collateral owned by the defaulted borrowers. Finally, structural factors behind the lack of a competitive secondary market in NPLs (such as an inadequate legal basis for the establishment and operation of AMCs) may impede or discourage the sale of NPLs to third parties.

The combined effect of various distortions from accounting, regulation, taxes, judicial procedures and market structures is to discourage banks from undertaking swifter recognition and resolution of their NPLs. Perhaps unintendedly, the combined effect of the distortions is that banks may prefer to keep NPLs on their balance sheets for a long time (in the hope that the impaired borrowers will be cured or the collateral will rise in value) rather than seek swifter and more efficient resolution of the bad loans. Reports from several official European sources (European Banking Authority, 2016; European Systemic Risk Board, 2017a; Council of the European Union, 2017) acknowledge the role of institutional distortions in the recognition and resolution of NPLs.

Some distortions start to have an effect from the very point at which the loans are originated. Considering the stylised lifespan of an NPL in Figure 2, distortions may start having an effect on future NPLs from the very moment the loans are granted, through their impact on banks' lending standards. For instance, inadequate provisioning or regulatory treatment of exposures with highly procyclical performance may push banks into highly cyclical loans (a sort of systemic gamble), with the implication that they will have below-normal NPL ratios in good times but above-normal NPL ratios in bad times (Martinez-Miera and Suarez, 2014). This may also occur if banks are induced to search for yield in a low interest rate environment (European Systemic Risk Board, 2016a; Martinez-Miera and Repullo, 2017). Several studies point to the role played by weak lending standards in the period preceding the global financial crisis (Garmaise, 2015; Ambrose et al., 2016). In contrast, well-

capitalised and forward-looking banks that anticipate the costs of dealing with their future NPLs might opt to originate loans that are less cyclical in the first place or, at the very least, pass part of the anticipated resolution costs on to their borrowers (in the form of higher interest rates).[7]

Accounting standards in Europe have allowed the recognition of interest income on NPLs, even if such interest was not effectively paid by the borrowers, which may have discouraged banks from disposing of their NPLs. Unlike in the United States, where accounting standards do not allow the recognition of interest income on loans that are more than 90 days past due, International Financial Reporting Standards (IFRS) have left ample discretion for banks to recognise interest income from their stock of NPLs (Aiyar et al., 2015; Jassaud and Kang, 2015; European Systemic Risk Board, 2017a). Accrued interest income has allowed banks to partially compensate for the impact of their NPLs on accounting profits and capital. More precisely, impairment allowances imply a need for provisioning (and a negative hit on profits) mainly when a loan enters the NPL stock, while the continued accrual of interest on that loan could add to the bank's accounting profit (and bolster its accounting capital) until the NPL is resolved. On the basis that headline profits and accounting capital matter as determinants of investors' perceptions of the bank and, in the case of capital, for regulatory purposes, the accrual of interest income on NPLs may have reduced banks' incentives to resolve their NPLs.[8] The entry into force of IFRS 9 on 1 January 2018, which requires the accrual of interest on NPLs based on the net carrying amount (gross carrying amount less accumulated impairment), goes some way towards addressing this institutional distortion (see Box 1 for a discussion of the treatment of NPLs under IFRS 9).

The disincentive to resolve NPLs stemming from the recognition of accrued interest as income may be exacerbated in an environment with low interest rates and low growth. In such an environment, banks' profit margins on new loans may be compressed (European Systemic Risk Board, 2016a), while interest rates on NPLs fixed in the expansion years may be significantly higher.[9] Mechanically, a bank with an unresolved stock of NPLs may therefore exhibit stronger average profit margins (on total assets) than the same bank after getting rid of its NPLs (e.g. through a sale).

The treatment of NPLs from a capital regulation perspective differs across regulatory regimes. Under the standardised approach (SA) to capital requirements, the unsecured portion of loans more than 90 days past due and with provisions exceeding 20% of the outstanding amount carries a 100% risk weight (Basel Committee on Banking Supervision, 2017). This risk weight applies to the outstanding amount net of specific provisions and rises to 150% when the provisions are below the 20% threshold. As a general rule, the secured portion is determined treating collateral and guarantees in the same way as for credit risk mitigation purposes. Under the internal ratings based approach (IRB), on the basis of the principle that expected losses are covered by provisions, the capital required on defaulted exposures is intended to cover residual unexpected

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7 This may produce the paradoxical result that policies that succeed in reducing the inefficiencies associated with NPL resolution may end up expanding the origination of risky loans, while policies that simply penalise future NPLs (making them more expensive to the banks) will have the opposite effect.

8 Of course, it is hard to believe that rational investors considering the valuation and financial health of EU banks will not discount, at least on an average or collective basis, for the implications of this distortion, rescaling the headline profit and accounting figures of EU banks before comparing them with those of, say, US banks. However, if such rescaling cannot be based on the NPL ratio and accounting criteria followed by each individual bank, banks' incentives will remain distorted, as indicated above.

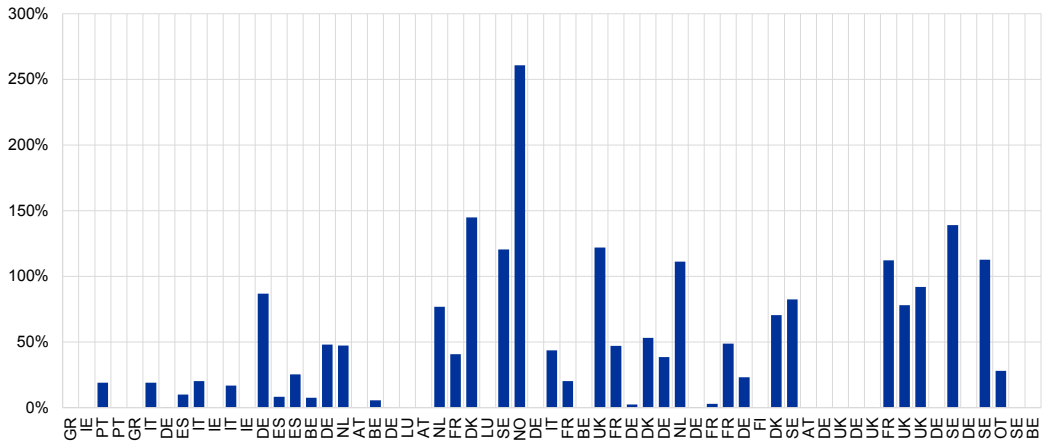
9 According to data from the ECB, the euro area average interest rate for new loans to non-financial corporations was 1.55% at the end of October 2017. By way of comparison, the equivalent rate was 3.53% in December 2005 and 2.87% in July 2012.

losses.[10] The capital requirement on a defaulted exposure is then arrived at as the difference between an estimated adverse-scenario loss given default (LGD) and the bank's best estimate of the expected loss (EL) of the defaulted exposure, where the latter is supposed to be covered by provisions (Basel Committee on Banking Supervision, 2017).[11] For banks or portfolios under the foundation IRB approach (where no modelling of LGDs is involved), all losses on defaulted exposures are treated as expected and hence covered by deducting the regulatory expected losses from CET1 capital, without the need to set aside additional capital for unexpected losses.

Chart 3

Ratio of risk weighted assets to total original exposures for defaulted corporate exposures under IRB models

(percentage)



Source: EBA Transparency Exercise 2017.
Notes: Banks are identified by their country of domicile and ordered in descending order of their ratio of defaulted original exposures to corporates to total original exposures to corporates. "OT" refers to other banks participating in the EBA Transparency Exercise. The reference date for the data is the second quarter of 2017.

Data from EU banks that follow the IRB approach show a broad range of variation in the risk weights assigned to defaulted exposures. Chart 3 uses data from the 2017 EBA Transparency Exercise and shows the average risk weight on defaulted corporate exposures of banks covered by the exercise that apply the IRB approach. In many jurisdictions, the banks apply zero or near-zero risk weights to their defaulted exposures, implying that most banks' estimates of adverse LGDs differ little or not at all from their estimates of ELs. Whether this might reflect the application of the foundation IRB approach, conservatism in the calculation of ELs or, alternatively, an oversimplified or complacent interpretation of adverse LGDs is very hard to establish.[12] In the last case, the

[10] The regulatory concept of "defaulted exposures" is largely equivalent to that of NPLs. See European Banking Authority (2016) for further details.

[11] The EL of a given exposure calculated as specified under the IRB approach may differ from the accounting provisions for that exposure determined according to the prevailing accounting standards. For the purpose of determining regulatory capital, some adjustments are made when these figures differ: when expected losses exceed accounting provisions, the difference is deducted directly from Tier 1 capital; in the opposite case, the difference can be added back, up to a certain limit, as Tier 2 capital.

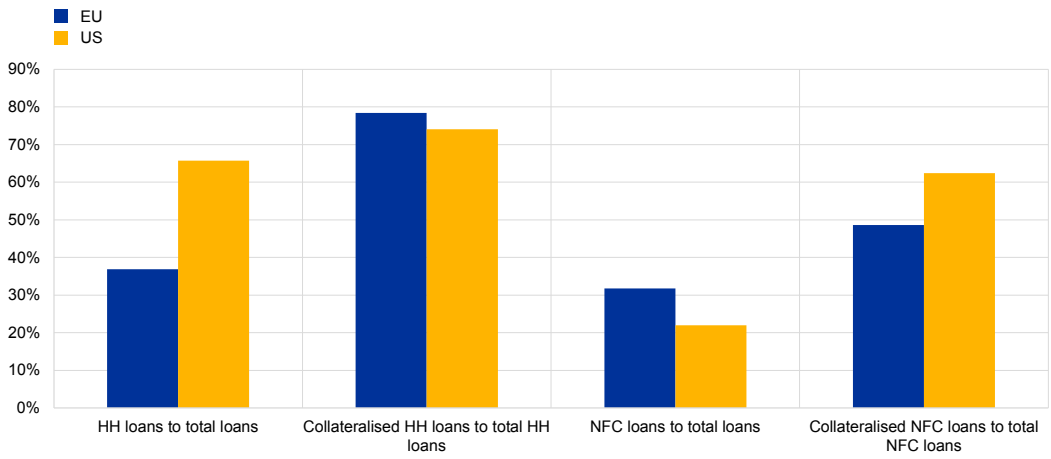
[12] The calculation of expected losses on the defaulted exposures of IRB portfolios is already made on a prudential basis (relative to accounting provisions), as it relies on the notion of "stressed LGDs" (downturn or bottom-of-the-cycle LGDs), rather than on best estimates of the corresponding expected losses.

implication would be that the tail risk implied by the holding of NPLs is not properly covered with capital, establishing a kind of regulatory arbitrage opportunity relative to other exposures with similar tail risk, and a reason at the margin to hold the NPLs.

NPLs are typically collateralised loans, whose collateral value may be overestimated, potentially leading to underprovisioning of the NPLs. Loans to households (HHs) and non-financial corporations (NFCs) make up a large part of banks' loan portfolios. In the case of EU banks, around 75% of the former and 50% of the latter are collateralised (see Chart 4). Typically, their collateral is real estate. When NPLs rise during a downturn, especially after a real estate boom, the associated collateral is likely to be overvalued as a result of the lack of recent and reliable prices with which to update its valuation, or just intentional inaction by the lender. Since the provisioning policies for NPLs also depend on the valuation of the associated collateral, an immediate consequence of this (in the absence of some decisive guidance from supervisors) may be the underprovisioning of NPLs (De Juan, 2003; Aiyar et al., 2015; European Systemic Risk Board, 2017a).

Chart 4
Scale of collateralised loans in EU and US banks

(percentage)



Sources: ECB, FDIC, Board of Governors of the Federal Reserve System and ESRB Secretariat calculations.
Notes: The reference date for household (HH), non-financial corporation (NFC) and total loans is the fourth quarter of 2016, except for collateralised loans to NFCs for the United States (reference date: May 2017). Data are not available for Bulgarian, UK, Hungarian or Slovak banks. Only FINREP banks (national and IFRS) are included in the EU data. US data cover commercial banks and refer to net loans and leases to individuals secured by real estate, and industrial and commercial loans.

Relationship lending may lead banks to exercise greater forbearance and to avoid disposing of their NPLs on a greater scale than in an arm's-length lending transaction. Relationship lending is one of the factors that makes bank-intermediated debt financing special (Petersen and Rajan, 1995; Elyasiani and Goldberg, 2004; Botsch and Vanasco, 2016), and it is important in various segments of the EU banking system (most notably corporate lending, and within that lending to SMEs). Relationship lending builds on the private information shared between banks and their borrowers and helps sustain intertemporal commitments (regarding the pricing and renewal of the loan or its restructuring if the borrower faces financial distress) that would be hard to achieve in an arm's-length contract (say, a short-term or long-term bond placed among dispersed investors).

Where relationship lending is important, interrupting existing relationships (e.g. by selling the loan to a third party) may be costly to both the borrower (which loses reputation built up with the lender and the implicit commitments associated with the relationship) and the lender (which loses the information acquired in the relationship and the future implied rents). All else being equal, relationship lending can therefore explain why a bank may be more lenient than dispersed bondholders to force a defaulted borrower into liquidation or the sale of the NPL to a third party. As such, it is a force which may act against the speedy resolution of the NPL and explain why banks' NPL management is not necessarily geared to maximising the net present value recovered from the defaulted loans. Policy options that involve accelerating the disposal of NPLs can therefore have the side effect of interfering with the implicit contracts established between banks and some of their borrowers, and breaking up some valuable lending relationships. Unfortunately, in practice, this "good forbearance" may be extremely hard to distinguish from the "bad forbearance" that arises from banks' distorted incentives, for example due to connected lending, as explained next.

Connected lending may also be an obstacle to the speedy resolution of NPLs, but in this case banks' inclinations towards forbearance and against disposing of NPLs are closer to a classic conflict of interest. In specific cases, banks continue preferential lending relationships with some borrowers because of the existence of explicit corporate ownership links or hidden connections between the banks' own ownership and management and the ownership and management of the preferred borrowers.[13] The importance of these links has been documented for emerging countries (see Morck and Nakamura, 1999, Peek and Rosengren, 2005, Caballero et al., 2008, for papers covering the Japanese lost decade; Lee, 2000, and Kihwan, 2006, for the Korean crisis; and La Porta et al., 2003, for Mexico) and, more casually, for European countries (Sapienza, 2004; Cuñat and Garicano, 2009; Illueca Muñoz et al., 2011; Jassaud, 2014; Koetter and Popov, 2018). In the presence of these links, connected borrowers are likely to be artificially kept alive by, for example, not initiating the legal process to foreclose their assets. In these cases, forcing the sale of the NPL to a third, non-connected party would lead to the recovery of greater value from the loan. As an alternative solution (especially when the connections occur at a more local, less senior level within the bank), changes in banks' internal governance systems favouring the management of NPLs in dedicated units, separate from the loan-originating units, may also be effective in removing the effects of connected lending. However, creating such units may be a challenge for smaller banks (Garrido et al., 2016; Lehmann, 2017).

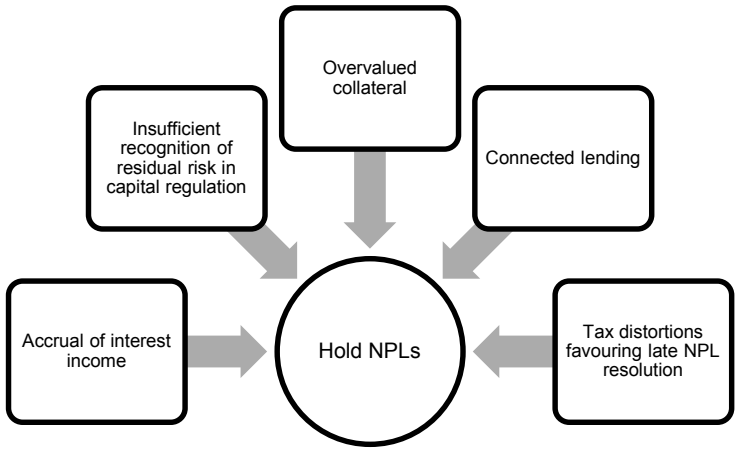
Finally, taxation remains an important source of incentives for banks in deciding on their strategy for resolving NPLs. The tax treatment of impairment losses, provisions and write-offs might give banks incentives to keep their NPLs on the balance sheet. In most tax systems, incremental accounting provisions and the additional losses derived from the disposal of NPLs are treated as an expense, and hence deductible for corporate income tax purposes.[14] In Europe, as documented by Aiyar et al. (2015) and Haley et al. (2016), tax systems exhibit some heterogeneity in their treatment of incremental accounting provisions and write-offs (be it in the form of caps on the deductibility of accounting provisions, restrictions on the deductibility of write-offs or limits on carrying forward losses for tax purposes). Therefore, tax considerations may be important in shaping banks' incentives to time the disposal of their NPLs, and hence must be taken into account in a comprehensive strategy to tackle the NPL problem.

[13] For a discussion of this topic, see, among others, Johnson et al. (2000), Beck et al. (2006) and Laeven and Levine (2009).

[14] Sunley (2002) provides a description of the tax treatment of accounting provisions.

To sum up, accounting standards, insufficient recognition of residual risk in capital regulation, overvalued collateral, connected lending and taxation are sources of potentially significant distortions to banks' incentives regarding the recognition and resolution of NPLs. While it is difficult to separately quantify the importance of each of these in favouring late recognition of NPLs and delaying their disposal, they identify channels through which it would be possible to affect the extent and evolution of NPLs in future crises. Conversely, if the various factors described in this section combine in the direction of making NPL disposal unattractive, they are likely to lead banks to accumulate NPLs on their balance sheets above and beyond what would be socially efficient, as illustrated in Figure 3.

Figure 3
Factors distorting banks' incentives to hold onto their NPLs



Source: Own elaboration.

Box 1
The accounting treatment of NPLs under IFRS 9

The new accounting standard for the classification and measurement of financial instruments, IFRS 9, entered into force on 1 January 2018, establishing an expected credit loss (ECL) approach to the calculation of impairment allowances. In the aftermath of the global financial crisis, the G20 tasked accounting standard-setters worldwide with adopting a more forward-looking approach to provisions for credit risk for instruments measured at amortised cost. IFRS 9 is the response of the International Accounting Standards Board (IASB) to this and is compulsory for all listed banks in the EU, as well as for non-listed banks in the majority of EU Member States.

Under the ECL approach taken by IFRS 9, non-performing exposures must be classified as Stage 3, which essentially means that NPLs will be provisioned according to the same criteria as under the previous incurred loss approach under IAS 39. According to the new ECL approach, banks must allocate their credit exposures to one of three stages, depending on their credit risk situation. At origination, exposures enter Stage 1, where provisions are based on

expected losses on a one-year horizon. If there is a significant deterioration in credit risk, they must be allocated to Stage 2, where the provision must be based on lifetime expected losses. If exposures become non-performing, they move to Stage 3. In fact, Stage 3 exposures closely match those which were recognised under the incurred loss model of IAS 39, which required evidence of impairment for the assignment of provisions. As such, the entry into force of IFRS 9 does not fundamentally modify the criteria for the measurement of impairments on NPLs.[15] Indeed, the novelty of the ECL approach is the recognition of expected credit losses for performing exposures as well, i.e. those classified in Stages 1 and 2 (European Systemic Risk Board, 2017b).

By reducing the additional impairment losses that will need to be recognised when transferring exposures from Stage 1 and, especially, Stage 2 to Stage 3, IFRS 9 might favour the earlier and perhaps more decisive provisioning of NPLs. Conceptually, under an expected loss paradigm, some credit losses on the NPLs will have been recognised before the loans become non-performing, so the impact on the profit or loss account and on capital of the additional losses due to recognition of the loans as non-performing will be lower. This might encourage earlier and more decisive (conservative) recognition of implied losses, reducing the net carrying amount of the NPLs and consequently bringing their accounting valuation closer to their potential disposal value, i.e. the value that could be obtained in a sale or liquidation of the NPL. This might reduce banks' incentives to hold onto their NPLs.

Regarding the accrual of interest of NPLs, IFRS 9 establishes that exposures in Stage 3 can accrue interest only on the net carrying amount. IFRS 9 provides that the accrual of interest on exposures allocated to Stage 3 must be calculated on the net carrying amount (gross carrying amount less accumulated impairment). With this clear requirement, IFRS 9 will positively contribute to addressing the previous ambiguity on the consideration of accrued interest from NPLs in the EU. While it is still not as strict as solutions which simply do not allow the accrual of interest on NPLs (as in the United States), IFRS 9 is a move in the right direction.

From an ex ante perspective, the introduction of IFRS 9 may help prevent the emergence of a sizeable stock of NPLs by raising awareness of and concern for the credit quality of banks' loan portfolios among banks and outside observers. Adopting the ECL of IFRS 9 will imply the need to collect and provide much more information (including via disclosures) regarding the credit quality of loan portfolios and, under proper enforcement, should reveal such quality before credit losses are actually realised. Confronted with the requirement of provisioning their riskier loans at a higher rate, not just in bad times (when losses are realised) but also in good times (when losses can be expected), banks may be induced to adopt more prudent lending standards and, in any event, carry larger buffers to absorb the credit losses once they are realised (European Systemic Risk Board, 2017b). Relatedly, banks are expected to improve the internal governance of credit risk, with potentially positive spillovers for the governance of NPL problems if and when they arise.

[15] There are, nonetheless, differences in the way that impairments must be measured, such as the requirement to estimate the expected cash flows of the NPLs considering a number of possible scenarios, including those in which the NPLs are sold to third parties.

2.4 Moral hazard vis-à-vis the safety net

A crucial role is ascribed to moral hazard in modern financial intermediation, which describes banks as agents that monitor their borrowers by delegation of the end-savers who invest at the bank.[16] Such delegation is efficient either as a way of economising on the costs of monitoring borrowers (Diamond, 1984) or because of the special skills that the monitor needs to have (Holmström and Tirole, 1997). In the world in which the savers providing funding to banks suffer the residual implications of inadequate monitoring by the bank, the right alignment between the incentives of banks and the interests of savers is achieved via risk diversification, bank capital and other market discipline devices, including savers' right to redeem their debt if things go wrong (Calomiris and Kahn, 1991; Diamond and Rajan, 2001). The need for bank regulation and supervision emerges when savers are not sophisticated enough or too dispersed to exercise their disciplining role on banks (Dewatripont and Tirole, 1993), or the risk of runs leads to the introduction of implicit or explicit guarantees such as deposit insurance (Diamond and Dybvig, 1983). With implicit or explicit guarantees in place, the guarantee providers become exposed to moral hazard on the part of banks, which may take excessive risk without being fully penalised at the margin via the cost of their (insured) funding. Reducing this moral hazard problem provides a prima facie case for bank regulation in general and bank capital regulation in particular (Kareken and Wallace, 1978; Hellman et al, 2000; Repullo, 2004; Allen et al., 2011; Zhang et al., 2016).

Among large banks (because of too-big-to-fail concerns) or when many banks are simultaneously affected by a common negative shock (becoming too many to fail), the expectation of public support beyond deposit insurance aggravates the severity of the moral hazard problem. Theory and evidence support the prediction that too-big-to-fail banks tend to engage in riskier transactions (Boyd and Gertler, 1994; Stern and Feldman, 2004; Nier and Baumann, 2006; Louzis et al., 2012; Dávila and Walther, 2017). The same logic can be applied to the situation in which banks are too many to fail (Acharya and Yorulmazer, 2008; Farhi and Tirole, 2012). Reducing expectations of public support (which, ex ante, encourage risk-taking and, especially, systemic risk-taking) is one of the goals of the EU bank resolution regime (namely the Banking Resolution and Recovery Directive – BRRD).[17]

The global financial crisis revealed the importance of adequately addressing moral hazard vis-à-vis the safety net, which is an objective at the core of macroprudential policy. The academic literature ascribes a decisive role to moral hazard as a contributory factor to the recent global financial crisis (Acharya and Viswanathan, 2011; Anginer et al., 2014; Clerc et al., 2016; Mariathasan et al., 2014). Addressing misaligned incentives related to moral hazard vis-à-vis the

[16] Moral hazard arises when an agent takes decisions which are not in the interest of another to which the agent is linked by virtue of a contract or social arrangement. For example, moral hazard affects the relationship between a principal and an agent if the principal does not perfectly observe the action of the agent and the interests of the principal and the agent are misaligned (Holmström, 1979) – say, because the former benefits from the outcomes influenced by the agent's actions (e.g. the profits generated by the agent's effort) but the latter incurs the costs of the action (e.g. the cost of the effort). Moral hazard may also affect the relationship between an insurance company and the insurance taker if the actions of the latter have an impact on the likelihood or severity of the insured risk (Arnott and Stiglitz, 1988) or between a lender and its borrower if the unobservable actions of the latter may have an impact on the probability of repaying a loan (Stiglitz and Weiss, 1986). In a corporate finance context, managers acting in their own interest (or in the interest of shareholders) may have an impact on the riskiness and value of corporate debt (Jensen and Meckling, 1976). As they are aware of the impact of moral hazard on the value of their contractual relationships, private agents tend to design the corresponding contracts so as to minimise the associated agency costs. In many circumstances, optimal private contracting is sufficient to reach constrained efficiency under moral hazard, not leaving room for efficiency-improving government or policy intervention.

[17] See World Bank (2017) for an introduction to the BRRD.

safety net is one of the main tasks conferred on the macroprudential authorities (Crockett, 2000; Borio, 2003; Brunnermeier at al., 2009; Farhi and Tirole, 2012). ESRB Recommendation 2013/1 explicitly states that one of the intermediate objectives of macroprudential policies is "to limit the systemic impact of misaligned incentives with a view to reducing moral hazard".

By the same logic that banks which are not properly capitalised might be tempted to take excessive risk, sticking to a portfolio of risky NPLs is a form of gambling which may be attractive to banks that are not properly capitalised. In textbook examples of excessive risk-taking by highly leveraged institutions, if NPL recoveries turn out to be abnormally high, the bank shareholders win, whereas if they are low the bank goes bankrupt and the losses are suffered by the safety net. A similar logic applies if the additional accounting losses that emerge in early resolution of NPLs lead a bank to become unable to meet its capital standards and be forced to recapitalise or otherwise be resolved: the bank may keep its NPLs unresolved in an attempt to "gamble for resurrection". Specifically, it is possible that even if the NPLs do not perform particularly well in the future, other investments undertaken by the bank will allow it to recover its solvency, especially in a benign economic environment. Such gambling may make perfect sense from the standpoint of bank managers and shareholders, and yet go against the interests of the deposit guarantor, the bank safety net or other uninsured creditors of the bank.

Beyond its purely redistributive implications, holding NPLs unresolved as a form of gambling implies inefficiency if that is not the strategy that maximises the overall value of the NPLs. Forcing earlier resolution of the NPL problem may inflict losses on bank shareholders (and even junior bail-in debt if bank resolution is triggered). However, if holding the NPLs is not the strategy that maximises the overall value of the NPLs, such losses would be more than offset by the gains obtained by the providers of the safety net or other uninsured senior creditors of the bank. In combination with the externalities mentioned in prior sections, reducing the gambling involved in keeping NPLs unresolved may carry even higher overall gains to society.

Once banks hold a sizeable stock of NPLs, the absence of policies to mitigate moral hazard may encourage banks to delay recognition of losses and to adopt lending policies that protract the survival of "zombie" firms at the expense of the required restructuring of the borrowers and lending to new healthy firms. These strategies have detrimental effects in the long term for the economy as a whole. Indeed, Caprio and Klingebiel (1997), Honohan (1997), Niinimaki (2012) and De Juan (2003) argue that, in these situations, banks can decide to practise evergreening, to increase their depositor bases by paying high interest on retail deposits, to engage in riskier transactions to compensate for the losses associated with their stock of NPLs, or to relax their lending standards. These actions, even if limited to a small set of "desperate" banks, may ultimately undermine confidence in the whole banking sector and impair the quantity and quality of new lending. If widespread, such behaviour can lead to the misallocation of credit, as unviable non-financial corporations ("zombies") are permitted to continue operating so as to avoid resolving (and acknowledging the losses on) the loans granted to them.[18]

[18] Using data from the Japanese lost decade, Caballero et al. (2008) find evidence that "zombification" depressed the investment and employment growth of healthy ("non-zombie") corporations and widened the productivity gap between zombie and non-zombie corporations. They also document contagion to non-zombie corporations, which became less profitable and faced additional difficulties in investing. Schivardi et al. (2017) also find the tendency of undercapitalised banks to keep lending to unviable borrowers, but not significant negative effects on healthier firms.

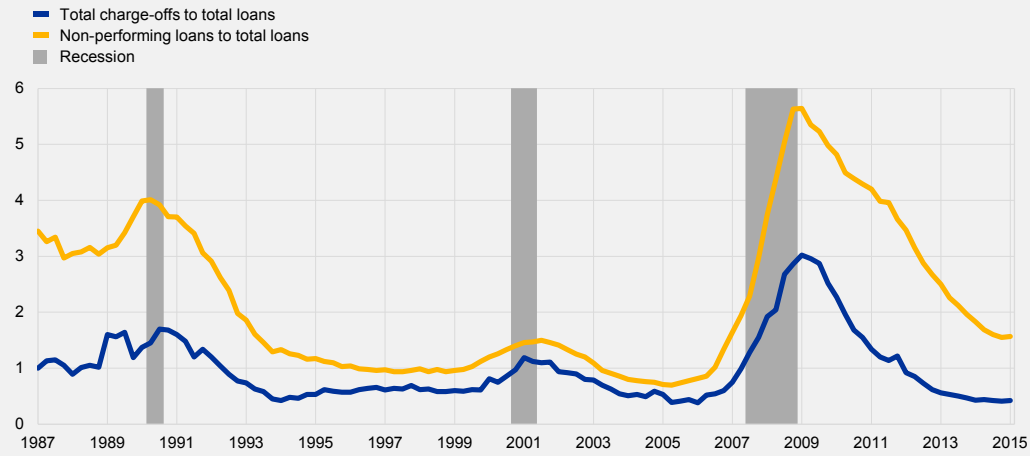
Observing banks with sizeable stocks of NPLs that do not fully bear the losses associated with these establishes a precedent that can encourage further irresponsible lending and inefficient NPL management by other banks. An inadequately addressed episode of moral hazard influences expectations as to how a similar situation will be dealt with in the future (Sbracia and Zaghini, 2001), signalling to other banks that such behaviour is tolerated by regulators and supervisors. Banks that have followed more careful lending practices and/or resolved their NPLs more decisively may consider that their more prudent behaviour is not properly rewarded and may be tempted to behave less prudently in the future. Even contemporaneously, the expectation of supervisory forbearance with respect to NPL problems can discourage individual banks from directly working out a solution to their problems (Martynova et al., 2018).

Box 2
Regulatory and tax treatment of NPLs in the United States

After the recent global financial crisis, NPL rates in the United States did not persist to the extent that those in the EU did. A comparison of NPL rates of banks on either side of the Atlantic reveals that US banks have been much quicker than European banks to reduce their NPLs. Chart A shows how the disposal of NPLs ("charge-offs" in the US terminology) has typically peaked soon after (or even during) recessions. Conversely, disposals of NPLs in Europe remain very low relative to the total volume of NPLs in the banking system. Indeed, in the majority of EU countries and in all those experiencing higher NPL rates, the volume of NPLs in the EU at the end of 2016 exceeded those at the end of 2009 (European Systemic Risk Board, 2017a).

Chart A
Evolution of charge-offs over the cycle in the United States

(percentage points)



Sources: Federal Reserve System, Federal Financial Institutions Examination Council, Federal Reserve Bank of St. Louis and ESRB Secretariat calculations.
Notes: Charge-off amounts as a percentage of the total stock of loans. Charge-offs are defined as the value of loans and leases removed from banks' balance sheets and charged against loss reserves. Charge-off rates are annualised, net of recoveries, and seasonally adjusted. NPLs include those more than 90 days past due and those less than 90 days past due and not accruing interest. Recessions are those reported by the NBER to the Federal Reserve Bank of St. Louis.

The US regulatory and accounting frameworks contain strong and clear prescriptions on interest accruals and collateral valuation for NPLs. Under the US accounting regime, interest income ceases to accrue when a loan becomes more than 90 days past due (a situation which typically leads to its recognition as an NPL). This implies that from the first day of recognition of an NPL, it does not generate any income for the bank. Furthermore, six months after classification as an NPL, banks must write the loan down to the recoverable value of the collateral (Jassaud and Kang, 2015). There are also strict standards for the valuation of collateral, which must be marked-to-market prices and not to estimates involving the expectation of increased values in the future (Financial Accounting Standards Board, 1993; Jassaud and Kang, 2015).

Lastly, the taxation system in the United States is unique in not allowing tax-deductibility of NPL provisions; only losses actually realised are deductible. Unlike in other countries, the US tax code establishes that incremental loan loss allowances made in the process of recognition of impairment losses for NPLs are a non-deductible expense. Only when the NPL is fully charged off (i.e. disposed of) does the related loss become deductible for tax purposes (Borio et al., 2001). As such, the tax system provides an incentive for the quick disposal of NPLs.

2.5 Wrapping up

The analysis in this section has identified a number of imperfections that provide a rationale for policy action aimed at preventing the excessive emergence and persistence of NPL problems, especially during economic downturns. Table 1 provides a list of the identified frictions regarding externalities, economies of scale and coordination failures, institutional distortions and moral hazard vis-à-vis the safety net, with an indication of the stage or stages in the lifecycle of an NPL in which they occur. The next section will address the policy discussion, taking into account the general goal of avoiding or reducing the inefficiencies caused by the combined effect of these imperfections. Importantly, policy design should be careful not to create new imperfections or have costs or side effects exceeding the social gains associated with correcting one or more of the identified imperfections.

The relative importance of the identified imperfections is expected to be heterogeneous, potentially varying across jurisdictions, loan portfolios, classes of borrowers, banks and time periods. Having 20 imperfections listed in Table 1 might look discouraging in practical terms, but this reflects the wealth of policy-relevant dimensions and trade-offs regarding NPLs. Not all these dimensions and trade-offs are expected to be of equal importance or even to be relevant in each particular crisis leading to system-wide NPL problems. Their importance may vary across jurisdictions and time periods depending on institutional and structural factors and the shocks or chain of events potentially leading to the emergence of the systemic NPL problems. They may also vary across loan categories and classes of borrowers, across better or worse-capitalised banks or across loan portfolios more or less concentrated in specific sectors, to name just a few of the many potential sources of heterogeneity. An exhaustive list of imperfections may help as a guide for the relevant micro- and macroprudential authorities in identifying the most relevant issues calling for policy action on NPLs in their jurisdictions.

In the view of the ASC, there are three imperfections which, if unaddressed, are likely to contribute to systemic NPL problems under virtually any circumstances: the overvaluation of collateral and underprovisioning of NPLs, the late recognition of NPLs, and the delayed or inadequate restructuring of impaired borrowers. When asked which of the imperfections listed in Table 1 can contribute most to the emergence, severity and persistence of systemic NPL problems, members of the ASC have shown broad agreement in identifying three of these: (i) the institutional distortions favouring the overvaluation of collateral and underprovisioning of NPLs (imperfection 15 in Table 1); (ii) the externalities that make banks recognise the severity of their NPL problems later or to a lesser extent than would be socially optimal (imperfection 2 in Table 1); and (iii) the negative externalities caused by banks' late or inadequate restructuring of their impaired borrowers (imperfection 3 in Table 1).

Other imperfections highlighted by the ASC as especially relevant from a systemic perspective include, in this order, those numbered 20, 14, 11, 16, 19, 7 and 1 in Table 1. The other imperfections considered important by the ASC are therefore those relating to: supervisory forbearance and inadequate reward for prudent management of NPLs (imperfection 20 in Table 1); insufficient coverage of residual unexpected losses in the capital treatment of NPLs (imperfection 14); structural deficits regarding bankruptcy, AMCs and secondary NPL markets (imperfection 11); excessive forbearance on connected borrowers (imperfection 16); gambling for resurrection incentives regarding recognition and resolution of NPLs (imperfection 19); investors' perceptions of banks' solvency and viability (imperfection 7); and lending with excessively cyclical performance (imperfection 1). These imperfections are highlighted without downplaying the importance of the remaining factors, which, as discussed above, should be judged in the light of the particular circumstances of each NPL-related situation.

Table 1

Mapping of imperfections relating to NPLs with the stages in their lifecycle where they are most relevant

		Prevention	Correction	
		Loan is granted	**NPL is recognised**	**Loss is realised**
Externalities linked to…	1. Lending with excessively cyclical performance	X		
	2. Late recognition of NPLs		X	
	3. Delayed or inadequate restructuring of impaired borrowers			X
	4. Fire sales of NPLs			X
	5. Fire sales of foreclosed assets			X
	6. Borrowers' repayment incentives and culture	X	X	X
	7. Investors' perceptions of banks' solvency and viability		X	X
Economies of scale and coordination failures regarding…	8. Coordination in incurring set-up costs of secondary NPL market			X
	9. Centralisation of information relevant for valuation of NPLs			X
	10. Strategic delay in expectation of future policy action			X
Institutional distortions	11. Structural deficits in relation to bankruptcy, AMCs and secondary NPL markets			X
	12. Insufficient regulatory discouragement of concentrated or highly cyclical lending	X		
	13. Accrual of interest on NPLs			X
	14. Insufficient coverage of residual unexpected losses in the capital treatment of NPLs			X
	15. Overvaluation of collateral and underprovisioning of NPLs	X		X
	16. Excessive forbearance on connected borrowers		X	X
	17. Tax incentives to delay NPL resolution			X
Moral hazard vis-à-vis the safety net	18. Consideration of highly cyclical or concentrated loans and NPLs as a gambling asset by undercapitalised banks	X	X	X
	19. Gambling for resurrection incentives regarding recognition and resolution of NPLs		X	X
	20. Supervisory forbearance and inadequate reward for prudent management of NPLs	X	X	X

Source: Own elaboration.

3 Policy discussion

3.1 General discussions

Policy actions to prevent the emergence of NPL problems should be aimed at addressing the imperfections identified in the previous section. The prevention of a situation like that recently witnessed in the EU, when NPLs piled up on banks' balance sheets over a number of years, would require a comprehensive approach that takes system-wide implications into account, for normal and crisis times. There are a wide range of policies that can directly or indirectly affect the incentives, institutions and market interactions relevant at the time of granting the loans, recognising their non-performing status or determining their form and speed of resolution. Table 2 contains a list of some of the most relevant ones. Variations of most of these have already been tried as a solution to NPL problems in some jurisdictions, during the recent or previous crises. All of them are also part of the ongoing debate on alternatives to address the NPL problem in the EU. The novelty of Table 2 therefore lies not on the list of policies per se, but in the systematic assessment of their association with each of the imperfections calling for policy action in this domain, as identified in Section 2.

In most cases, there is not a one-to-one mapping between each of the imperfections identified in Section 2 and the policies that might potentially be useful in addressing them. Solid circles in Table 2 indicate that the listed policy, if properly designed, could directly address (at least partially) the imperfection listed in that column. For instance, creating a platform through which potential buyers of NPL could access information from credit registers relevant for the valuation of NPLs (a policy included in policy category 6) would directly address some of the economies of scale and coordination problems that potentially prevent the existence of an active NPL market (imperfections 8-10). Similarly, empty circles indicate the capacity to indirectly address the imperfection, where "indirectly" means by possibly reducing the magnitude of the problem or the size of another factor that contributes to or magnifies that imperfection. For instance, enforcing better lending standards (policy 1) should lead to the emergence of fewer NPLs in a future downturn, thus reducing the NPL and collateral sales implied by them, and in turn the negative fire sale externalities in the corresponding markets. Finally, the crosses in Table 2 identify cases in which policies that are potentially useful in addressing other imperfections may have a negative side effect on the imperfections listed in the corresponding columns. One example of this is the creation of government-sponsored AMCs or "bad banks" (policy 11) which, properly designed, can be very useful at helping banks to get NPLs off their balance sheets without having to wait for the NPLs to actually be resolved (e.g. via cure, debt restructuring or foreclosure of the borrowers' assets). As one of the functions of the AMCs is to allow NPLs to be disposed of at prices that do not cause excessive damage to the solvency of the selling banks, one possible negative side effect (as with any policy involving some form of public support) is the deterioration in ex ante incentives (which explains the crosses in columns 1, 12 and 20). In this sense, a cross in Table 2 also helps identify complementarities between policies: establishing government-sponsored AMCs as a solution to the ex post NPL problem might require a policy on lending standards that guarantees a lack of excessive cyclicality or sectoral concentration of loans originated by banks that might potentially benefit from the arrangement in a crisis.

Table 2

Interactions of possible policies in relation to NPLs with the identified imperfections

	Description of policy	Imperfections (numbered as in Table 1)																			
		I. Externalities							II. Coordination			III. Institutional distortions							IV. Moral hazard		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Lending standards preventing excessively risky or cyclical loans	●			○	○								●					●		
2	Limits to sectoral concentration of exposures				○	○								●					●		
3	Capital surcharges discouraging excessively risky or cyclical lending	●			○	○								●					●		
4	Supervisory guidance regarding lending policies	●			○	○								●					●		
5	Prudential adjustments to compensate for potential underprovisioning		○	●				○			○				●	●	●		○	○	●
6	Structural reforms regarding bankruptcy, AMCs, secondary NPL markets, taxation & bank resolution			●	○	○	●		●	●	●	●						●			
7	Accounting prescriptions limiting or not allowing accrual of interest income on NPLs			○			●				○						○		●	●	●
8	Supervisory guidance on NPL recognition		●	○	×	×	○	○			○		○				●			○	●
9	Supervisory guidance on collateral valuation	○	○	●	×	×	○	●			○		○		○	●	○		○	○	●
10	Provisioning and write-off calendars on already recognised NPLs	○		●	×	×	○	●			●		○	○	●	●	○		●	●	●
11	Government-sponsored AMCs (bad banks)	×			●	●		●	●	●	●	●	×		○				○	○	×
12	Bank recapitalisation tools			○	○	○		●			○				○					○	○

Source: Own elaboration.

Notes: Key to the symbols used in the table: ● - directly addresses the imperfection, ○ - indirectly addresses the imperfection, × - might have counterproductive effects regarding the imperfection.

Prudential adjustments to compensate for potential underprovisioning, supervisory guidance on collateral valuation, and provisioning and write-off calendars would be policies well tailored to addressing the imperfections identified as most relevant by the ASC. Imperfections regarding the overvaluation of collateral and the underprovisioning of NPLs (imperfection 15 in Table 1), the late recognition of NPLs (imperfection 2) and the delayed or inadequate restructuring of impaired borrowers (imperfection 3) were ranked by members of the ASC as the most relevant for policymakers facing system-wide NPL problems. The connections between available policies and imperfections provided in Table 2 can be used to identify the policies that, in principle, might help address these (or other) imperfections. For instance, a calendar for the provisioning and writing off of NPLs would directly address two of them (imperfections 3 and 15). Similarly, prudential adjustments to address possible underprovisioning of NPLs under existing accounting standards and proper supervisory guidance on collateral valuation (to prevent collateral values being inflated during booms and remaining so during busts) would address imperfections 3 and 15 directly, and imperfection 2 indirectly. Table 2 also identifies other policies that may directly or indirectly affect these imperfections (for example, supervisory guidance on NPL recognition). Given its largely self-explanatory nature, a full discussion of Table 2 is omitted for the sake of brevity.

The success of any policy measure in the area of prudential regulation and supervision will depend on how decisive and effective the policies undertaken on the structural and non-prudential fronts are. Many of the policies listed in Table 2 are not under the control of the micro- and macroprudential authorities. In fact, many of the factors determining the excessive size and persistence of NPL problems are of a structural nature and would be better tackled with policy action in the tax, legal and judicial domains. Policy initiatives from micro- and macroprudential authorities can have a limited impact if they are not accompanied by the right structural reforms in the areas relevant for the recognition, management and resolution of NPLs. For example, if legal reforms and investments in market infrastructure (centralisation of relevant information, trading platforms) succeed in creating an active secondary market for certain classes of NPLs, prudential policy actions aimed at accelerating the resolution of NPLs (e.g. the establishment of a calendar) would be less costly to implement (and in turn encourage sales in the created market). The structural reform and the prudential pressure for quick resolution of NPLs would therefore complement each other. In contrast, it seems reasonable to conjecture a certain degree of substitutability between tax reforms and capital regulation reforms if both were to push for penalising the holding of NPLs. Likewise, if the legal system were able to deal with bankruptcy and foreclosures more rapidly (but with the right preservation of economic value), the social value of government-sponsored AMCs would be smaller. Preventing the excessive emergence and persistence of NPL problems in future crises therefore requires strong political leadership and the involvement of multiple authorities.

While macroprudential policy mainly approaches the issues from the lender perspective, the implementation of policies on the borrower side may also be necessary. The scope of macroprudential policy is typically focused on financial institutions and the financial system. In the case of NPLs, then, macroprudential policy would act from the lending side. However, when NPL problems emerge in a crisis, there is always an important component involving borrowers, which also need to be addressed by policymakers. In this sense, the recent emergence of NPL problems in the EU evidences weaknesses in the household and non-financial corporation sectors, particularly in their degree of indebtedness and their resilience to a change in the economic cycle.

Policies affecting the sustainability of private sector indebtedness, even if out of the scope of macroprudential authorities, would therefore be an important component in the comprehensive approach to the prevention of system-wide NPL problems.

When not only end-borrowers but also financial intermediaries and governments are overindebted, the economy is highly vulnerable to negative shocks and may not be able to undertake beneficial forms of debt restructuring, paving the way for extended evergreening and forbearance practices. In general, debt restructuring at end-borrower level is more likely to be efficient (and hence an instance of "good forbearance") if the lender is itself sufficiently solvent and forward-looking. In some circumstances, debt relief offered through the renegotiation of an impaired loan may allow the distressed borrower to overcome its financial difficulties and lead to the extraction of more value from the funded assets than if the assets were liquidated and foreclosed (Myers, 1977; Chemmanur and Fulghieri, 1994; Harding and Sirmans, 2002).[19] However, loan renegotiation (or the replacement of an unpaid maturing loan with another similarly unviable one) can also be part of the strategy of a bank that is interested in delaying the recognition of loan losses, artificially reducing the size of its NPL problem or buying additional time to gamble for resurrection (Diamond and Rajan, 2011; Huizinga and Laeven, 2012; Homar et al., 2015). This form of "bad forbearance" (evergreening), which is a source of concern for regulators (European Banking Authority, 2013), is more likely to be exercised by lenders in a weak financial position for which the recognition of additional losses could imply further tightening of capital constraints, further deterioration in investors' perceptions, the need to raise new capital or even being forced into resolution (Watanabe, 2010). If banks enter downturn periods with sufficient capital buffers, they can better absorb the implications of prompt recognition of borrowers' repayment problems, properly provision their NPLs and undertake the strategy that maximises the recovery of value from them. Likewise, governments entering a downturn or a crisis with sufficient financial strength might be better able to support, if needed, the recovery and resolution of damaged banks under their jurisdiction, preventing bad forbearance (Guizani and Watanabe, 2016; Homar and van Wijnbergen, 2017).

3.2 Identifying intermediate objectives for policy action

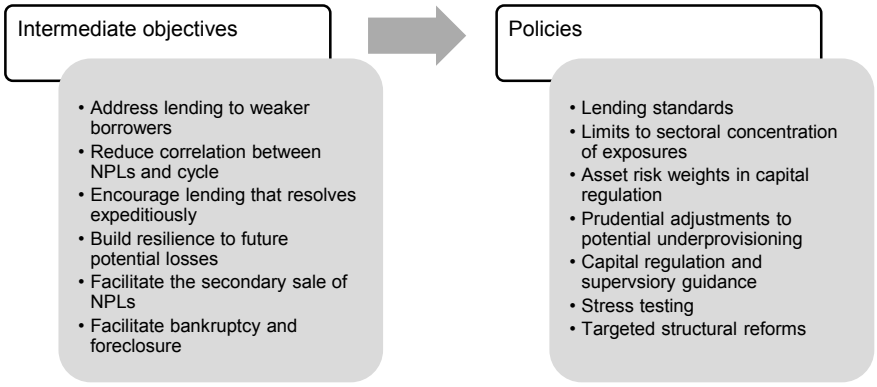
In general terms, policies to address NPLs may have a preventive nature, being implemented during expansions, or a corrective nature, being mainly implemented in downturns when NPL stocks mount up. While all policies should be ultimately justified as a means of addressing some of the imperfections identified in Section 2 (see Table 2), it is useful to connect them to intermediate objectives that can be more unequivocally mapped to each policy. Preventive policies on NPLs may be linked to the following intermediate objectives: (i) reducing the potential volume of NPLs in a future downturn by addressing lending to weaker borrowers; (ii) reducing the correlation between NPLs and the business or credit cycle; (iii) encouraging forms of lending that resolve expeditiously when non-performing; (iv) encouraging banks to build resilience to future potential losses associated with NPL recognition and resolution (see Box 3 for a

[19] See Roberts and Sufi (2009) for evidence on debt renegotiation even out of financial distress, and Piskorski et al. (2010), Adelino el al. (2013) and Haughwout et al. (2016) for evidence on the extent of and limits to distressed mortgage renegotiation in the United States during the global financial crisis. For the role of debt renegotiation in various European countries, see Andritzky (2014) and McCann (2018).

discussion of the Spanish experience with dynamic provisions); (v) establishing infrastructure to facilitate the secondary sale of NPLs if needed; (vi) undertaking structural reforms to enable bankruptcy and foreclosure to be completed quickly and effectively if needed. Figure 4 sets out a selection of policies which could be used to pursue these intermediate objectives. The objectives numbered (i), (ii) and (iii) might be influenced by policies directly or indirectly covering lending standards and limiting the concentration of exposures in specific sectors. Preventive policies can also include setting asset risk weights in capital regulation or additional prudential buffers with the objective of discouraging certain forms of excessively cyclical or over-concentrated lending. This is complemented by intermediate objective (iv), which is connected to prudential adjustments for potential underprovisioning, capital regulation, supervisory guidance and stress testing, among other tools, whose objective is to guarantee that banks have the capacity to suitably absorb the losses potentially associated with their loans in a downturn. Finally, intermediate objectives (v) and (vi) require targeted structural reforms which would be better undertaken preventively in good times and before the lending contracts are originated rather than under adverse circumstances and once the lending contracts in question are already in place.

Figure 4

Intermediate objectives and policies to prevent the emergence of NPL issues



Source: Own elaboration.

Establishing a framework for the macroprudential monitoring of lending standards and concentration of exposures could serve as a tool for the early detection of vulnerabilities regarding future NPLs. Beyond the usual microprudential monitoring of lending standards, it may be worth developing a framework for the macroprudential monitoring of bank lending standards (Committee on the Global Financial System, 2012; European Systemic Risk Board, 2016a). This framework could pay particular attention to issues connected to the future occurrence of NPLs, such as concentration of lending on certain sectors or locations, possible mis-valuation of collateral which may prove unsustainable in the long term or vulnerabilities of borrowers to common factors such as interest rates. Macroprudential authorities could develop such a framework within their mandate to contribute to financial stability in their jurisdictions. This information could be later used to take action, not necessarily constrained to borrower-based measures, if the authorities diagnose that vulnerabilities are piling up to the extent of potentially leading to or aggravating a systemic event in the future.

Box 3

The experience with dynamic provisioning in Spain

The Banco de España introduced dynamic provisions in July 2000 to address credit risk on Spanish banks' balance sheets. At that time, credit growth in Spain was strong and intense competition between banks was negatively affecting loan pricing practices. The introduction of the system of dynamic provisioning was also intended to address the procyclicality of loan loss provisions throughout the cycle (Saurina, 2009). The Banco de España wanted banks to recognise credit risk in the upward phase of the cycle (when loans which will later become NPLs are generated), not when NPLs are recorded in banks' accounting and regulatory books (Saurina and Trucharte, 2017). The Banco de España discontinued dynamic provisioning at the end of 2016.

For a given period, the flow of dynamic provisions was a function of the stock of loans and its variation, and of the level of specific provisions. An abridged approximate formula for the calculation of dynamic general provisions is provided by Jiménez et al. (2017) and was as follows:

$$General\ Provisions_t = \alpha \Delta Loans_t + \left(\beta - \frac{Specific\ Provisions_t}{Loans_t}\right) Loans_t$$

where α is an estimate of the latent loss in a loan portfolio and β is the average volume of specific provisions throughout the cycle. The volume of general provisions was then a positive function of the variation in the stock of loans and of the stock of loans itself, and a negative function of the specific provisions, which served as a proxy for the cyclical position of the economy at a given point in time. General provisions were then automatically released as the growth in NPLs took the ratio of specific provisions above normal levels, providing an implicit incentive for banks not to delay the recognition of credit losses.

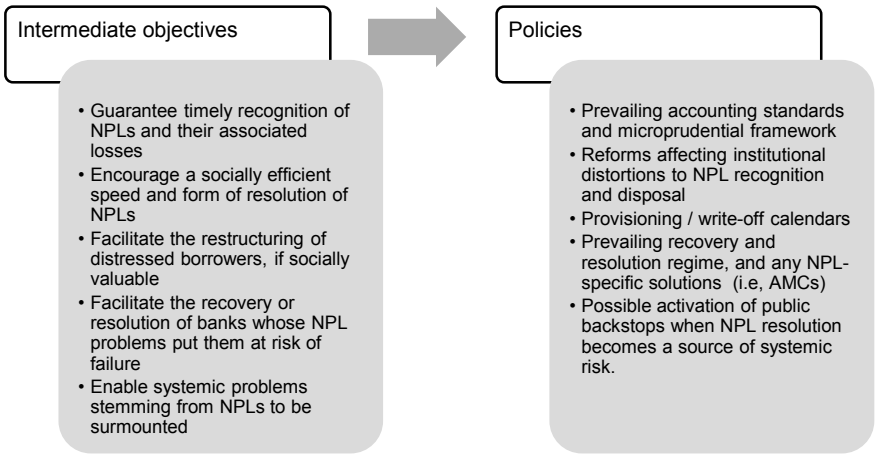
The experience of the Banco de España with dynamic provisioning shows that a countercyclical approach to capital and provisions helps to attenuate the effects of typical downturns on credit supply. According to Jiménez et al. (2017), dynamic provisioning can mitigate credit supply cycles, generating positive effects on credit, employment and firm survival rates during crisis times, by comparison with a framework where no countercyclical policy is implemented. The calibration of the general provisions was based on the credit losses observed in past crises in Spain. The volume of general provisions accumulated before the global financial crisis (roughly 1% of the risk-weighted assets of Spanish banks) would have sufficed to address a crisis on a similar scale to previous ones, but not a crisis with the severity of the global financial crisis.

However, the global financial crisis also revealed the limitations of these provisions in preventing the credit boom from developing, absorbing the full losses when it abruptly ended and softening the constraints faced by the weakest banks. The volume of general (dynamic) provisions which were accumulated in the expansionary phase of the cycle proved insufficient to absorb the volume of credit losses generated when the effects of the global financial crisis hit Spain (Saurina and Trucharte, 2017; Jiménez et al., 2017). Therefore, authorities need to remain modest with regard to the effectiveness and sufficiency of purely rules-based countercyclical policies. And, importantly, these policies should not lead to complacency on the part of microprudential supervisors when addressing a period of financial stress. Additionally, Jiménez

et al. (2017) find evidence suggesting that the introduction of dynamic provisioning influenced banks' lending behaviour, leading them to take more risk and to engage in the search for yield. They also find that the positive effects of dynamic provisioning on credit supply during the contraction period were weaker among banks with higher NPL and leverage ratios, suggesting the existence of a market-based constraint which is binding for those banks perceived to be weaker, despite the softening of the requirements associated with the dynamic provisions.

If and when an NPL problem arises, policies should promote the prompt recognition and adequate provisioning of problem loans and the implementation of a resolution path coherent with the social benefits and costs at stake. The list of intermediate policy objectives in this corrective phase includes: (i) guaranteeing timely recognition of NPLs and their associated expected losses; (ii) encouraging a socially efficient speed and form of resolution of the NPLs; (iii) facilitating the restructuring of distressed borrowers, if socially valuable, both when their NPLs remain held by banks and when banks dispose of them; (iv) facilitating the recovery or resolution of banks whose NPL problems put them at risk of failing or being likely to fail; (v) enabling systemic problems stemming from the size and severity of the NPL problem to be surmounted. Figure 5 includes a selection of policies that could be used to reach these intermediate objectives. Objective (i) must be pursued by private enforcers according to prevailing accounting standards and by microprudential supervisors and can be further encouraged if other intermediate objectives are properly met (of the preventive objectives, specifically (iii)-(vi)) and with the facilitation of the recovery or resolution of banks at risk of failing or being likely to fail due to their NPL problems. These policies should reduce the cost of dealing with an NPL problem once it has been recognised. Objective (iii) is related to the opportunities and incentives for debt restructuring provided by the law, taxation and regulations, both when the NPL is held by the bank and after its disposal. Objective (iv) is related to the prevailing recovery and resolution regime and to any NPL-specific solutions that might arise around it, such as the creation of government-sponsored AMCs to allow banks to dispose of their NPLs on better terms. Finally, objective (v) is mainly connected to the activation of public backstops (bank recapitalisation tools) that might be provided if bank insolvency related to NPL resolution were to become a source of systemic risk.

Figure 5
Intermediate objectives and policies to corret system-wide NPL issues



Source: Own elaborations.

Preventive and corrective policies are tightly interconnected: announcing at an early stage how future NPL problems will be corrected can affect agents' ex ante incentives and thus have a preventive impact. Agents' behaviour around the origination of new loans depends, among other things, on their expectations about how potential future NPL problems will be dealt with, which will in turn be influenced by the policies established on the corrective front. Establishing corrective policies for future NPL problems today may, through its impact on ex ante behaviour, have a preventive impact too. In some cases, a good corrective policy may also play a positive preventive role. For example, establishing a calendar for the provisioning or writing off of future NPLs, perhaps as a backstop, increases the opportunity cost of originating loans that are likely to produce a large NPL problem in a future downturn and may therefore influence lending standards in the direction of making originated loans less prone to creating system-wide NPL problems. For other corrective policies, the side effects on the preventive front might be negative. For instance, expecting an overly generous "bad bank" arrangement in the future (e.g. one that limits the losses to bank managers and shareholders in a crisis) might have counter-productive preventive effects. The design of corrective policies should therefore take proper account of their preventive effects, which in some cases reinforce and in others reduce the desirability of those policies from a macroprudential perspective.

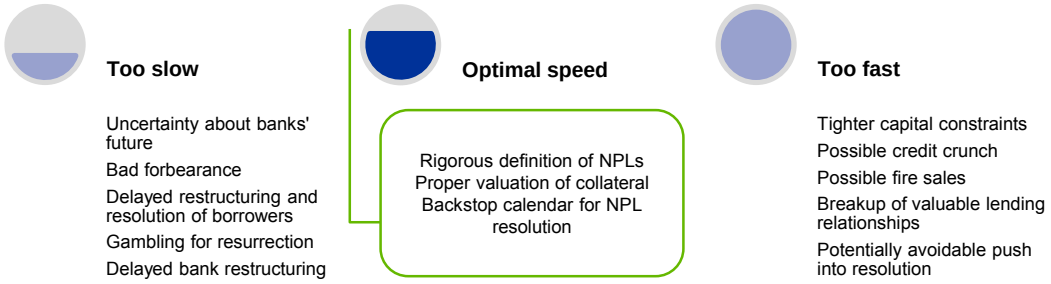
As in other fields of policy action, there may be a time inconsistency between the course of policy action which is most desirable ex ante and that which is most desirable ex post. On an ex ante basis, the impact of policy on subsequent behaviour, including that associated with the quality of the originated loans, may call for a relatively tough approach to the resolution of future NPLs. However, ex post, once the NPLs have already been accumulated, policymakers might prefer softer approaches to their resolution in order to, for example, prevent the affected banks from suffering sudden reductions in regulatory capital. The severity and implications of this time inconsistency can be reduced by combining the ex ante commitment to realistically tough (albeit flexible) resolution arrangements with mechanisms that guarantee the presence of sufficient loss-absorbing capacity throughout the system (which will reduce the social costs of NPL resolution and hence the temptation to forbear).

In the ex post phase, inducing a socially efficient speed and form of resolution of the NPLs is the crux of the matter and involves several complex trade-offs. Many of the imperfections identified in Section 2 of this report interfere with the achievement of a socially optimal speed and form of resolution of the NPLs (intermediate objective (ii) on the corrective front). Fulfilling this objective involves several complex trade-offs. For reasons detailed in Section 2, the most appropriate speed for NPL resolution is not necessarily the quickest, and the most appropriate form of resolution is not necessarily the sale of the NPL or the repossession of the associated collateral. It is therefore necessary for policymakers to make their decisions after properly assessing the relevant trade-offs. The next section concludes the report by elaborating further on such trade-offs.

4 Afterword: achieving the optimal speed and form of NPL resolution

Authorities aiming to influence the speed of recognition and resolution of NPL problems face a number of important and complex trade-offs. Understanding such trade-offs is crucial to determining the optimal speed and form of resolution of NPL problems (see Figure 6). The following paragraphs briefly describe these trade-offs.

Figure 6
Considerations regarding the speed of resolution of NPLs



Source: Own elaboration.

Striking the right balance on NPL recognition would involve a clear commitment to a rigorous, but not unduly tough, definition of NPLs and a valuation of recovery values that becomes increasingly stringent as time passes. This would set a clear path for affected banks to be prepared to accommodate the implied capital needs over a reasonable time horizon. Lack of recognition of the severity of the NPL problem would spread doubts about banks' viability, encourage bad forbearance, delay proper restructuring or resolution of distressed borrowers, encourage gambling for resurrection and delay the necessary restructuring of the banks themselves. All else being equal, all these problems will tend to have a more severe effect on banks with weaker capital positions and with individual characteristics (such as geographical or sectoral exposures) pointing to a larger and yet not fully recognised NPL problem. Acknowledging NPL problems does, however, imply acknowledging (and provisioning for) losses and possibly being exposed to tighter prudential capital requirements. If banks are unwilling or unable to raise new equity, they may meet the regulatory capital needs by reducing risk-weighted assets. Consequently, capital scarcity could reduce banks' capacity to extend new loans, push them into fire sales of assets or, in extreme cases, push them into resolution. As such, overly aggressive recognition of NPLs (e.g. an excessively broad definition of doubtful loans, excessively pessimistic forecasts of the chances of curing the bad loans or overly conservative valuation of collateral) may unnecessarily reduce banks' capacity to continue lending during a downturn or exert excessive pressure on banks to restructure at the worst point in a crisis.

Turning to NPL resolution, it is clearly undesirable to postpone resolving a systemic NPL problem when economic recovery is on its way or banks have sufficient capacity to absorb losses (against either existing capital or capital that they can raise in markets). In such circumstances, the underlying debt overhang problems are bad for the affected end-borrowers, which remain blocked in their distressed financial positions, and for the banks, whose incentives to undertake profitable new lending may be eroded. A more conservative prudential valuation of NPLs or, even more explicitly, the introduction of calendars aiming at achieving full provisioning, disposal or write-off of NPLs over a given horizon would constitute a useful backstop for banks hesitant to undertake decisive action at their own initiative.[20] Structural reforms facilitating the restructuring or sale of impaired loans, the foreclosure of collateral from defaulted borrowers and the sale of foreclosed assets are key to improving the trade-offs faced by micro- and macroprudential authorities when pressing banks for NPL resolution in the aftermath of a crisis.

However, if banks are in a weak capital position, forcing them to dispose of their NPLs at market prices could push some of them into resolution. Disposing of NPLs at market prices in haste or during a crisis may generate substantial losses for a bank, requiring capital in excess of that available at the bank, and perhaps in excess of the amount that its owners are able or willing to raise externally. In some cases, banks may simply "prefer" to be resolved than to cope with their NPL problem out of resolution. These are precisely the banks that would tend to take a passive approach to resolving their NPLs, waiting for economic recovery to enhance their chances of avoiding resolution. Bank resolution may involve substantial costs to the holders of bail-in debt, the deposit guarantee scheme and the bank's impaired and non-impaired borrowers (e.g. because lending relationships are abruptly interrupted). Authorities wanting a quick solution to an NPL problem but faced with banks in a weak capital position must be prepared to accept a system-wide increase in the number of bank resolutions (and their side effects), and perhaps be ready to undertake mitigating policy actions, such as preventive bank recapitalisations.

In the above context, using AMCs for the resolution of system-wide NPL problems can be useful. AMCs smooth the process by which NPLs are taken off banks' balance sheets by detaching the bank's disposal of the NPLs from the final recovery of value from the defaulted borrowers. In addition, government-sponsored AMCs may pay higher prices for the acquired NPLs than those that would prevail in decentralised fire sales, closer to the real economic value of the NPLs. For the selling banks, achieving better sale prices translates directly into reducing their NPL-related capital needs, although this comes, of course, at the expense of the residual stakeholders in the AMC, which may include taxpayers.

Despite the above, neither AMCs nor secondary NPL markets should be seen as a panacea. As discussed further in Box 4, they may work quite well for specific classes of loans but not so well for others. AMCs may, in some cases, be just another way of postponing the restructuring of distressed borrowers or the recovery of value from their assets, have a significant cost to taxpayers and have undesirable effects on lenders' ex ante incentives. Similarly, for loans with a large informational and relationship component, secondary market sales may simply not be the best way to recover value from the defaulted borrowers.

[20] The calibration of such calendars should aim to produce an optimal speed and form of NPL resolution, which may require to take account of various factors, such as whether the loans are secured or not, or whether the corresponding borrowers are considered to be viable ("going concern") or insolvent ("gone concern").

With the foregoing in mind, preventive policies to ensure that NPL problems emerging in future downturns are not excessively large and that banks have sufficient loss absorption capacity and the right institutional framework to cope with them are of paramount importance. As stressed above, good preventive policies can make NPL problems smaller and their solution socially less painful. Likewise, good corrective policies can contribute to improving the ex ante incentives that shape banks' lending policies (and hence the likelihood and severity of future NPL problems) and also the extent to which banks and other relevant agents (investors, supervisors, resolution agencies) will be equipped to cope with systemic NPL problems if and when they emerge. It is to be hoped that effective development and implementation of the current agenda for policy action on NPLs in the EU, which envisages a combination of a good part of the preventive and corrective policies mentioned in this report, will ensure that NPL problems in future crises are less severe, and less painful and lengthy to resolve.

Box 4

Secondary NPL markets and AMCs as solutions to NPL problems

Secondary NPL markets constitute a valid alternative for the resolution of NPLs, so policy initiatives boosting their development are very welcome. The development of NPL secondary markets has frequently been identified as a policy action which could help European banks to unload the stock of NPLs on their balance sheets (Fell et al., 2016; European Banking Authority, 2016; European Systemic Risk Board, 2017a). Asymmetries of information are one of the main fundamental obstacles to the proper functioning of these markets (An et al., 2011; Adelino et al., 2016) and cannot be fully addressed by policies. Barriers to entry connected to the acquisition of local legal and institutional knowledge, the performance of due diligence and minimal transaction volumes may make competition too low and prices unattractive to the sellers. Given the economies of scale and coordination failures, intervention by public authorities could contribute to enhancing the functioning of these markets.

Enhancing the information available to potential buyers of NPLs could contribute to the development of NPL secondary markets, in particular those involving larger loans. The cost to buyers of acquiring information relevant for valuing the NPLs that they can purchase has been identified as one of the main obstacles to a larger investor base in EU secondary markets for NPLs (Fell et al., 2016; European Systemic Risk Board, 2017a). In this regard, access to the information available in public credit registers might complement initiatives to develop trading platforms helping candidate buyers and sellers in the market to meet each other. Data availability makes these initiatives especially promising for NPLs associated with lending to medium-sized and large corporations (Fell et al., 2017b). There is typically less or inferior-quality information to enable the recovery prospects of loans granted to households or smaller corporations to be evaluated, making it harder for buyers to assess the expected recovery on a loan-by-loan basis. Similarly, all else being equal, loans associated with more homogeneous, marketable and liquid collateral are better candidates for trading in a secondary market.

In any case, the development of secondary markets is a policy option with significant limitations. First, the disposal of some NPL portfolios (for example, household mortgages on primary residences) may raise concerns at the political level regarding the manner in which the new owners of the NPLs will treat troubled borrowers (particularly the most socially vulnerable). Second, in the case of some SME loans based on soft information and trust, breaking up the relationship

between the borrower and its initial lender may imply large losses and potentially render the borrower's business unviable. Third, the transfer of NPLs outside the banking system may raise concerns about the shift of the corresponding risks to other sectors typically subject to lighter surveillance and a less stringent regulatory regime, and about creating a back door to the growth of the shadow banking system (Pozsar et al., 2013; Luck and Schempp, 2014; European Systemic Risk Board, 2016b).

AMCs can smooth the process by which NPLs exit bank books by detaching the bank's disposal of the NPLs from the final recovery of value from the defaulted borrowers and by acquiring the NPLs at higher prices than those achieved in decentralised fire sales. In fact, the creation of AMCs has been a frequent approach to the resolution of systemic NPL issues, typically, but not necessarily, with sponsorship and financial support from the public sector. In theory, the creation of these schemes can provide adequate incentives to banks not to evergreen their NPLs and to avoid fire sales (Aghion et al., 1999; Gorton and Huang, 2004; Diamond and Rajan, 2011; Bruche and Llobet, 2014). However, AMCs have shown limited success in addressing corporate restructuring and have led to successful disposal of troubled assets only in specific circumstances (Klingebiel, 2000). These circumstances relate to (i) the nature of the assets transferred (or backing the loans transferred) to the AMC (real estate assets typically working better); (ii) a lack of political interference in setting the transfer price of the assets as well as in determining which assets are to be transferred; and (iii) the application of adequate management skills and resources.[21] Furthermore, the use of AMCs to address NPL problems, especially if this involves implicit subsidies, has been identified as a possible source of ex ante moral hazard among banks (Terada-Hagiwara and Pasadilla, 2004; Bianchi, 2016; Chari and Kehoe, 2016).

[21] See Woo (2000) and Ingves et al. (2004) for a description and discussion of the main features that can contribute to the success of AMCs, including operational arrangements.

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