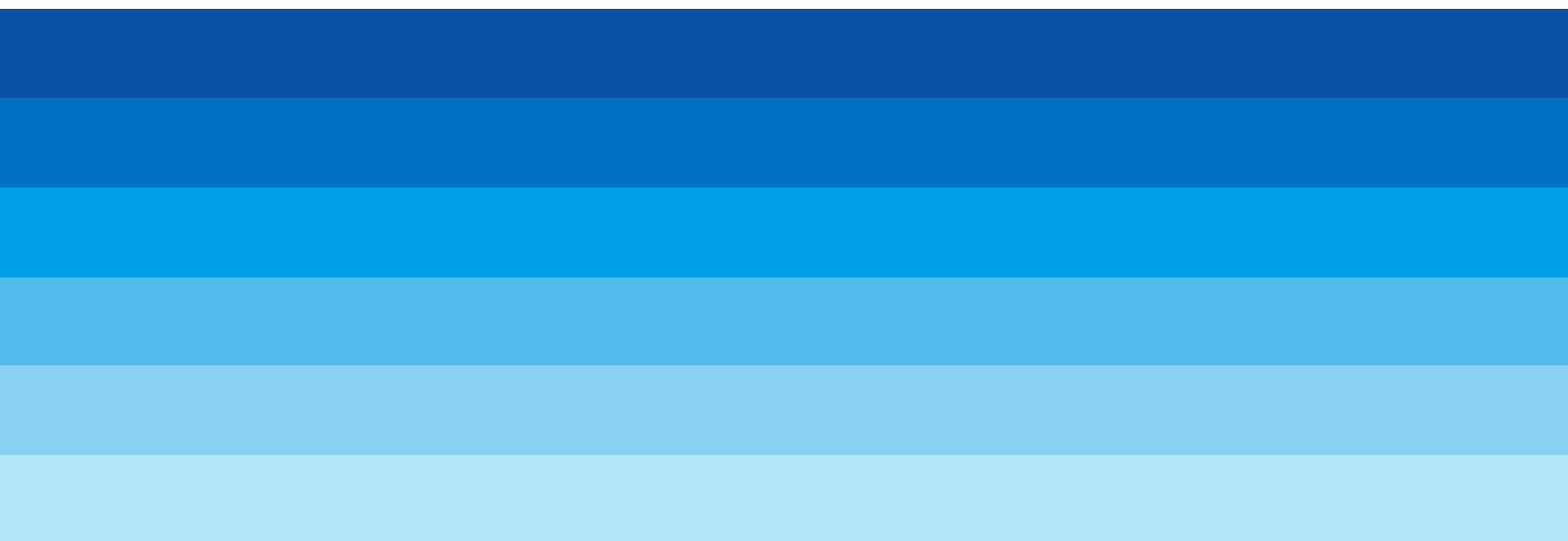


Working Paper
Number 12/22

Dynamic provisioning: a buffer rather than a countercyclical tool?

Economic Analysis
Madrid, October 22, 2012



Dynamic provisioning: a buffer rather than a countercyclical tool?

Authors: Santiago Fernández de Lis and Alicia Garcia-Herrero¹

October 22, 2012

Abstract

This paper analyzes whether dynamic provisioning systems act as a dampener -as intended- or as a buffer. After briefly reviewing the literature, we explain the rationale for dynamic provisions and analyze the experience of three of the few countries that adopted them: Spain, Colombia and Peru. We conclude that in the case of Spain, which is the only one where dynamic provisions worked over a complete cycle, the fact that market discipline only operated in the downturn implied that the system acted more as a buffer than as a dampener. We also observe that even rule-based systems tend to be applied in a discretionary way, since they require a very reliable calibration of the cycle "ex ante", an assumption that has proven unrealistic. The comparison of the Spanish system versus the Peruvian and Colombian raises interesting policy conclusions on whether dynamic provisioning should be applied differently to industrial versus emerging countries.

Keywords: Financial Stability, Macroprudential, Anticyclical,

JEL: E52, E58.

1: BBVA Research. sfernandezdelis@bbva.com; alicia.garcia-herrero@bbva.com.hk. The opinions are those of the authors and not necessarily those of BBVA.

We would like to acknowledge the useful comments provided by Augusto de la Torre, Tito Cordella and other participants at a LACEA Seminar. Juan Carlos Bejarano, Hugo Perea, Ana Rubio Juana Téllez and Victoria Santillana provided very useful input and comments. Remaining errors are obviously the authors'.

1. Introduction

The global financial storm which started in 2007 and which we are still experiencing is one of the very best examples in recent economic history of how much the financial system can exacerbate real economy cycles. Such pro-cyclicality has triggered a lively debate on which tools can be used to smooth this pattern, focused on macro-prudential policies.

There was limited experience in the use of macro-prudential instruments before the crisis. The most prominent examples are the use of Loan-to-Value ratios (LTV) in some Asian countries and dynamic provisions in Spain (see Caruana, 2010). The latter received a lot of attention and in the early stages of the crisis were seen as a model for the then incipient international regulatory reform.

But the debate shifted rapidly from provisions to capital and the reform crystallized soon in the adoption of a capital buffer in the context of Basel III, whereas the discussion on provisions languished and seems now in a deadlock. Two reasons explain this decreasing interest: the difficulties for accounting harmonization between the Americans and the Europeans, which partly explains why the Basel Committee took the easier route of capital; and the evidence, as the crisis deepened, that dynamic provisions did not prevent serious problems in certain segments of the Spanish banking system.

The analysis of the Spanish case raises now more complex issues than a few years ago: why was dynamic provisioning insufficient? Was a problem of design or application? Or were the bubble and the crisis too big to be addressed by this tool? Did dynamic provisioning have unintended consequences? In particular, did it delay the solution of the problems of saving banks? Was it a useful buffer, but not a genuine countercyclical tool?

This paper focuses in the latter question, but to do so we need to address the previous questions to a certain extent, since they are very much interlinked. The question of whether dynamic provision was a buffer or a dampener is closely related *inter alia* to the rules versus discretion debate. Under a formula-driven system, the required level of provisions would vary according to some predetermined metric. It would provide a preset discipline independent on judgment. However, its success will depend crucially on the possibility of calibrating the business cycle *ex ante*, an issue to which we will return later. A rules-based system is superior to a discretionary mechanism in situations where the policy maker faces a problem of lack of credibility of its commitment.

However, a rules-based system may face constraints that ultimately lead to discretionary adjustments. In particular, asymmetric market discipline (that fact that markets are too lenient in the good times and too strict in the bad times) may preclude the use of the accumulated buffer in the downturn, thus impeding the anti-cyclical compensation. We provide some evidence that this was a factor in the case of Spain: when liquidity dried-up and funding in the interbank market disappeared, markets required a higher level of own funds, limiting the anti-cyclical impact of dynamic provisions. To be fair, the sheer size of the crisis was also a factor limiting the compensation of rising NPLs, with the final effect that total provisions rose considerably in the bust, contrary to what was intended.

Spain is not the only country that adopted dynamic provisions, but it was the pioneer and the only one for which there is experience on a boom and bust cycle. In order to obtain more general conclusions we do not limit ourselves, however, to the analysis of the Spanish case, but compare it to two Latin American countries that adopted dynamic provisions in the late 2000s: Peru and Colombia. The comparison with these countries allows extracting more general conclusions on the pros and cons of alternative designs, and allows also considering whether there are particular aspects that need to be taken into account in applying this tool to emerging market economies.

2. Literature review

There is a wealth of reasons for the procyclicality of the financial system. A quick review is warranted to better understand which instruments could be more efficient to limit it.

First of all, the financial system is prone to have a more lax assessment of risk in good times than in bad ones influenced by the economy's general environment. The idea of short-sightedness in economic or financial decision making was introduced by Kahneman and Tversky (1973) and then developed more by Kindleberger (1978) and Minsky (1982), whose contribution was to explain why it is an inherent component of our financial system, branded as the "financial-instability hypothesis." The "excess or overlending which takes place during good times is then corrected during recessions.

Second, borrowers' net worth-as well as cash flow-is bound to be higher during upturns, facilitating their access to credit (Kiyotaki and Moore, 1997). In the same vein, the value of collateral is bound to increase in the good times and fall in the bad times. Such asset price dynamics-and the related wealth effects-clearly increase borrowers' capacity to obtain collateralized lending during booms. However, during the subsequent slowdown, it will become clear that the collateral backing the loans did not have the expected value.

Third, banks may also be intermediating the procyclicality of other markets in so far as their funding is more expensive, or even scarcer, in bad times, which translates into more expensive credit, and possibly, a smaller supply of it.

Fourth, investors-and thus financial institutions as intermediaries of savings-tend to show herd behavior (Rajan 1994; Devenow and Welch 1996) as mistakes are generally judged more leniently if they are common to the whole industry. This crisis has done nothing but confirm this idea.

Fifth, the classical principal-agency problem between bank shareholders and managers can also feed excessive volatility into loan growth rates. Managers, once they obtain a reasonable return on equity for their shareholders, may engage in other activities that depart from firm value maximization and focus more on managers' rewards. One of these strategies might be excessive credit growth in order to increase the social presence of the bank (and its managers) or the power of managers in a continuously enlarging organization (Williamson 1963).

Sixth, compensation policies are generally such that there is no need to have a classical principal-agency problem for managers of financial institutions to behave procyclically. Bonuses linked to business growth in good times and to business retrenchment in bad ones are probably a good enough reason for financial institutions to become very procyclical.

Seventh, human capital cannot grow as fast as a financial institution does in good times. In fact, when the economy booms, loan officers need to grant loans faster and, probably, in a less rigorous way. Furthermore, the more time that has gone by since the last downturn, the less prepared are loan officers to realize that the economic environment can change very quickly. This is what Berger and Udell (2003) have called lack of institutional memory.

Eighth, the increasing sophistication, harmonization, and automatization of risk management also add to procyclicality. If we take the example of Value at Risk (VaR) techniques, they basically transform large nominal amounts into much smaller values-at-risk. This reduces the perceived order of magnitude of risk exposures and gives a sense of comfort that may turn wrong. In fact, the current crisis proved that nominal and notional amounts do matter when looking at risk exposures. Furthermore, network externalities also increase risk assumption in the good times and propagate financial distress in the downturn.

Ninth, competition in the banking system leads to cross subsidization to attract clients, an important aspect of which is credit access even at the cost of relaxing credit standards. (Nys [2008] and Lepetit et al [2008]).

Finally, and very importantly, financial regulation may be an additional source of procyclicality. In fact, traditional loan-loss provisions are tied to loan delinquency. That means that in the good times financial institutions hardly need to provision, while they need to step up provisioning as soon as delinquencies appear. This obviously reduces their available capital and, thus, their lending capacity when it is most needed.

After such a long list of different reasons behind the procyclicality of the financial systems, it seems logical to think that it cannot possibly be eliminated fully but only mitigated. In the same vein, one single tool may not be able to address all of the sources of such procyclicality.

After limiting our expectations to what is achievable, it seems important to evaluate which is the most effective way to do it. One first question is whether we aim at a buffer or a dampener. A second question is whether measures to be taken should be rule-based or discretionary. A third question relates to which regulatory tool is better placed to mitigate procyclicality: provisioning or capital. We shall develop these questions in the next section.

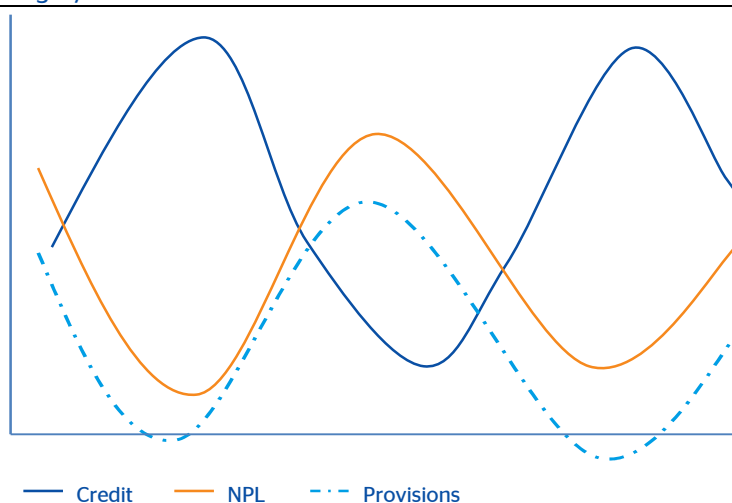
3. Goals and design of dynamic provisioning

3.1. The goals of dynamic provisioning

As can be seen in Figure 1, under a normal provisioning system provisions are a function of contemporary nonperforming loans (NPLs), although this may be smoothed by the possibility of using "generic" provisions based on the credit stock. In the upturn, when gross domestic product (GDP) grows above potential, credit growth also accelerates. Since business conditions are favorable, collateral prices are increasing and optimism is pervasive, debtors have in general no problem in servicing the debt, which is reflected in low Non Performing Loans (NPLs) and provisions. The low provisioning effort fuels low risk aversion and credit growth, thus feeding back economic growth. In the downturn the opposite spiral operates: the difficult economic environment is accompanied by high NPLs, which require a bigger provisioning effort. This in turn decreases risk appetite and feeds credit contraction. Hence the pro-cyclical pattern of normal provisions.

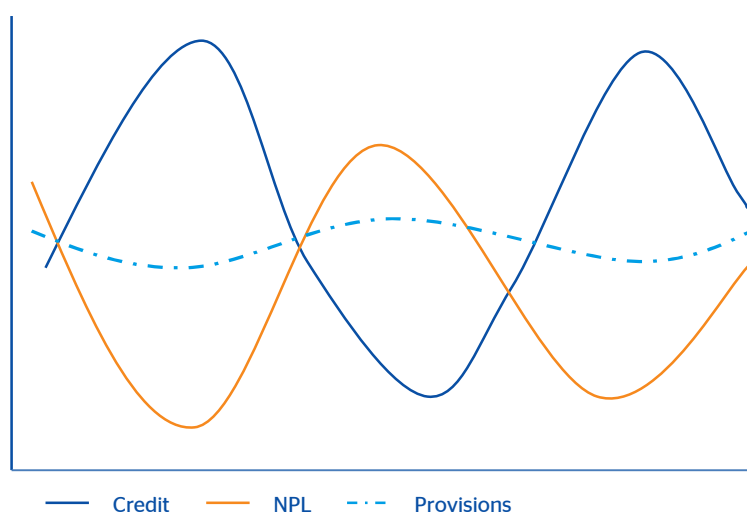
The objective of dynamic provisions is to smooth the provisioning effort along the cycle, as shown in Figure 2 below. How much? This is an open question. While the idea is to avoid the pro-cyclical effect of the normal system, a regulator would hardly aim at an opposite pattern of provisions (i.e. increase in the good times and decrease in the bad times), since risk is cyclical and this reality should be reflected at least partially in provisions. A reference would be to try to obtain an approximately flat provisioning effort along the cycle in terms of the ratio of provisions to credit. The chart below-which should be taken only as a reference-depicts provisions with a smoothed pro-cyclical pattern, although the degree of smoothing is in practice open to judgment.

Figure 1
Normal Provisioning Cycle



Source: Authors

Figure 2
Dynamic Provisioning Cycle



Source: Authors

3.2. A buffer or a dampener?

There are two possible approaches in which a regulatory tool of the nature of dynamic provisioning can be useful. First, it can create a buffer that would provide protection if systemic risk materializes. Second, it can help distribute the regulatory burden along the economic cycle more evenly, reducing the inherent procyclicality of the financial system. In the first case, the objective will be to set an absolute minimum, increasing the overall level of provisions. In the second case, the objective would be a better distribution along the cycle, without altering the overall level of protection in the long term.

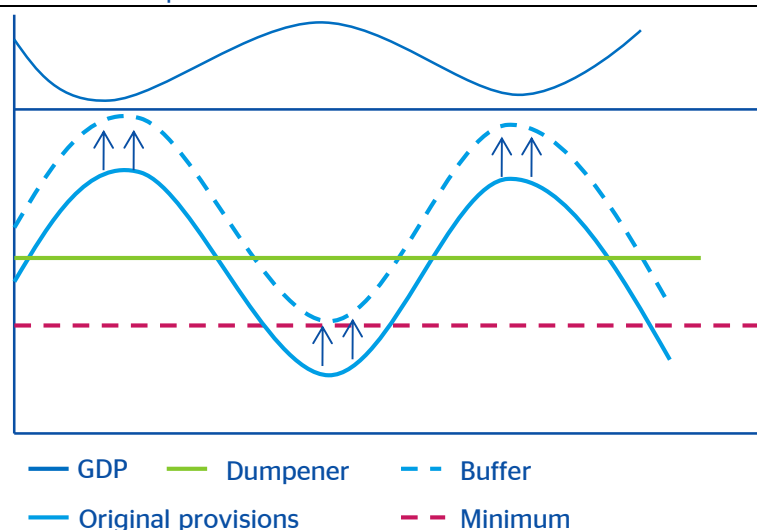
While both objectives may be complementary, their effect over credit and, thereby, economic growth should in principle be very different. Figure 3 depicts how provisionings would behave as a buffer versus a countercyclical tool. As mentioned in the previous section, a dampener would aim at a relatively flat provisioning effort along the cycle. However, if the objective is to

obtain a buffer that protects the financial system, then the objective would be to increase overall provisions along the cycle, but not necessarily to smooth their cyclical pattern.

Dynamic provisioning is an instrument designed in theory to smooth provisions along the cycle (and therefore a dampener). But in this paper we will argue that under certain conditions its impact could be more akin to a buffer.

Figure 3

Provisions: buffer versus dampener



Source: Authors

4. Existing experiences

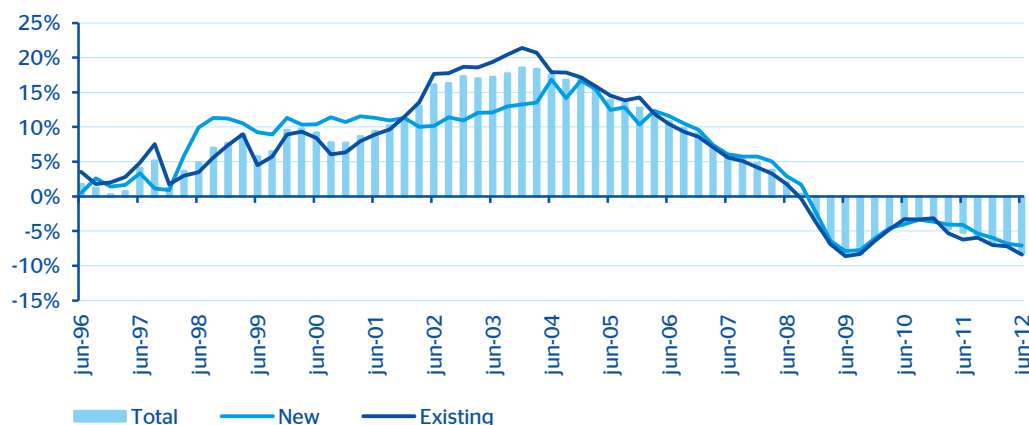
4.1. Spain

The introduction of dynamic provisioning in Spain should be seen in the context of the profound impact of the euro adoption in the Spanish economy. In the first ten years of the euro, the Spanish economy benefited from a significant reduction of risk premia, in particular those related to inflation and currency risk. The real long-term interest rate (defined as the difference between nominal rates and contemporary inflation) moved from a level of 4-5% in the 1980s and first half of the 1990s to around zero in the aftermath of monetary union.

The expansionary impact of the reduction in real interest rates on the Spanish economy was very significant. Domestic credit growth, which ranged between 5-10% in the mid-1990s, accelerated to rates above 15% in 1998-2000. House prices increased at an annual rate of around 10% in the same period (see Figure 4). Inflation accelerated from 1.9% in 1997 to 2.2% in 1999 and 3.5% in 2000. The differential in domestic demand growth between Spain and Germany in the early years of monetary union was around 3.5 percentage points. This differential reflected, in particular in the investment side, gains from price stability and policy credibility for Spain (and in general peripheral countries), whereas Germany, where credibility was already high, did not experience a similar effect.

The boom in domestic demand in Spain reflected also, however, very lax monetary conditions for Spain, which fuelled especially consumption growth. The European Central Bank kept interest rates in the late 1990s around 4%, a level which was consistent with average conditions in the Eurozone, but which was too low for the Spanish economy. This expansionary impact was compounded by the depreciation of the euro vis-à-vis the US dollar in the first years of EMU.

Figure 4
Housing Prices in Spain (yoy growth)



Source: Ministerio de Vivienda, Spain

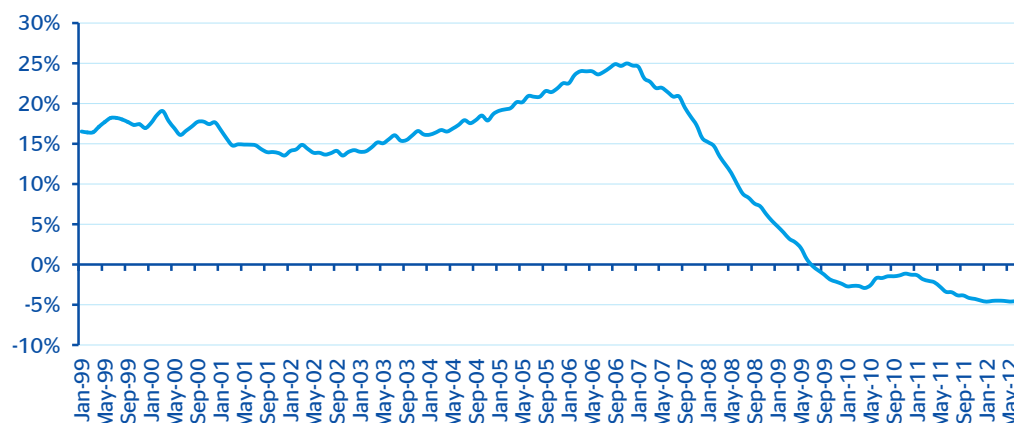
In the early years of the 2000s, therefore, the Spanish authorities saw with increasing anxiety the combination of high credit growth, inflation differentials with the Eurozone average, loss of competitiveness, and widening current account deficits. Monetary policy and the nominal exchange rate were no longer available as policy instruments. In this context, dynamic provisions (or statistical provisions, according to the denomination they received at the time) were seen as an instrument with a double objective: (i) to contain credit growth, by increasing the cost (in terms of provisioning effort) of the granting of new credit, and (ii) to protect Spanish banking institutions from future losses as a consequence of the relaxation of lending standards typical of the boom phase. The first objective was related to the dampener function, whereas the latter was closer to the buffer function. While the first objective was probably more important at the time of adoption of this system, the results-as we will see below-were much more satisfactory in terms of the second objective.

Dynamic or statistical provisioning was therefore a truly macroprudential tool, in the sense that a prudential instrument (provisions) was used to achieve a systemic or macroeconomic goal (limiting credit growth). As concerns the second objective, it was mostly addressed at ensuring an adequate protection to individual institutions (and therefore could be seen as a microprudential tool), but to the extent that excessive risk assumption was partly a result of herd behavior and collective myopia by credit institutions, it had also a certain macroprudential component.

How was the system designed and how did it work?

Credit growth stabilized at around 15% annually after the introduction of dynamic provisioning in 2000, and decreased slightly between 2001 and 2003. It is difficult to assess however to what extent this was related to the new provisioning system. Most probably the impact of the burst of the dotcom bubble was more relevant in this period. After 2004, however-coinciding with a reform of the provisioning system towards more laxity-credit accelerated sharply and reached rates of growth close to 25% in 2006. The impact of the global financial crisis since mid-2007 implied a sharp contraction of both GDP and credit, which showed negative growth rates since 2009 in the context of a deleveraging process. To understand these patterns it is useful to recall how the system was designed and how it was reformed in 2004.

Figure 5
Spain: credit growth



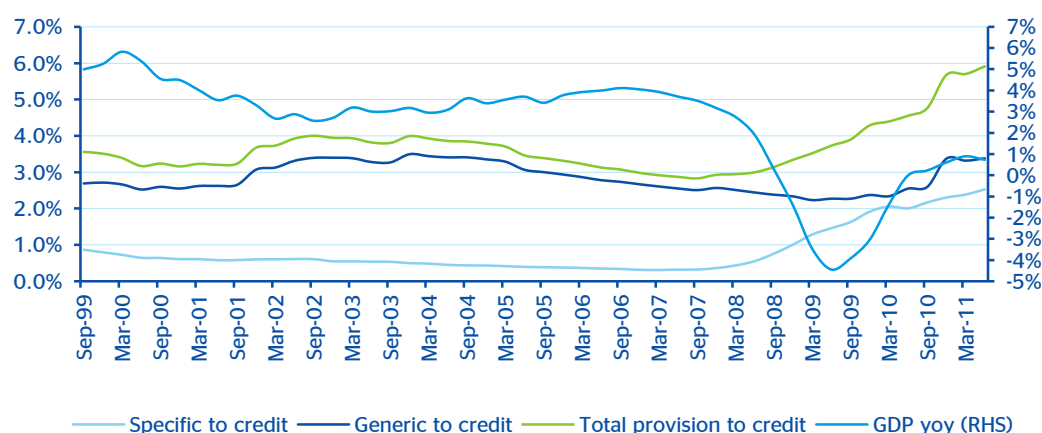
Source: Ministerio de Vivienda, Spain

Initially the reform of 2000 was based on three types of provisions: specific, generic (both already existing), and statistical (introduced in 2000). Specific provisions depended on current bad loans; generic provisions were 1% of the credit stock; and statistical provisions were designed to offset specific provisions and depended on credit growth.

This mechanism was criticized on several grounds: First, by international accounting bodies, which argued that it implied profit smoothing along the cycle and masked the real situation of the banks. Second, Spanish financial institutions complained about being subject to higher provisioning requirements than their competitors, being put therefore at a disadvantage in the single European market for financial services.

By 2004 there was a sense that the accumulation of provisions was excessive. By that time, they reached a level of more than 2.5% of credit (of which less than 0.5% was specific provisions, i.e., related to contemporary bad loans), as can be seen in Figure 4 below. Furthermore, the coverage of provisions over bad loans reached nearly 500%.

Figure 6
Spain: Provisioning to Credit and GDP* (left scale in % of credit; right scale in % growth)



* (Left scale in % of credit; right scale in % growth)
Source: Banco de España.

For this reason, and also to counteract the criticism by international accounting bodies, the system was reformed. The changes basically implied the integration of the generic and the statistical provisions and the reduction of the limits to the accumulated fund. According to the formula:

$$\text{Generic provisions} = \alpha \Delta \text{Credit} + \beta \text{Credit} - \text{Specific provisions}$$

$$\text{Where} \quad 0 \leq \alpha \leq 2.5\%$$

$$\text{and} \quad 0 \leq \beta \leq 1.64\%$$

Δ stands for change

The coefficients of the different types of assets were as shown in Table 1 below.

Table 1:
Coefficients Applied to Dynamic Provisioning

Type of risk	α	β
No apparent risk	0.0%	0.00%
Low risk	0.6%	0.11%
Low-medium risk	1.5%	0.44%
Medium risk	1.8%	0.65%
Medium-high risk	2.0%	1.10%
High risk	2.5%	1.64%

Source: Fernández de Lis, Martínez, and Saurina (2001).

The limits of the Generic Fund, which was the result of accumulated provisions, were set between 0.33% and 1.25% of the alpha. Since a number of institutions were at that time (2004) at or very close to the upper limit, this implied the liberation of €14 billion from the Generic Fund. These "liberated" provisions were, however, not distributed as profits, but consolidated as reserves. In the subsequent quarters, as more institutions reached the upper limit of the Generic Fund, and credit accelerated over 25% annually, the ratio of total provisions to credit went down, from 2.5% in 2004 to 2.2% in 2007.

To a certain extent, the 2004 reform can be assessed in retrospect as a "lack of faith" in the dynamic provisioning system, which was innovative, with no precedent and no similar system in any other country, contested by the banks and by the international accounting bodies. The Spanish authorities started wondering whether the system could be explosive and whether there would be limits in the accumulation process. Had the authorities knew the magnitude of the shock that was incubating-and that would erupt in 2007-they would probably not have changed it, or at least not set the limits so close to the then prevailing levels.

The events since 2007 show a dramatic turn. GDP and credit dropped rapidly to negative rates, NPLs started rising swiftly, and specific provisions grew tenfold from the summer of 2007 to the end of 2010. As expected in an anti-cyclical mechanism, the accumulated fund was used to compensate the increase in specific provisions, so that generic provisions decreased initially, but not sufficiently to compensate for the increase in specific provisions. Total provisions to credit in early 2009 exceeded the maximum reached in 2004, also due to the rapidly decreasing credit growth as the global crisis hit Spain. This limited use of generic provisions in the downturn can be explained by the prudence of financial institutions (which were aware that the worst was yet to come) and the authorities' guidelines (aimed at limiting profit distribution when the impact of the shock was starting).

A reform was introduced in 2009 which shortened the period for recognition of expected losses in NPLs and allowed for a more proper use of collateral to measure the severity of the losses. The first measure implied a more demanding losses recognition, whereas the second reduced the provisioning effort, depending the net effect of the features of each financial institution.

A rapid deterioration was observed in 2010, as the Eurozone crisis spread to peripheral countries and wholesale financing dried up except for the most solvent institutions. Spanish savings banks were particularly affected by this rapid worsening of financing conditions, which implied that most of the smaller institutions were not able to renew the substantial maturities of bonds, covered bonds and other paper. Under the auspices of the Bank of Spain, a series of mergers between savings banks took place, to strengthen their balance sheet and facilitate a restructuring of the sector, using in some cases public money to facilitate the process. These mergers helped to break the link with regional governments in the corporate governance of Spanish savings banks and provided a catalyzer for capacity adjustment. But in some cases the mergers also exacerbated the problems, by combining institutions with serious problems of rising NPLs and huge funding needs. The mergers also allowed for some capital gains, which were used to recapitalize the new institution and indirectly to increase generic provisions.

In these circumstances, when market discipline required a capital increase, it would not have been prudent to use the generic provision to distribute more profits. Total provisions increased therefore from 3.4% of credit to 5.7% in 2010, a rise one would have hardly foreseen under an anticyclical mechanism.

In 2012, as the crisis deepened, the nature of provisions changed dramatically. Especial provisions were approved for real estate assets, including a "new generic" provisions for the "healthy" real estate portfolio. The old generic provisions were used to cover new requirements, disappearing in practice. This period is not covered in this paper.

Some preliminary lessons emerge from the Spanish case. First, dynamic provisions helped creating a cushion in the good times, but hardly discouraged credit growth or rises in house prices in the boom. When the size of the boom is big enough, the impact of an additional provision on credit supply is marginal. Second, the Spanish system—although being rule-based—allowed for some discretion. Despite the fact that the Bank of Spain has a very complete and reliable data set of credit and NPLs, based on a long standing Credit Registry, the difficulty in calibrating the cycle "ex ante" is clear from the comparison between the expected and the actual functioning of the system. This explains why the rules were changed in the middle of the game. Third, when the crisis hit, accumulated provisions were initially used to smooth the impact of total provisions as expected; but as the markets (whose discipline was absent during the good years) required higher capital ratios, it became evident that excess profits distribution was not appropriate (neither possible for some institutions), implying a steep increase in provisions in the bad times, which was compounded by the impact of saving banks mergers. This upward pattern in the upturn questions the supposedly anti-cyclical features of the system.

The aggravation of the Eurozone crisis in 2011 led to intense market pressures for the recapitalization of European banks, which finally led EU authorities to increase significantly capital requirements, to 9%. In this exercise, dynamic provisions were not recognized as capital by the European Banking Authority (EBA), on grounds of harmonized European definition, questioning further the usefulness of the Spanish anti-cyclical regulation.

The increase in capital in the middle of a profound crisis, as a result of market pressures, is at odds with anti-cyclical policies. To assess the impact of an asymmetric market discipline, a simulation exercise is done in the next section, with an update of the initial simulations done in 2000, when the system was designed.

The impact of asymmetric market discipline in the downturn: a simulation exercise

To extract lesson from the Spanish experience with dynamic provisions it is important to analyze to what extent the differences between the functioning of the system and the initial expectations were due to general flaws in the design of the mechanism or to specific factors related to the recent Spanish boom and bust.

The simulations included in the Bank of Spain working paper by Fernández de Lis, Martínez and Saurina (2001) [in what follows FM&S 2001] are a good proxy for what did the Bank

expect from the system. In this section we compare these simulations with what actually happened, and we also include an alternative simulation on the asymmetric functioning of market discipline to illustrate the impact it would have of dynamic provisions over the cycle.

With the benefit of hindsight (and despite the fact that the downturn has not finished yet), three features of the recent credit cycle in Spain stand out:

The boom was longer and more intense than expected. This led to an accumulation of provisions far above initial expectations which, in a context of doubts about the end of the boom (those were the days of "the great moderation") and criticism to the system both domestically and internationally, led to the reform in 2004, which reduced the pace of provisions' accumulation (see figure 4). Whereas in FM&S 2001 the length of the initial boom was 4 years, and the average annual credit growth was 13%, in reality it lasted 8 years and the average annual credit growth was 16% (see table 2). This implies that accumulated credit growth in the boom phase was 76 points above initial estimates.

The bust was also much sharper than expected. In the initial estimates made in 2000 the crisis period would last 4 years and the average annual credit growth would be 6%. At the time of writing, in the fourth quarter of 2011, the crisis already lasted 4 years and the credit crunch was considerably sharper than expected, with almost stagnant credit.

As explained in the previous section, market discipline avoided the use of the accumulated provisions in the downturn. This implied that dynamic provisions worked asymmetrically, with little or not anti-cyclical effects in the downturn.

Table 2

Boom phase and crisis: expectations and actual developments

	Boom phase		Crisis	
	Years	Average annual credit growth	Years	Average annual credit growth
Expected ²	4	13%	4	6%
Observed	8	16%	4+	1%

Source: Authors

One interesting exercise is to try to introduce in the simulation done in FM&S 2001 the idea of an asymmetric functioning of market discipline. This is done through a limitation of profits distribution in the downturn: during the 4-year recession period (from year 5 to year 8 in Figure 5) profits distribution is reduced to 25%³ of what would have been achieved had the full use of generic provisions been allowed. This constraint in profits distribution can be seen as the result of several forces:

In the early stages of the crisis, the combination of (i) a prudent use of the accumulated fund by the banks, that were aware that the crisis was going to be long and intense and (ii) moral suasion by the Bank of Spain, who did not want to see the accumulated fund be used to increase dividends at a time when capital increases were necessary.

In a later phase, international financial markets demanded higher capital to provide access to funds (in the form of equity, hybrid capital or bonds) and/or the renewal of maturing debt, especially for institutions seen as weaker. This forced the banks and especially savings banks to retain profits and to make a less generous use of the generic fund than foreseen in the original system. This impact was exacerbated by the savings banks mergers process, which permitted some capital gains.

Figure 5 includes the original simulation realized in 2000, in which the newly introduced statistical provision was designed to smooth the pro-cyclical pattern of the old system to obtain an approximately constant provisioning effort along the cycle, together with a new simulation based on limits on profits distribution in the crisis. The line "market discipline in the downturn"

² FM&S (2001)

³: This is an arbitrary level, just to illustrate the effect.

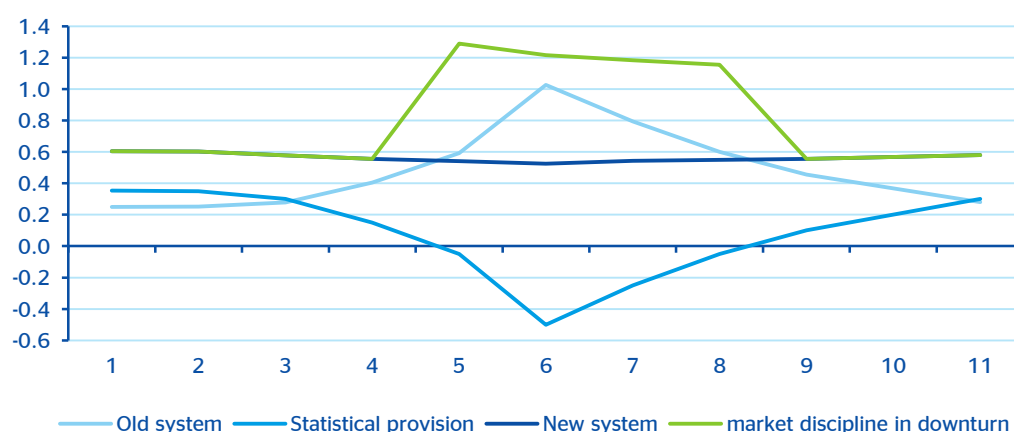
illustrates how in the bad times the use of the accumulated fund was partly precluded by market discipline. The result is that the profile of provisions over credit is relatively similar to the old system, but with a higher level.

The conclusion is that dynamic provisions, as originally designed, did not avoid pro-cyclicality, but provided a cushion (buffer) that was useful in the bad times. If dynamic provisions were meant to lead to a constant level of provisions over credit along the cycle, the constraints on profits distributions in the downturn need to be factored into the system.

It is unclear, however, to what extent these results have a general applicability or were a consequence of the specific features of this crisis and/or the Spanish specificities. The recent cycle has certainly been characterized by a particularly myopic lack of market discipline in the Eurozone in the good times and a specially harsh market discipline in the downturn, exacerbated by the lack of transparency on the true situation of financial institutions in the EU and the ensuing drying up of certain segments of the interbank markets. More research needs to be done on the asymmetric working of market discipline and its impact on the design of anti-cyclical tools like dynamic provisions.

Figure 7

Provisions over credit. The impact of market discipline in the downturn



Old system, statistical provision and new system based on Fernández de Lis, Martínez and Saurina (2001). The line titled "market discipline in downturn" based on own calculations according to a limit on profit distribution in the years 4 to 8 (25% of the initial assumption).
Source: Authors

4.2. Colombia

In 2007 Colombia adopted a model of dynamic provision for commercial and consumer loans, which represent about 90% of the total outstanding loan portfolio. The banking regulator implemented reference models for commercial and consumption credit risk. Although each bank could use its own credit risk model, which must be approved by the regulator, at present all banks are using the reference model. This model was reformed in 2010.

The 2007 reference model established three types of provisions: Individual, countercyclical, and generic provisions. Individual provisions reflected the characteristic risk of every borrower and every type of loan, and can only be used if the loan becomes nonperforming. Countercyclical provisions covered changes in borrower's credit risk due to changes in the economic cycle and had the same characteristics as individual provisions (both were in fact included in the same balance account). This consideration of countercyclical provisions as a especial type of specific provision is crucial for its tax deductibility, according to international accounting standards. Finally, generic provisions were at least 1% of the total loan portfolio and could be used to meet countercyclical provision regulation requirements.

Once the model of countercyclical provisions was implemented there was a dramatic fall in generic provisions. In fact, the system was criticized since the increase in individual provisions, through countercyclical, was compensated in part by the reduction in generic provisions.

The system, that was initially highly discretionary, was reformed in April 2010 towards a rules-based mechanism. The reform implied (i) for commercial and consumption loans, the breakdown of the individual provisions into two components, one pro-cyclical and another countercyclical, with no generic requirement and (ii) for the remainder of the loan portfolio (concentrated in housing), the continuation of the old system of individual (with no countercyclical component) and generic provisions, the latter set at 1% of the credit stock.

How was the system designed?

The regulator, using historical data, calculates two risk scenarios, A and B (where B is a riskier scenario). The outputs of this calculation are two default probability matrixes which contain default probabilities for every type of credit and borrower. Provisions, based on expected losses, are the result of:

$$P = OVL * PD * LGD$$

Where:

OVL = Outstanding Value of the Loan

PD = Probability of Default

LGD = Loss Given Default

Under the original system, the regulator decided every year which matrix should be used to compute individual provisions. During years of high credit and economic growth, matrix A was used to determine the accumulation of individual provisions and matrix B was used to calculate the riskier scenario provisions, so that countercyclical provisions were the difference between the riskier scenario provisions and the individual provisions. During years of low growth matrix A was used to calculate individual provisions and there was no accumulation of countercyclical provisions. In the system applied from 2007 to 2010, the regulator could also exercise discretion in determining when banks can use countercyclical provisions to compensate the increase in individual provisions during an economic downturn. Since there were no rules determining the change of state or the use of the provisions, which depended on the regulator discretion, the system was criticized for introducing a great uncertainty.

The reform of April 2010 introduced clear rules as a response of this criticism. The countercyclical provisions can be subject to two situations (activation or depletion), based on four indicators:

1. Deterioration of the portfolio, based on the variation of individual provisions.

$$\Delta Provisions = (provisions_t / provisions_{t-3}) - 1 \geq 9\%$$

2. Efficiency, based on the ratio between provisions net of recoveries and interest income.

$$PNR / IxC \geq 17\%$$

where *PNR* = provisions net of recoveries

IxC = interest income

3. Stability, based on the ratio between provisions net of recoveries and gross financial margin

$$0 \leq (PNR / MFBa) \geq 42\%$$

where *PNR* = provisions net of recoveries

$MFBa$ = operational margin before depreciation and amortizations plus provisions net of recoveries of the credit and leasing portfolio

4. Growth of the credit portfolio

$$\Delta CB = (CB_t / CB_{t-1}) - 1 < 23\%$$

The indicators are defined in such a way as to indicate the downturn of the cycle. For each of them, there are precise reference values that trigger the suspension of the accumulation mode. In the default situation, if any of the four indicators is not met, the entity will be subject to accumulation of anticyclical provisions (this will correspond to the cyclical upturn). If the four indicators are met for 3 consecutive months, the entity will enter the depletion phase, where the accumulated provisions are run down (this will correspond to the downturn of the cycle).

It is interesting to note that the fourth indicator roughly corresponds to the same concept than the Spanish system (credit growth). In this regard, the Colombian system is more demanding than the Spanish one, since the normal situation (by default) will be the accumulation mode. In particular, the third indicator (stability) is so demanding that the perception of the institutions is that only banks that are in real difficulties will be allowed to use the provisions.

Contrary to the Spanish case, there are no precise limits to the accumulated funds. The limits are implicit however in the values of the coefficients of matrixes A and B for each type of loan.

As in the system introduced in 2007, in the good times, when both types of provisions are activated (pro-cyclical and anti-cyclical) the coefficients used for the overall provisioning effort will be those of matrix B. The difference introduced in 2010 is that the counter-cyclical component is now subject to a minimum which is the product between the provisions of the previous period (quarter) and the exposure of that particular loan.

When the depletion mode is activated, the use of existing provisions is based on a formula that calculates the pro-cyclical component (in this phase, the counter-cyclical component is in off mode). This formula applies the coefficients of matrix A only to the best credit quality loans, whereas matrix B (more demanding) is used for lower credit quality loans. The implication is that, even in the bad times, the provisioning requirements of lower credit quality loans are also relatively stringent.

All in all, the 2010 reform implied a profound change in the Colombian provisioning rules, which moved from a discretionary to a rules-based system. The system is complex and demanding, having established by default the activation of the counter-cyclical component, which is meant for the good times. The complexity of the system is partly related to the fact that the counter-cyclical component is linked to each loan, and not (like in the Spanish and the Peruvian systems) included in generic provisions, a feature that is related to the aim of maintaining the tax deductibility of specific provisions. One open question is whether this system, introduced at a time of relatively strong economic growth, will be appropriate for a crisis period.

4.3. Peru

After the emerging markets crisis of the late 1990s, which led to a credit crunch in Peru until 2003, the Peruvian economy began a period of rapid economic expansion. Although initially fueled by exports, this boom was later related to private investment and consumption fueled by a credit boom.

Credit to all types of clients showed significant growth rates in this period, in particular that to higher-risk agents such as micro-firms and consumers (over 30% year on year growth [yoy]). In this context, and even though credit over GDP was still relatively low (compared to other countries in the region), due to the limited bankarization, concerns grew on whether these rates could be unsustainable or could partly be related to a less rigorous banks risk

assessment. The authorities started considering the idea of introducing business cycle-adjusted provisions as a tool both to moderate credit expansion and to generate a buffer. In 2008, in the context of very high GDP (9.8%) and credit growth (36%), changes in generic provisions were introduced. This change partly turned voluntary provisions banks had accumulated in the last two years into permanent provisions.

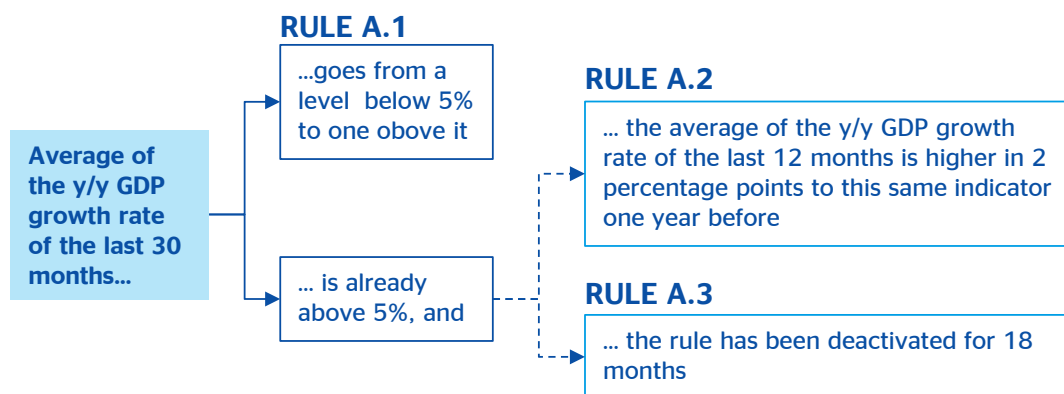
Cyclical provisions are activated and deactivated according to an automatic mechanism that will be described later. The system was activated in November 2008 for 10 months (until September 2009, when it was deactivated) and activated again in September 2010 (for 12 months until mid-2012).

Since December 2008, the generic rate depends on the type of debtor (commercial, micro-firms, consumers, or mortgage) and is not homogeneous anymore: 0.7% in the case of all commercial and mortgage "normal" loans, and 1% in the case of all micro-firms and consumers "normal" loans. With this change, generic rates now penalize more those (riskier) loans that have historically shown a higher non-performance rate. Secondly, cyclical provisioning was introduced, primarily aiming at moderating credit growth rates and reducing the probability of eventual consumer over-indebtedness.

How was the system designed?

The Peruvian financial supervisor/regulator (Superintendencia de Banca, Seguros y AFP, SBS) has set a rule based on GDP growth. In this way, cyclical provisioning is activated when the rate of growth of GDP exceeds a certain threshold (in boom periods), which is related to an estimation of potential output growth. Figure 6 below illustrates the rule.

Figure 8
Cyclical Provisioning Activation



Source: SBS and authors

The cyclical provisions are part of generic provisions (and therefore not related to individual loans, contrary to the Colombian system). When cyclical provisioning is activated, generic provision charges increase (although this depends on the type of debtor). Table 3 below shows how these charges changed when the cyclical provisions were launched in 2008.

Table 3
Provisioning Rules

Type of debtor	Since December 2008 Generic rate (in %)	
	When the rule is not activated	Additional when the rule is activated (cyclical)
Commercial	0.7	0.5
Micro-firms	1.0	0.5
Consumers	1.0	1.0
Mortgage	0.7	0.4

Source: SBS

Rates on additional generic provisions were based on data from the last episode of financial crisis in the late 90s. They were therefore calibrated for a stress situation. In times of economic slowdown, on the other hand, the rule is deactivated and generic rates are reduced.

It should be noted, however, that although additional accumulated generic provisions cannot be directly allocated to profits, the possibility of using them to cover other required provisions reduces the provisioning effort banks need to make during the cycle's downturn. Thus, they indirectly benefit banks profits in bad times, smoothing them over the cycle.

Why is the rule based on GDP? Why not credit (a banking system variable)? According to the SBS, it is assumed that GDP precedes credit (this is confirmed by BBVA Research estimates, according to which there is a 3 quarters lead of GDP over credit). In this sense, credit growth would not be a good variable to anticipate future bank losses, which reduces the suitability of this variable as a leading indicator.

Another issue to consider is that a GDP based-rule is systemic. This means that its activation does not depend on a bank's behavior, but on the economy as a whole. For this reason, the effect could be asymmetric on banks: it could be the case that a more prudent bank would have to increase generic provisions⁴.

Since January 2010, regulators asked financial institutions to classify loans into eight groups (by debtor type), instead of the former four groups. The aim of this was to increase the homogeneity of loans in each credit type, which favors the accuracy of the assessment that can be made and therefore enhances risk management. Provisioning charges now are as shown on Table4.

Table 4
New Provisioning Rules (from January 2010)

Type of debtor	Generic rate (in %)	
	When the rule is not activated	Additional when the rule is activated (cyclical)
Corporate	0.7	0.40
Large firms	0.7	0.45
Medium firms	1.0	0.30
Small firms	1.0	0.50
Micro firms	1.0	0.50
Consumer revolving	1.0	1.50
Consumer Non-revolving	1.0	1.00
Mortgage	0.7	0.40

Source: SBS

4: There is another regulation for consumer loans which makes generic provisions more institution-specific, forcing lenient banks to increase them if they lend to over-indebted clients.

5. Comparison between Spain, Peru, and Colombia

The first important difference between the three systems is how are they activated or deactivated (see Table 4 below for a full comparison). The three systems are in theory rules-based, but the definition of the rules is very different as well as their practical implementation. The Spanish system, for example, was adjusted in the upturn (2004) to make it more lenient; it was reformed again in the downturn phase (July 2009), in an ambiguous direction, some aspects of the reform implying a harsher treatment whereas others were relaxed, being the net impact institution-specific. A lesson in this regard would be that even the rules-based systems would inevitably be applied in a discretionary way.

One important difference between the three systems is the variable chosen to calculate the amount of provisioning. The Spanish system is based in credit whereas the Peruvian system is based on GDP. In Colombia a complex set of indicators is used, including the increase in NPLs, credit growth, efficiency and stability. These differences have important implications. First, provisions under the Spanish and Colombian system are based on the performance of each institution, whereas in the Peruvian system the activation or deactivation of the mechanism is common to the whole system.

Choosing a path which is common for all banks may have different implications for institutions depending on their strategy, their geographical or client specialisation, or their efficiency and profitability. Some may be gaining market share and others may be shrinking, but a system that is not institution-specific will tend to treat banks similarly (although the size, variation, or riskiness of their portfolio will imply of course differences in provisions even in system-based mechanisms).

Under the Spanish and Colombian systems, some banks may be increasing generic provisions while others are reducing them (for instance because the former are gaining and the latter are losing market share, or because there is an asymmetric negative [positive] shock in the latter [former] geographical area). The Peruvian system is activated for the system as a whole, although its impact on each institution depends on the riskiness of its portfolio. This implies that an institution losing market share, or with a more prudent lending policy, or which is experiencing a negative shock in its area of activity will be forced to provision above the normal level, simply because GDP is growing above a certain threshold.

The implications of the above are interesting from a competition point of view. On the one hand, one possible criticism of the Spanish system is that it could penalize institutions that are gaining market share because they are more efficient. On the other hand, the Peruvian system can be criticised for penalizing institutions that are more prudent. It also treats differently small and big institutions. The bigger (more systemic) a firm is, and the more diversified geographically, the less likely it is that you will face a rate of expansion very different from the average. In this regard, the Peruvian system could have a certain bias against smaller and local institutions.

The choice of GDP as an aggregate variable also poses some questions. Even if one opted for an aggregate variable, credit would seem more naturally linked to banking activity than GDP and it is directly linked to banks' behaviour (whereas GDP is not a variable to which the banking system has any direct impact). On the other hand, in countries in the process of financial deepening (like Peru or Colombia) a high credit growth is not necessarily a signal of excess in the financial sector, but may be a result of a healthy financial inclusion process. From this point of view the Peruvian system could be more tailored to the needs of emerging market economies (whereas in the case of Spain financial inclusion is not an issue and high credit growth can be considered a *prima facie* indicator of financial excess).

Another important difference lies on the sources of the data. Credit is a banking statistic and, therefore, much easier to use by the central bank and/or supervisor, whereas GDP is an

estimate normally calculated by the statistics agency. Interestingly, Peru's choice of GDP coincides with its exceptional division of labour in terms of statistics: GDP is calculated by the central bank and this is done monthly (which is also exceptional, and raises some reliability issues).

Another difference lies in the fact that specific and generic provisions can net off. In the Spanish case this compensation is in principle automatic (although, as we are seeing now there is a certain room for discretion, both for the institution and for the supervisor, in the use of the generic provisioning in the downturn). The benchmark is to try to reach a constant total provisioning effort along the cycle. Constant overall provisions along the cycle are arbitrary, but any other objective would probably be even more arbitrary. In the Peruvian and Colombian cases there is no such benchmark. Banks are only required to provision more in the boom phase, without any real reference. In the case of Colombia, the default situation is established in the accumulation mode, which, together with the strict definition of the four indicators in which the change of state (to depletion mode) is based, implies a certain asymmetry and raises some issues about the suitability of the mechanism for the bad times.

One important aspect is tax deductibility. Peruvian provisions are not tax deductible, in line with their generic nature, whereas in Colombia countercyclical provisions are an especial type of specific provision, which permits their tax deductibility according to international accounting standards. In the Spanish case, generic provisions are deductible with a limit of 1% of credit (based on the old generic definition before 2000).

Table 5:
Dynamic provisioning in Spain, Peru, and Colombia

	Spain	Peru	Colombia
Introduced	July 2000	November 2008	June 2007 (commercial) June 2008 (consumption)
Based on	Rule: Credit (stock and growth)	Rule: GDP	Rule based in 4 indicators
Discreet/continuous	Continuous	Discreet (on/off)	Continuous
System vs. institutions	Institution- specific	System-based	Institutions specific
Thresholds	Fund limits: 10%-125%	Potential GDP (5%) implicit minimum threshold. Change in GDP growth also plays a role	Implicit threshold in the provisioning coefficients set by the authorities
Symmetry	Yes, generic provisions can increase or decrease	Yes, "pro-cyclical" provisions can increase or decrease	The use of provisions in the downturn is subject to considerable constraints
Use: individual or general	General. Can smooth profits in the downturn	General. Can smooth profits in the downturn	Individual
Amount	Depends on specific provisions, credit level, credit growth and riskiness of portfolio	Depends on riskiness of portfolio	Depends on specific (individual) provisions and riskiness of portfolio
Tax deductibility	Yes (1% limit)	No	Yes

Source: Authors

6. Conclusions

In the case of Spain (the only country that experienced both a boom and a bust under this system), the adoption of dynamic provisions was related to two objectives: (i) to smooth credit growth (a dampener) and (ii) to allow for the creation of a buffer that provides additional security. The first objective (dampener) was probably more important at the time of adoption, but the results "ex post" were more satisfactory as regards the second objective (buffer). Although the stock of dynamic provisions which had accumulated since it was introduced in 2001 provided some leeway when the crisis started, the size of the shock was so big that the buffer was exhausted before the crisis ended. After the initial phase of the crisis, a substantial increase of provisions was registered, limiting seriously the anticyclical effect in the downturn. It cannot be denied that the accumulated fund provided some margin for policy action but it might ironically have only helped extend the inaction, increasing the duration of the crisis and its related costs.

Another key question, related to the design of an anti-cyclical device, is whether it should be rules-based or discretionary. The inherent risk of the authorities lacking a credible commitment argues in favour of rules. Rules, however, require a very reliable calibration of the cycle "ex ante", an assumption that has proven unrealistic with this crisis and offered room for some discretion. The policy implication is that there are inevitable mistakes in forecasting the crisis and in adapting these forecasts to new information, with the final result that the authorities tend to incur the same biases than in a discretionary system: excessive complacency in the good times and excessive harshness in the bad times.

This is compounded by asymmetric market discipline, which tends to preclude the use of accumulated funds in the downturn: since markets are, in a crisis, extremely sensitive to capital levels, they introduce powerful incentives not to use the accumulated fund. These incentives are more powerful the more dependent are banks from funding in global markets (as was the case in Spain). The accumulation of reserves in the good times that are not fully used in the bad times leads to a pattern above the old provisioning cycle, but with a higher level: in other words, a buffer.

It is interesting to note that rules fit better with the buffering function and discretion fits better with the dampening function. This is because deciding the level of a buffer and maintaining it in different business cycle conditions seems easier than designing "ex ante" anti-cyclical policies that are robust to changes in the cyclical patterns.

The comparison of the Spanish system to those of Peru and Colombia also raises interesting policy conclusions on to what extent dynamic provisioning should be applied differently to industrial versus emerging countries:

- The Peruvian system, which was more rules-based than the other two, was also more stable. The Colombian system, which was in its origin totally discretionary, evolved to a more rules-based one. The implication is that all regulators prefer to commit to a predictable behaviour, but not all systems are equally resistant to the temptation of adjustment.
- The fact that Peru opted for GDP instead of credit as the key variable implies that the system allows for financial deepening. GDP has also the advantage, at least in some countries, of being a leading indicator of credit. On the other hand, it has the drawback of neither being a banking variable, nor one provisions have a direct impact on.
- Another important feature of GDP as compared to credit is that it is an aggregate variable and not bank-specific. A system wide mechanism (like the Peruvian one) would be coherent with the idea of having to deal with a systemic problem, but it has implications in terms of competition and equal treatment that need to be considered carefully. Institution-specific mechanisms, like the Spanish and Colombian ones, introduce better incentives on the behaviour of individual banks.

Finally, any solution to the pro-cyclicality problem needs to maintain the equilibrium between making regulation more anti-cyclical while at the same time reinforcing transparency of banks' accounting statements. It is important to keep in mind that this crisis has been the result of (i) pro-cyclical financial system behaviour and regulation, but also of (ii) opaqueness of financial institutions, which implies that both aspects need to be addressed in the ongoing reforms. Reinforcing anti-cyclical mechanisms at the expense of transparency is not a solution.

References

- Aiyagari, S. R., and M. Gertler. 2009. Overreaction of Asset Prices in General Equilibrium. *Review of Economic Dynamics* 2 (1): 3-35.
- Brunnermeier, M. et al. 2009. The Fundamental Principles of Financial Regulation. Geneva Reports on the World Economy, International Center for Monetary and Banking Studies. London: Centre for Economic Policy Research.
- Caruana, J (2010): Macroprudential policy: what we have learned and where we are going, Keynote speech at the Second Financial Stability Conference of the International Journal of Central Banking, Bank of Spain, Madrid, 17 June 2010.
<http://www.bis.org/speeches/sp100618a.pdf>
- Caruana, J., and A. Narain. 2008. Banking on more Capital. *Finance and Development, International Monetary Fund* 45 (2): 24-28.
- Devenov, A. and I. Welch. 1996. Rational Herding in Financial Economics. *European Economic Review* 40 (3-5): 603-615.
- Fernández de Lis, S., J. Martínez, and J. Saurina. 2001. Credit growth, problem loans and credit risk provisioning in Spain. In *Marrying the macro- and micro- prudential dimensions of financial stability*, BIS Paper 1. Available <http://www.bis.org/publ/bppdf/bispap01.htm>
- Fernández de Lis, S., and E. Ontiveros. 2009. Towards more symmetric and anti-cyclical monetary and financial policies. Available: <http://www.voxeu.org/index.php?q=node/3240>
- Fernandez de Lis, S., and A. Garcia-Herrero. 2009. The Spanish approach: dynamic provisioning and other tools, in *Central Banking: Towards a new framework for financial stability*. In *Towards a New Framework for Financial Stability*, edited by D. Mayes, R. Pringle, and M. Taylor. London: Central Banking Publications.
- . 2008. The housing boom and bust in Spain: impact of the securitisation model and dynamic provisioning. *Housing Finance International* September.
- FSB (2011): Progress in the implementation if the G20 recommendations for strengthening financial stability. Report of the Financial Stability Board to G20 Finance Ministers and Central Bank Governors, 10 April 2011.
- FSB-IMF-BIS (2011): Macroprudential Policy Tools and Frameworks. Progress Report to G20.
- Haldane, A. 2009. "Why banks failed the stress test", Speech at the Marcus-Evans Conference on Stress-Testing, London, 9-10 February. Available:
<http://www.bankofengland.co.uk/publications/speeches/2009/speech374.pdf>
- Gruss, B., and S. Sgherri. 2009. The Volatility Costs of Procyclical Lending Standards: An Assesment Using a DSG Model. International Monetary Fund (IMF) Working Paper 09/35. Washington, DC: IMF.
- Jiménez, G., and J. Saurina. 2006. Credit Cycles, Credit Risk and Prudential Regulation. *International Journal for Central Banking* 2 (2): 65-98.
- Kiyotaki N., and J. Moore. 1997. Credit Cycles. *Journal of Political Economy* 105 (2): 211-248.

Lepetit L., E. Nys, P. Rous, and A. Tarazi. 2008. The Expansion of Services in European Banking: Implications for Loan Pricing and Interest Margins. *Journal of Banking and Finance* 32 (11): 2325-2335.

Nys, E. 2008. Service Provision and Loans: Price and Risk Implications. *Revue d'Economie Politique* May.

Repullo, R., and J. Suarez. 2008. The Procyclical Effect of Basel II. Center For Economic Policy Research (CEPR) Discussion Paper No. 6862. London: Center For Economic Policy Research.

Restoy F., and J. M. Roldan. 2009. Dynamic Provisioning and Accounting: Can a Consensus be Reached. *The Banker* August.

Saurina, J., and C. Trucharte. 2007. An Assessment of Basel II Procyclicality in Mortgage Portfolios. *Journal of Financial Services Research* 32 (October): 81-101.

Taylor, A., and C. Goodhart. 2006. Procyclicality and Volatility in the Financial System: the Implementation of Basel II and IAS 39. In *Procyclicality and Volatility in the Financial System in Asia*, edited by S. Gerlach and P. Grunewald. London: Palgrave McMillan.

Turner, A. 2009. *The Turner Review: A Regulatory Response to the Global Banking Crisis*. London: Financial Supervisory Agency.

Wezel, Torsten (2010): Dynamic Loan Loss Provisions in Uruguay: Properties, Shock Absorption Capacity and Simulations Using Alternative Formulas, IMF WP/10/125

Working Papers

09/01 **K.C. Fung, Alicia García-Herrero and Alan Siu:** Production Sharing in Latin America and East Asia.

09/02 **Alicia García-Herrero, Jacob Gyntelberg and Andrea Tesei:** The Asian crisis: what did local stock markets expect?

09/03 **Alicia García-Herrero and Santiago Fernández de Lis:** The Spanish Approach: Dynamic Provisioning and other Tools.

09/04 **Tatiana Alonso:** Potencial futuro de la oferta mundial de petróleo: un análisis de las principales fuentes de incertidumbre.

09/05 **Tatiana Alonso:** Main sources of uncertainty in formulating potential growth scenarios for oil supply.

09/06 **Ángel de la Fuente y Rafael Doménech:** Convergencia real y envejecimiento: retos y propuestas.

09/07 **KC FUNG, Alicia García-Herrero and Alan Siu:** Developing Countries and the World Trade Organization: A Foreign Influence Approach.

09/08 **Alicia García-Herrero, Philip Woolbridge and Doo Yong Yang:** Why don't Asians invest in Asia? The determinants of cross-border portfolio holdings.

09/09 **Alicia García-Herrero, Sergio Gavilá and Daniel Santabárbara:** What explains the low profitability of Chinese Banks?

09/10 **J.E. Boscá, R. Doménech and J. Ferri:** Tax Reforms and Labour-market Performance: An Evaluation for Spain using REMS.

09/11 **R. Doménech and Angel Melguizo:** Projecting Pension Expenditures in Spain: On Uncertainty, Communication and Transparency.

09/12 **J.E. Boscá, R. Doménech and J. Ferri:** Search, Nash Bargaining and Rule of Thumb Consumers.

09/13 **Angel Melguizo, Angel Muñoz, David Tuesta y Joaquín Vial:** Reforma de las pensiones y política fiscal: algunas lecciones de Chile.

09/14 **Máximo Camacho:** MICA-BBVA: A factor model of economic and financial indicators for short-term GDP forecasting.

09/15 **Angel Melguizo, Angel Muñoz, David Tuesta and Joaquín Vial:** Pension reform and fiscal policy: some lessons from Chile.

09/16 **Alicia García-Herrero and Tuuli Koivu:** China's Exchange Rate Policy and Asian Trade.

09/17 **Alicia García-Herrero, K.C. Fung and Francis Ng:** Foreign Direct Investment in Cross-Border Infrastructure Projects.

09/18 **Alicia García Herrero y Daniel Santabárbara García:** Una valoración de la reforma del sistema bancario de China.

09/19 **C. Fung, Alicia García-Herrero and Alan Siu:** A Comparative Empirical Examination of Outward Direct Investment from Four Asian Economies: China, Japan, Republic of Korea and Taiwan.

- 09/20 **Javier Alonso, Jasmina Bjeletic, Carlos Herrera, Soledad Hormazábal, Ivonne Ordóñez, Carolina Romero y David Tuesta:** Un balance de la inversión de los fondos de pensiones en infraestructura: la experiencia en Latinoamérica.
- 09/21 **Javier Alonso, Jasmina Bjeletic, Carlos Herrera, Soledad Hormazábal, Ivonne Ordóñez, Carolina Romero y David Tuesta:** Proyecciones del impacto de los fondos de pensiones en la inversión en infraestructura y el crecimiento en Latinoamérica.
- 10/01 **Carlos Herrera:** Rentabilidad de largo plazo y tasas de reemplazo en el Sistema de Pensiones de México.
- 10/02 **Javier Alonso, Jasmina Bjeletic, Carlos Herrera, Soledad Hormazabal, Ivonne Ordóñez, Carolina Romero, David Tuesta and Alfonso Ugarte:** Projections of the Impact of Pension Funds on Investment in Infrastructure and Growth in Latin America.
- 10/03 **Javier Alonso, Jasmina Bjeletic, Carlos Herrera, Soledad Hormazabal, Ivonne Ordóñez, Carolina Romero, David Tuesta and Alfonso Ugarte:** A balance of Pension Fund Infrastructure Investments: The Experience in Latin America.
- 10/04 **Mónica Correa-López y Ana Cristina Mingorance-Arnáiz:** Demografía, Mercado de Trabajo y Tecnología: el Patrón de Crecimiento de Cataluña, 1978-2018.
- 10/05 **Soledad Hormazabal D.:** Gobierno Corporativo y Administradoras de Fondos de Pensiones (AFP). El caso chileno.
- 10/06 **Soledad Hormazabal D.:** Corporate Governance and Pension Fund Administrators: The Chilean Case.
- 10/07 **Rafael Doménech y Juan Ramón García:** ¿Cómo Conseguir que Crezcan la Productividad y el Empleo, y Disminuya el Desequilibrio Exterior?
- 10/08 **Markus Brückner and Antonio Ciccone:** International Commodity Prices, Growth, and the Outbreak of Civil War in Sub-Saharan Africa.
- 10/09 **Antonio Ciccone and Marek Jarocinski:** Determinants of Economic Growth: Will Data Tell?
- 10/10 **Antonio Ciccone and Markus Brückner:** Rain and the Democratic Window of Opportunity.
- 10/11 **Eduardo Fuentes:** Incentivando la cotización voluntaria de los trabajadores independientes a los fondos de pensiones: una aproximación a partir del caso de Chile.
- 10/12 **Eduardo Fuentes:** Creating incentives for voluntary contributions to pension funds by independent workers: A primer based on the case of Chile.
- 10/13 **J. Andrés, J.E. Boscá, R. Doménech and J. Ferri:** Job Creation in Spain: Productivity Growth, Labour Market Reforms or both.
- 10/14 **Alicia García-Herrero:** Dynamic Provisioning: Some lessons from existing experiences.
- 10/15 **Arnoldo López Marmolejo and Fabrizio López-Gallo Dey:** Public and Private Liquidity Providers.
- 10/16 **Soledad Zignago:** Determinantes del comercio internacional en tiempos de crisis.
- 10/17 **Angel de la Fuente and José Emilio Boscá:** EU cohesion aid to Spain: a data set Part I: 2000-06 planning period.
- 10/18 **Angel de la Fuente:** Infrastructures and productivity: an updated survey.

- 10/19 **Jasmina Bjeletic, Carlos Herrera, David Tuesta y Javier Alonso:** Simulaciones de rentabilidades en la industria de pensiones privadas en el Perú.
- 10/20 **Jasmina Bjeletic, Carlos Herrera, David Tuesta and Javier Alonso:** Return Simulations in the Private Pensions Industry in Peru.
- 10/21 **Máximo Camacho and Rafael Doménech:** MICA-BBVA: A Factor Model of Economic and Financial Indicators for Short-term GDP Forecasting.
- 10/22 **Enestor Dos Santos and Soledad Zignago:** The impact of the emergence of China on Brazilian international trade.
- 10/23 **Javier Alonso, Jasmina Bjeletic y David Tuesta:** Elementos que justifican una comisión por saldo administrado en la industria de pensiones privadas en el Perú.
- 10/24 **Javier Alonso, Jasmina Bjeletic y David Tuesta:** Reasons to justify fees on assets in the Peruvian private pension sector.
- 10/25 **Mónica Correa-López, Agustín García Serrador and Cristina Mingorance-Arnáiz:** Product Market Competition and Inflation Dynamics: Evidence from a Panel of OECD Countries.
- 10/26 **Carlos A. Herrera:** Long-term returns and replacement rates in Mexico's pension system.
- 10/27 **Soledad Hormazábal:** Multifondos en el Sistema de Pensiones en Chile.
- 10/28 **Soledad Hormazábal:** Multi-funds in the Chilean Pension System.
- 10/29 **Javier Alonso, Carlos Herrera, María Claudia Llanes y David Tuesta:** Simulations of long-term returns and replacement rates in the Colombian pension system.
- 10/30 **Javier Alonso, Carlos Herrera, María Claudia Llanes y David Tuesta:** Simulaciones de rentabilidades de largo plazo y tasas de reemplazo en el sistema de pensiones de Colombia.
- 11/01 **Alicia García Herrero:** Hong Kong as international banking center: present and future.
- 11/02 **Arnoldo López-Marmolejo:** Effects of a Free Trade Agreement on the Exchange Rate Pass-Through to Import Prices.
- 11/03 **Angel de la Fuente:** Human capital and productivity
- 11/04 **Adolfo Albo y Juan Luis Ordaz Díaz:** Los determinantes de la migración y factores de la expulsión de la migración mexicana hacia el exterior, evidencia municipal.
- 11/05 **Adolfo Albo y Juan Luis Ordaz Díaz:** La Migración Mexicana hacia los Estados Unidos: Una breve radiografía.
- 11/06 **Adolfo Albo y Juan Luis Ordaz Díaz:** El Impacto de las Redes Sociales en los Ingresos de los Mexicanos en EEUU.
- 11/07 **María Abascal, Luis Carranza, Mayte Ledo y Arnoldo López Marmolejo:** Impacto de la Regulación Financiera sobre Países Emergentes.
- 11/08 **María Abascal, Luis Carranza, Mayte Ledo and Arnoldo López Marmolejo:** Impact of Financial Regulation on Emerging Countries.
- 11/09 **Angel de la Fuente y Rafael Doménech:** El impacto sobre el gasto de la reforma de las pensiones: una primera estimación.
- 11/10 **Juan Yermo:** El papel ineludible de las pensiones privadas en los sistemas de ingresos de jubilación.

- 11/11 **Juan Yermo:** The unavoidable role of private pensions in retirement income systems.
- 11/12 **Angel de la Fuente and Rafael Doménech:** The impact of Spanish pension reform on expenditure: A quick estimate.
- 11/13 **Jaime Martínez-Martín:** General Equilibrium Long-Run Determinants for Spanish FDI: A Spatial Panel Data Approach.
- 11/14 **David Tuesta:** Una revisión de los sistemas de pensiones en Latinoamérica.
- 11/15 **David Tuesta:** A review of the pension systems in Latin America.
- 11/16 **Adolfo Albo y Juan Luis Ordaz Díaz:** La Migración en Arizona y los efectos de la Nueva Ley "SB-1070".
- 11/17 **Adolfo Albo y Juan Luis Ordaz Díaz:** Los efectos económicos de la Migración en el país de destino. Los beneficios de la migración mexicana para Estados Unidos.
- 11/18 **Angel de la Fuente:** A simple model of aggregate pension expenditure.
- 11/19 **Angel de la Fuente y José E. Boscá:** Gasto educativo por regiones y niveles en 2005.
- 11/20 **Máximo Camacho and Agustín García Serrador:** The Euro-Sting revisited: PMI versus ESI to obtain euro area GDP forecasts.
- 11/21 **Eduardo Fuentes Corripio:** Longevity Risk in Latin America.
- 11/22 **Eduardo Fuentes Corripio:** El riesgo de longevidad en Latinoamérica.
- 11/23 **Javier Alonso, Rafael Doménech y David Tuesta:** Sistemas Públicos de Pensiones y la Crisis Fiscal en la Zona Euro. Enseñanzas para América Latina.
- 11/24 **Javier Alonso, Rafael Doménech y David Tuesta:** Public Pension Systems and the Fiscal Crisis in the Euro Zone. Lessons for Latin America.
- 11/25 **Adolfo Albo y Juan Luis Ordaz Díaz:** Migración mexicana altamente calificada en EEUU y Transferencia de México a Estados Unidos a través del gasto en la educación de los migrantes.
- 11/26 **Adolfo Albo y Juan Luis Ordaz Díaz:** Highly qualified Mexican immigrants in the U.S. and transfer of resources to the U.S. through the education costs of Mexican migrants.
- 11/27 **Adolfo Albo y Juan Luis Ordaz Díaz:** Migración y Cambio Climático. El caso mexicano.
- 11/28 **Adolfo Albo y Juan Luis Ordaz Díaz:** Migration and Climate Change: The Mexican Case.
- 11/29 **Ángel de la Fuente y María Gundín:** Indicadores de desempeño educativo regional: metodología y resultados para los cursos 2005-06 a 2007-08.
- 11/30 **Juan Ramón García:** Desempleo juvenil en España: causas y soluciones.
- 11/31 **Juan Ramón García:** Youth unemployment in Spain: causes and solutions.
- 11/32 **Mónica Correa-López and Beatriz de Blas:** International transmission of medium-term technology cycles: Evidence from Spain as a recipient country.
- 11/33 **Javier Alonso, Miguel Angel Caballero, Li Hui, María Claudia Llanes, David Tuesta, Yuwei Hu and Yun Cao:** Potential outcomes of private pension developments in China.

- 11/34 **Javier Alonso, Miguel Angel Caballero, Li Hui, María Claudia Llanes, David Tuesta, Yuwei Hu and Yun Cao:** Posibles consecuencias de la evolución de las pensiones privadas en China.
- 11/35 **Enestor Dos Santos:** Brazil on the global finance map: an analysis of the development of the Brazilian capital market
- 11/36 **Enestor Dos Santos, Diego Torres y David Tuesta:** Una revisión de los avances en la inversión en infraestructura en Latinoamérica y el papel de los fondos de pensiones privados.
- 11/37 **Enestor Dos Santos, Diego Torres and David Tuesta:** A review of recent infrastructure investment in Latin America and the role of private pension funds.
- 11/ 38 **Zhigang Li and Minqin Wu:** Estimating the Incidences of the Recent Pension Reform in China: Evidence from 100,000 Manufacturers.
- 12/01 **Marcos Dal Bianco, Máximo Camacho and Gabriel Pérez-Quiros:** Short-run forecasting of the euro-dollar exchange rate with economic fundamentals.
- 12/02 **Guoying Deng, Zhigang Li and Guangliang Ye:** Mortgage Rate and the Choice of Mortgage Length: Quasi-experimental Evidence from Chinese Transaction-level Data.
- 12/03 **George Chouliarakis and Mónica Correa-López:** A Fair Wage Model of Unemployment with Inertia in Fairness Perceptions.
- 2/04 **Nathalie Aminian, K.C. Fung, Alicia García-Herrero, Francis NG:** Trade in services: East Asian and Latin American Experiences.
- 12/05 **Javier Alonso, Miguel Angel Caballero, Li Hui, María Claudia Llanes, David Tuesta, Yuwei Hu and Yun Cao:** Potential outcomes of private pension developments in China (Chinese Version).
- 12/06 **Alicia Garcia-Herrero, Yingyi Tsai and Xia Le:** RMB Internationalization: What is in for Taiwan?
- 12/07 **K.C. Fung, Alicia Garcia-Herrero, Mario Nigrinis Ospina:** Latin American Commodity Export Concentration: Is There a China Effect?
- 12/08 **Matt Ferchen, Alicia Garcia-Herrero and Mario Nigrinis:** Evaluating Latin America's Commodity Dependence on China.
- 12/09 **Zhigang Li, Xiaohua Yu, Yinchu Zeng and Rainer Holst:** Estimating transport costs and trade barriers in China: Direct evidence from Chinese agricultural traders.
- 12/10 **Maximo Camacho and Jaime Martinez-Martin:** Real-time forecasting US GDP from small-scale factor models.
- 12/11 **J.E. Boscá, R. Doménech and J. Ferri:** Fiscal Devaluations in EMU.
- 12/12 **Ángel de la Fuente and Rafael Doménech:** The financial impact of Spanish pension reform: A quick estimate.
- 12/13 **Biliana Alexandrova-Kabadjova, Sara G. Castellanos Pascacio, Alma L. García-Almanza:** The Adoption Process of Payment Cards -An Agent- Based Approach:
- 12/14 **Biliana Alexandrova-Kabadjova, Sara G. Castellanos Pascacio, Alma L. García-Almanza:** El proceso de adopción de tarjetas de pago: un enfoque basado en agentes.

12/15 **Sara G. Castellanos, F. Javier Morales y Mariana A. Torán:** Análisis del Uso de Servicios Financieros por Parte de las Empresas en México: ¿Qué nos dice el Censo Económico 2009?

12/16 **Author(s): Sara G. Castellanos, F. Javier Morales y Mariana A. Torán:** Analysis of the Use of Financial Services by Companies in Mexico: What does the 2009 Economic Census tell us?

12/17 **R. Doménech:** Las Perspectivas de la Economía Española en 2012.

12/18 **Chen Shiyuan, Zhou Yinggang:** Revelation of the bond market (Chinese version).

12/19 **Zhouying Gang, Chen Shiyuan:** On the development strategy of the government bond market in China (Chinese version).

12/20 **Angel de la Fuente and Rafael Doménech:** Educational Attainment in the OECD, 1960-2010.

12/21 **Ángel de la Fuente:** Series enlazadas de los principales agregados nacionales de la EPA, 1964-2009

12/22 **Santiago Fernández de Lis and Alicia Garcia-Herrero:** Dynamic provisioning: a buffer rather than a countercyclical tool?

The analysis, opinions, and conclusions included in this document are the property of the author of the report and are not necessarily property of the BBVA Group.

BBVA Research's publications can be viewed on the following website: <http://www.bbvaresearch.com>

Contact details

BBVA Research
Paseo Castellana, 81 - 7th floor
28046 Madrid (Spain)
Tel.: +34 91 374 60 00 and +34 91 537 70 00
Fax: +34 91 374 30 25
bbvaresearch@bbva.com
www.bbvaresearch.com