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RESEARCH UPDATE

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Welcome to the Banco de España RESEARCH UPDATE

The Research Committee of the Banco de España is pleased to announce the Spring 2017 issue of our *Research Update.* The *Update* aims to inform both academic and policy-oriented economists and financial specialists about publications, conferences, and other research activities at the Banco de España.

This issue includes five feature articles summarizing notable recent Banco de España projects in diverse areas of research. First, an article by Galo Nuño and Carlos Thomas outlines a new methodology for solving optimal policy problems in dynamic models with heterogeneous agents, and applies it to an example that studies the redistributive effects of monetary policy. The remaining features are empirical, documenting how the efficiency of the judicial system affects economic outcomes in Spain (Mora-Sanguinetti), which factors explain governments' failure to follow fiscal rules (Delgado, Lledó, and Pérez), how the effects of recent unconventional monetary policies differed across European countries (Burriel and Galesi), and to what extent work experience is a substitute for formal education in helping workers accumulate skills (Jimeno, Lacuesta, Martínez-Matute, and Villanueva). In addition, this *Research Update* interviews Carlos Thomas, who was recently appointed to head the Monetary Policy Unit, regarding his work on labor markets, monetary policy, and banking.

This year the Banco de España will host an unusual number of conferences, reflecting several new and continuing initiatives. Starting in 2017, it will regularly organize two conferences featuring top academics from around the world: an Annual Research Conference, and a biennial Conference on Financial Stability. This year it will also host two workshops for the newly-established Research Clusters of the European System of Central Banks (ESCB). It will also collaborate on conferences with other academic and policy institutions such as the CEPR, the ADEMU network, and the World Bank.

We highlight these and other research developments at the Banco de España in hopes that they will interest the broader research community, in Spain and internationally, and thereby contribute to an improved understanding of economic policy.

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OPTIMAL MONETARY POLICY WITH HETEROGENEOUS AGENTS

GALO NUÑO AND CARLOS THOMAS

WORKING PAPER Nº 1624

Economic models with heterogeneous agents are increasingly used for policy analysis. We propose a novel methodology for solving dynamic optimal policy problems in models of this kind, both under discretion and commitment. We illustrate our methodology by studying optimal monetary policy in an incomplete-markets model. Under discretion, an inflationary bias arises from the central bank's attempt to redistribute wealth towards debtor households, which have higher marginal utility of net wealth. Under commitment, this inflationary force is counteracted over time by the incentive to prevent expectations of future inflation from being priced into new bond issuances; under certain conditions, long run inflation is zero as these two effects cancel out asymptotically.

Introduction

A recent literature addresses the importance of household heterogeneity in the transmission of monetary policy.[1] These Heterogeneous Agent New Keynesian (HANK) models are providing new insights about how relevant the redistributions associated with monetary policy are for understanding business cycle dynamics. A major shortcoming of this literature is that it provides few policy prescriptions, as the optimal monetary policy can only be studied under very restrictive assumptions. The difficulty of analyzing the *optimal* monetary policy arises from the fact that in these models the state of the economy is described by the income-wealth distribution, a very high-dimensional object, making the traditional approaches to the optimal policy problem too complex.

In a recent working paper, Nuño and Thomas (2016), we propose a novel methodology for solving fully dynamic optimal policy problems in models with heterogeneous agents, both under discretion and commitment, in the absence of aggregate shocks. To this end we use recent continuous-time mathematical techniques related to what is now known as "mean field game theory".[2]

Model

We illustrate our methods by analyzing optimal monetary policy in an incomplete-markets economy. Our framework is close to Huggett's (1993) model: households trade non-contingent claims, subject to an exogenous borrowing limit, to smooth consumption in the face of idiosyncratic income shocks. We depart from Huggett's framework by considering nominally non-contingent bonds with an arbitrarily long maturity. This allows monetary policy to have an effect on equilibrium allocations. In particular, as in Fisher (1933), unanticipated inflation redistributes wealth from lenders to borrowers.[3] In order to have a meaningful trade-off in the choice of the inflation path, we also assume that inflation is costly. In addition, expected future inflation raises the nominal cost of new debt issuances through inflation premia. Also, we consider a small open economy, which may sell some of its (domestic currency-denominated) bonds to risk-neutral foreign investors. As a result, the redistributive channel operates not only between domestic lenders and borrowers, but also between the latter and foreign bond holders.

1 See, for instance, Auclert (2016), Doepke and Schneider (2006b), Kaplan, Moll and Violante (2016), Gornemann, Kuester and Nakajima (2012), McKay, Nakamura and Steinsson (2015), Luetticke (2015), Meh, Ríos-Rull and Terajima (2010), Sheedy (2014), Challe *et al.* (2015) or Sterk and Tenreyro (2015).

2 See Lasry and Lions (2006) or Nuño and Moll (2016).

3 See Doepke and Schneider (2006a) for a study of net nominal asset positions across US household groups which estimates the potential for inflation-led redistribution. See Auclert (2016) for a recent analysis of the Fisherian channel in a more general model that allows for additional redistributive mechanisms.

We now describe of the main model elements.

Individual states. Over a brief interval dt, a household´s real wealth a evolves as $da_t = s_t dt$, where

$$s_t = (r_t - \pi_t)\, a_t + \frac{y_t - c_t}{Q_t}$$

is the drift, π is inflation, y is an exogenous output endowment (assumed to follow a 2-state Markov chain with transition probabilities λ_1 and λ_2), c is consumption, Q is the nominal bond price, and $r = \delta / Q - \delta$ is the nominal bond yield, where δ is the amortization rate. Domestic bonds are in positive net supply, and are priced by risk-neutral foreign investors.

Household problem. The value function of a household is defined by

$$v(t,a,y) = \max_{\{c_s\}_{s=t}^{\infty}} E_t \int_t^{\infty} e^{-\rho(s-t)}\, u(c_s, \pi_s) ds,$$

subject to the law of motion of a. Notice that instantaneous utility depends both on consumption and inflation.[4] The dynamic programming or Hamilton-Jacobi-Bellman (HJB) equation for this problem is

$$\rho v_i = \frac{\partial v_i}{\partial t} + \max_c \left\{ u(c,\pi) + s_i \frac{\partial v_i}{\partial a} \right\} + \lambda_i [v_j - v_i],$$

for $i \neq j = 1,2$, where $v_i(t,a) = v(t,a,y_i)$. This HJB equation closely resembles the analogous discrete-time Bellman equation for a household that chooses between consumption and saving while facing Markovian income shocks.

Wealth distribution. The law of motion of the household wealth distribution $f_i(t,a) = f(t,a,y_i)$ is given by the so-called Kolmogorov forward (KF) equation,

$$\frac{\partial f_i}{\partial t} = -\frac{\partial}{\partial a}(s_i f_i) - \lambda_i f_i + \lambda_j f_j,$$

which describes how the density of households f varies over time at all points (a, y_i). The last two terms in this equation show the loss of mass around a given point (a, y_i) as some households' income changes from y_i to y_j, offset by the gain in mass around (a, y_i) as others' income changes from y_j to y_i.

The first term in the KF equation deserves more explanation. Since s_i is the rate at which a household's assets drift away from their current level a, $s_i f_i$ represents a flow of mass away from the neighborhood of the point (a, y_i). But (when $s_i > 0$), this is offset by a flow into the neighborhood of (a, y_i) from a lower asset level $a\text{-}da$. Therefore, if $s_i f_i$ is unchanging with a, the mass around (a, y_i) is neither increased nor decreased by savings. But if $\frac{\partial}{\partial a}(s_i f_i) > 0$, then savings behavior causes the mass around (a, y_i) to decrease over time (the flow away from (a, y_i) exceeds the flow into that neighborhood).

[4] This can be micro-founded by assuming firms face sticky prices à la Rotemberg (1982).

Methodology

We assume that the central bank is utilitarian, *i.e.* it gives the same Pareto weight to each household. Thus, it maximizes the following welfare criterion:

$$U_{CB} = \int_{\phi}^{\infty} \sum_{i=1}^{2} v_i(0,a) f_i(0,a)\, da.$$

We now consider both the case in which the central bank can credibly commit to a future inflation path (the Ramsey problem), and the time-consistent case in which the central bank decides optimal current inflation given the current state of the economy (the Markov Perfect equilibrium).

Discretion. In the case of discretion, the central bank cannot commit to any future policy. The inflation rate π then depends only on the current aggregate state variable, the net wealth distribution: $\pi(t) \equiv \pi[f(t,a,y)]$. Notice that the inflation policy is not an ordinary function, but a functional, as it maps the infinite-dimensional state variable $f(t,a,y)$ into $\mathbb{R}$. The appropriate solution concept is a *Markov Perfect Equilibrium* (MPE) in a space of distributions. The central bank maximizes aggregate welfare subject to the law of motion of the distribution, taking bond prices and individual consumption policies as given. We frame this decision as a dynamic programming problem on a suitable space of functions, and solve it using variational arguments. In particular, we employ *Gateaux derivatives,* which generalize the concept of derivatives to functional spaces.

In the case of separable preferences $u(c,\pi) = u^c(c) - u^{\pi}(\pi)$, the inflation under discretion satisfies:

$$u_{\pi}^{\pi} = \int_{\phi}^{\infty} \sum_{i=1}^{2} (-a)\, u_c^c f_i(t,a)\, da.$$

That is, at all times, optimal discretionary inflation increases with the average cross-household net liability position *weighted by each household's marginal utility* *of net wealth.* This reflects an "inflation bias", whereby the central bank tries to use inflation so as to redistribute wealth, and hence consumption, in two ways. On one hand, inflation redistributes from foreign investors to domestic borrowers *(cross-border redistribution).* On the other hand, and somewhat more subtly, under market incompleteness and standard concave preferences for consumption, borrowing households have a higher marginal utility of net wealth than lenders. Hence, they receive a higher effective weight in the optimal inflation decision, giving the central bank an incentive to redistribute wealth from creditors to debtors (*domestic redistribution).*

Commitment. Assume now that the central bank can credibly commit at time zero to the complete future inflation path. The optimal inflation path is thus a function of the initial distribution $f_0(a)$ and of time: $\pi(t) \equiv \pi[t, f_0(a)]$. Under commitment, the central bank maximizes welfare taking into account not only the dynamics of wealth (the KF equation), but also the HJB equation and the bond pricing condition. That is, the central bank understands how it can steer households' and foreign investors' expectations by committing to an inflation path, unlike the discretionary case, where the central bank takes expectations as given. The appropriate solution concept under commitment is that of a *Ramsey problem.* Here, the Ramsey problem is an optimal control problem in a function space; calculating the first-order conditions again requires Gateaux derivatives.

For separable preferences, the optimal inflation under commitment satisfies

$$u_\pi^\pi = \int_\phi^\infty \sum_{i=1}^{2} (-a)\, u_c^c\, f_i\,(t,a)\, da + \mu(t)\, Q(t),$$

where the costate $\mu(t)$ captures the value to the central bank of promises about time t inflation made to foreign investors at time 0. The value is zero at the time the Ramsey plan is announced $(t=0)$, when the central bank is not bound by previous commitments, but it will generally be different from zero at any time $t>0.$ By contrast, in the MPE case no promises are made at any time, hence the absence of this costate. Therefore, the static trade-off between the welfare cost of inflation and the welfare gains from inflating away net liabilities, explained above in the MPE context, is now modified by the central bank's need to respect past promises to investors about current inflation.

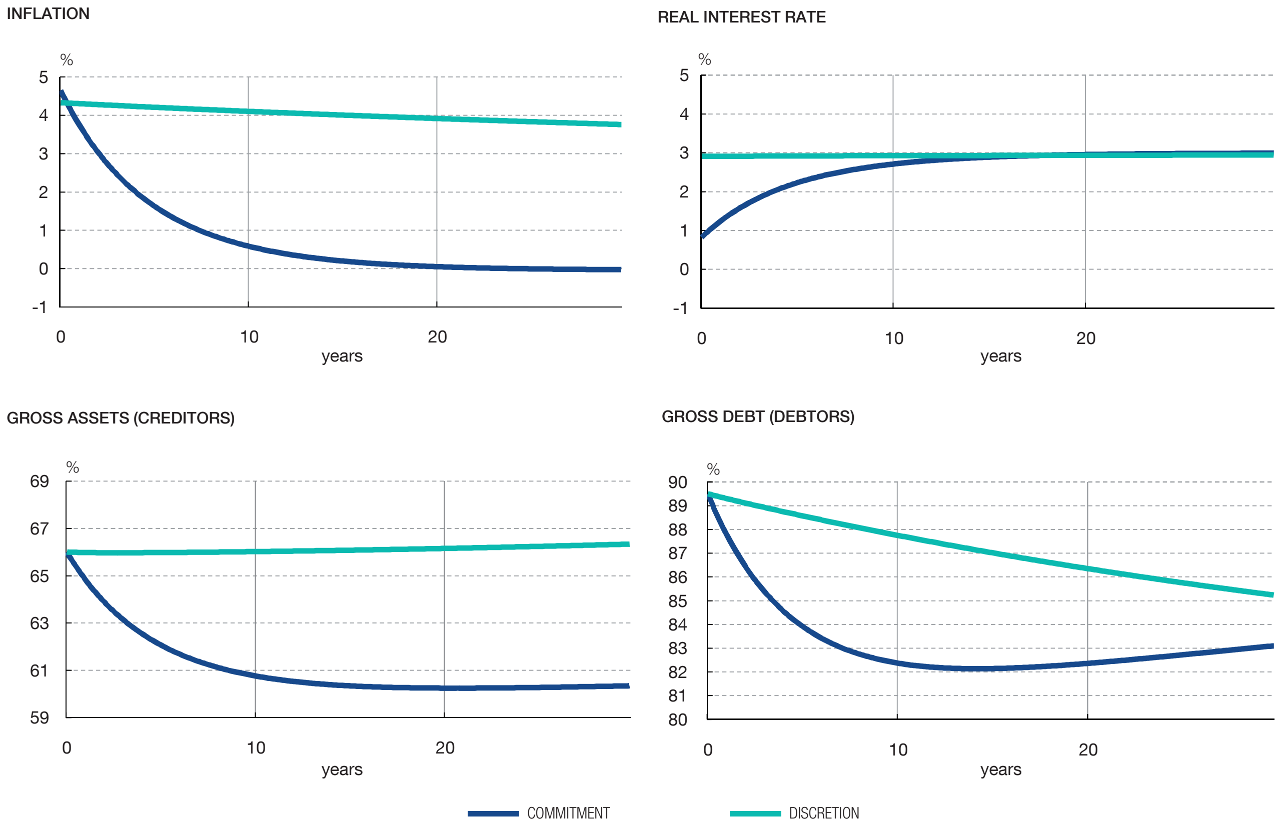
Under commitment, the same redistributive motives to inflate exist as under discretion, but they are counteracted by an opposing force: the central bank internalizes how investors' expectations of future inflation affect their pricing of the long-term nominal bonds from the time the optimal commitment plan is formulated ("time zero") onwards. At time zero, inflation is close to that under discretion, as no prior commitments exist. But from then on, the fact that the price of newly issued bonds incorporates promises about the future inflation path gives the central bank an incentive to commit to reducing inflation over time. Importantly, we show that under certain conditions on preferences the steady state inflation rate under the optimal commitment is zero; that is, in the long run the redistributive motive to inflate exactly cancels out with the incentive to reduce inflation expectations and nominal yields for an economy that is a net debtor.

Numerical analysis

We then solve numerically for the full transition path under commitment and discretion. We calibrate our model to match a number of features of a prototypical European small open economy, such as the size of gross household debt and their net international position.

We find that optimal time-zero inflation, which as mentioned before is very similar under commitment and discretion, is quite high. We also show that both the cross-border and the domestic redistributive motives are quantitatively relevant for initial inflation. Under discretion, inflation remains high due to the inflationary bias discussed before (see the figure). Under commitment, by contrast, inflation falls gradually towards its long-run level (essentially zero, under our calibration), reflecting the central bank"s efforts to prevent expectations of future inflation from being priced into new bond issuances. In summary, under commitment the central bank front-loads inflation so as to transitorily redistribute existing wealth from lenders to borrowing households, but commits to gradually undo such initial inflation.

In welfare terms, the discretionary policy implies sizable losses relative to the optimal commitment. These losses are suffered by creditor households, but also by debtor ones. The reason is that, under discretion, expectations of permanent future positive inflation are fully priced into current nominal yields. This impairs the very redistributive effects of inflation that the central bank is trying to bring about, and leaves only the direct welfare costs of permanent inflation, which are borne by creditor and debtor households alike.



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ASSESSING THE IMPACT OF THE INSTITUTIONAL FRAMEWORK ON THE EFFICIENCY OF THE SPANISH ECONOMY

JUAN S. MORA-SANGUINETTI

Introduction

The economic literature has stressed the critical role played by institutions to explain differences in economic performance across nations [Hall and Jones (1999) and Helpman (2008)]. North (1990) concludes that less effective enforcement mechanisms (rather than regulation *per se*) were the key institutional difference between the Third World and developed countries. He argued that both contracting, and verifying compliance with contracts, is crucial for economic efficiency [Coase (1960), North (1990)]. Similarly, regarding the law, if enforcement institutions fail to function efficiently, or operate in an extortionate fashion, legal uncertainty may inhibit transactions. Indeed, there is ample empirical evidence that protection of property rights and private contracts promotes economic development (Acemoglu *et al.,* 2001, Rodrik *et al.,* 2004, Acemoglu and Johnson, 2005).

Likewise, many studies have shown how the efficiency of judicial systems affects specific aspects of economic performance for very different countries (Palumbo *et al.,* 2013). For instance, Djankov *et al.* (2008), Bae and Goyal (2009), Qian and Strahan (2007), Jappelli *et al.* (2005) and Shvets (2013) have addressed the impact of justice on the development of credit markets. Due in part to their effect on credit markets, firm size, firm growth, and even firm specialization also appear to be positively related to the efficiency of judicial systems [Laeven and Woodruff (2007), Giacomelli and Menon (2016)]. In addition, the literature highlights that judicial performance also affects the use of resources and technology (Ferguson and Formai, 2013), the structure of housing markets (Casas-Arce and Saiz, 2010), and the functioning of labour market relationships (Berger and Neugart, 2011, Ichino *et al.,* 2003).

The quality of enforcement institutions in Spain

The efficiency of the judicial system is also an important issue for the Spanish economy. Compared with other high-income countries, the Spanish judicial system shows a relatively low level of efficacy. Evidence for this can be found either by looking directly at data sources on the performance of judicial systems such as those of the OECD (Palumbo *et al.*, 2013) or the CEPEJ (2014), or by analyzing estimates based on survey data (World Bank, 2015).

Moreover, the performance of the system has not shown improvements since the beginning of the 2000s, in contrast to recent advances in other areas of the Spanish economy and society. More specifically, the efficiency of the system worsened during the economic expansion, then improved in the recession (returning to initial values), largely due to a reduction in the demand for litigation (Mora-Sanguinetti, 2016).

Finally, there is substantial regional diversity in the efficacy of the judicial system. This raises the question of potential different impacts on economic efficiency in Spain at a disaggregated level. Figure 1 illustrates the geographical variation of the clearance rate (as a proxy of judicial efficacy) for a standard civil procedure for the period of expansion between 2001 and 2007, and since 2008, for the Spanish recession. From the data, we could expect that the impacts of justice on economic efficiency will vary according to the province or region. Indeed, these impacts can be measured, as Spain is one of the few countries that has quality databases to properly study how enforcement institutions affect the economy at a disaggregated level.

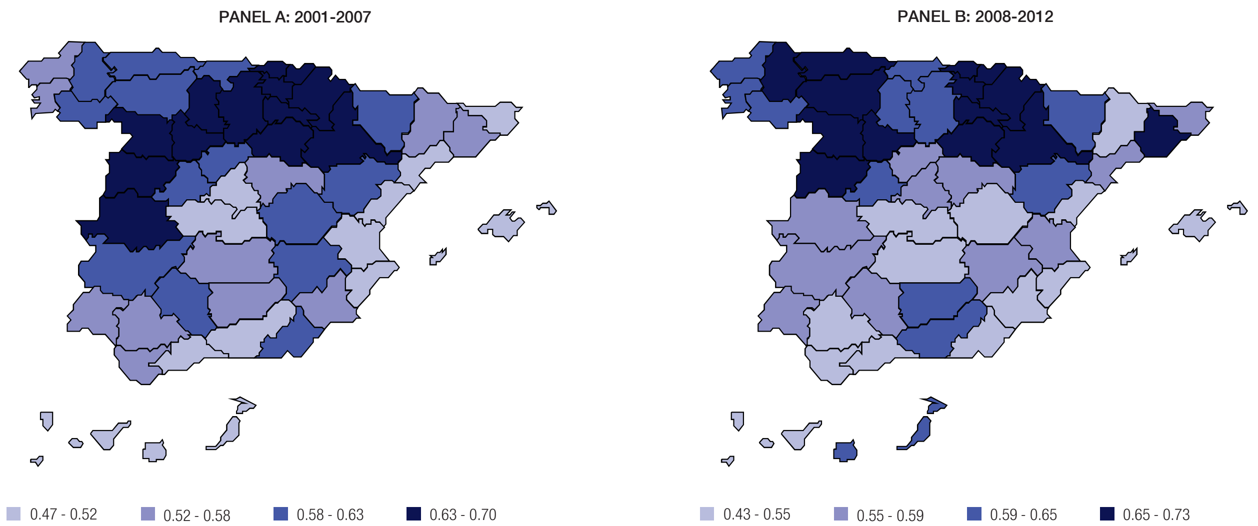
Judicial efficiency and economic outcomes in Spain

Several recently published studies by Banco de España economists analyze the impacts of local differences in judicial efficacy on diverse aspects of the Spanish economy, including the average size of companies, firm entry and exit rates, entrepreneurship rates, credit availability, distortions in rental and home ownership shares in the real estate market, and the behavior of Spanish local labour markets.

García-Posada and Mora-Sanguinetti (2015) found that greater efficacy of the judicial system at the local level increases the growth and size of Spanish companies and also favors entry of new firms. They found no significant effect on the exit rate, however. The implied effects on firm size and growth are economically significant. If the province with the lowest judicial

JUDICAL CLEARANCE RATES FOR ORDINARY CIVIL TRIALS, BY PROVINCE

FIGURE 1



SOURCE: Own elaboration using CGPJ data.

efficacy (when solving a declaratory trial) improved to align with the best practice, the relative increase in the average firm size would range from 0.6 to 2.8% while annual firm growth would rise between 1.1 and 2.8 percentage points. Attributing to the province with the worst judicial efficacy the best law enforcement in the sample, the relative increase in its entry rate would range between 8.8 and 9.5%[1].

If we analyze the firm entry rate by type (that is, if we differentiate across legal company types, such as limited liability –*sociedades anónimas* and *limitadas-,* unlimited liability, and entrepreneurs), a decrease in the efficacy of justice (when solving a declaratory procedure) is only found to reduce the entry of new entrepreneurs, without a significant impact on larger firms with limited liability structures (García-Posada and Mora-Sanguinetti, 2014). If the province with the lowest judicial efficacy improved to match the efficacy of the least congested one, the increase in the rate of entry of entrepreneurs would be between 5 and 7%. This result is consistent with the idea that the lack of judicial efficacy can be considered a fixed cost to be paid by the companies that litigate and, like any fixed cost, is a proportionally larger burden for a (small) entrepreneur than for a large company.

The previous examples refer to the impacts of judicial efficacy in "declaratory" procedures. The "declaratory" stage refers to the time at which the existence of a debt or an obligation is declared and acknowledged by a judge. If the debtor decides, after all, not to fulfill the obligation declared by the judge (for instance, choosing not to repay a loan even after the judgment), a second procedure, an "execution", may take place. In the execution stage, the civil judge forcibly compels the debtor to pay (for example, the judge may take the money from the bank accounts of the debtor). Thus, "execution" is not always needed and therefore the importance of the different procedures varies between different studies.

Judicial performance also has some specific impacts on real estate markets (Mora-Sanguinetti, 2012). Indeed, legal certainty seems relevant for the relationship between the rental and the property market, affecting the prevalence of each type of tenure. If a landlord perceives insecurity in expelling a tenant who does not pay the rent or does not comply with the conditions of the lease, he or she may decide to remove the dwelling from the rental market, increasing the share of property in the local economy. More specifically, an increase in judicial efficacy at the execution stage (in which an expulsion –*lanzamiento*- of the delinquent tenant takes place) is estimated to have a positive impact on the rental market (a reduction in one point of judicial congestion[2] would increase the tenancy rate by 0.15 percentage points). In other words, taking Madrid as an example, the estimates suggest that a 1 point decrease in the rate of judicial congestion would attract

1 These ranges refer to the results of the different econometric specifications studied.

2 The judicial congestion rate (which is the inverse of the clearance rate mentioned above) is the number of cases pending resolution plus the new cases entering the judicial system at a given point in time, divided by the number of cases that the system is able to resolve at that time. The higher the congestion rate, the lower the efficacy of the judicial system.

IMPACTS OF THE PERFORMANCE OF THE JUDICIAL SYSTEM ON CREDIT MARKET DEVELOPMENT

TABLE 1

	Credit availability		NPL ratios	
	Expansion	Recession	Expansion	Recession
Declaratory	No significant effect	No significant effect	No significant effect	Decrease
Execution	Increase	Increase	No significant effect	No significant effect

SOURCE: Mora-Sanguinetti *et al.* (2016, forthcoming 2017).

about 3400 dwellings to the rental market; in Barcelona, the estimated increase would be 3100 homes; and in Valencia, 1400.

Judicial performance also affects the size of credit markets. In a recent study, Mora-Sanguinetti *et al.* (2016, forthcoming 2017) analyze how local differences in the availability of credit and the evolution of non-performing loans (NPL) ratios may be partially explained by regional variations in the quality of loan contract enforcement. This analysis is performed both for periods of sustained growth (2001-2007) and recession (since 2008) in the Spanish economy. The research concludes that a rise in the clearance rate of executions increases the ratio of total credit to GDP at the local level. However, the declaratory stage of the procedure does not seem to be statistically significant.

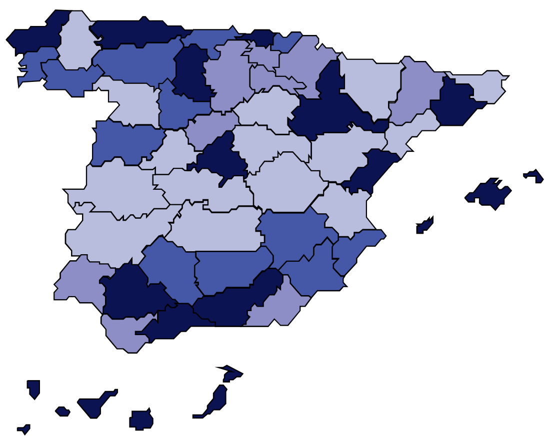
A possible explanation for this finding is that, throughout the economic cycle, a relevant proportion of the defaults that take place are strategic (*i.e.*, defaults by a solvent debtor). Furthermore, it is observed that, in provinces where declaratory procedures are more efficient, less credit is declared as non-performing. The latter effect, however, is only observed after the onset of the "Great Recession" in 2008. A plausible explanation is that non-strategic defaults (i.e., defaults caused by the debtor's inability to honor his debts) are much more frequent during recessions than strategic defaults, because borrowers' cash flows and collateral values are very low. In that case, what matters is the judicial efficacy at the declaration stage, as debtors do not voluntarily default on their obligations, making the execution stage less relevant. A summary of all these results can be found in Table 1.

In addition to these analyses of judicial enforcement of private contracts (which are resolved in the civil jurisdiction), there is also research on the role of the Spanish court system in resolving conflicts in labour markets (dismissals specifically). Jimeno *et al.* (2015) point out that judges are "active" decision makers when interpreting the Law in a dismissal conflict in Spain, and therefore their behavior affects the ratio between legal and de facto dismissal costs (*i.e.* the compensation actually paid in Spain to the dismissed employee). The results indicate that judges seem to be sensitive to local market conditions (such as the unemployment rate) and not only to legal provisions. The labor market reforms of 2010 and 2012 have slightly reduced the association between the unemployment rate and the likelihood that a dismissal is declared inadmissible by a judge.

Finally, as used here, the "efficacy" of the judicial system means its ability to complete decisions on cases brought before the courts. But it is also relevant to study how the number of court cases is determined. Mora-Sanguinetti and Garoupa (2015) analysed, using instrumental variables, whether the number of lawyers in the market in Spain (which displays substantial geographical variation, as shown in Figure 2) was related to the amount of litigation, over the period 2001–2010. Their results showed that the number of lawyers had a positive effect on litigation. More specifically, a one percent increase in the number of lawyers per capita entailed an increase in litigation of around 1.4%.

Table 2 summarises the results found in some of the studies discussed above.

NUMBER OF LAWYERS PER THOUSAND INHABITANTS, BY PROVINCE (AVERAGE 2000-2015) FIGURE 2



SOURCE: Author's elaboration, using data from the census of the Consejo General de la Abogacía Española (2016).

Outcome	Experiment	Procedure	Estimated effect	Source
Housing rentals	1 point reduction in the judicial congestion rate	Execution	Increase in the tenancy rate by 0.15 percentage points	*Mora-Sanguinetti (2012)*
Entrepreneurship	Align with the best judicial practice	Declaration	Increase in the rate of entry of entrepreneurs between 5 and 7%.	*Garcia-Posada and Mora-Sanguinetti (2014)*
Firm size	Align with the best judicial practice	Declaration	Increase in the average firm size would range from 0.6 to 2.8%	*Garcia-Posada and Mora-Sanguinetti (2015)*
Firm growth	Align with the best judicial practice	Declaration	Annual firm growth would rise between 1.1 and 2.8 percentage points	*Garcia-Posada and Mora-Sanguinetti (2015)*
Firm entry	Align with the best judicial practice	Declaration	Increase in entry rate would range between 8.8 and 9.5%.	*Garcia-Posada and Mora-Sanguinetti (2015)*
Litigiousness	Increase of 1% in the number of lawyers per capita	NA	Litigation would Increase by 1.4%	*Mora-Sanguinetti and Garoupa (2015)*
Credit availability	Increase of 1% in the judicial clearance rate	Execution	Increase by 0.32% the ratio of total credit to GDP	*Mora-Sanguinetti et al. (2017)*

SOURCE: Author's elaboration. The estimated effect ranges refer to the results of the different econometric specifications studied.

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UNCOVERING THE HETEROGENEOUS EFFECTS OF ECB UNCONVENTIONAL MONETARY POLICIES ACROSS EURO AREA COUNTRIES

PABLO BURRIEL AND ALESSANDRO GALESI

WORKING PAPER Nº 1631

We assess the effects of recent ECB unconventional monetary policy measures by estimating a global VAR that exploits panel variation across euro area economies and allows for cross-country interdependencies. Unconventional monetary policy measures have beneficial effects on activity, credit, inflation, and equity prices, and lead to a depreciation of the exchange rate. Most euro area members benefit from these measures, but with a substantial degree of heterogeneity. Cross-country spillovers account for a sizable fraction of this dispersion, and substantially amplify effects. Countries with less fragile banking systems benefit the most from unconventional monetary policy measures. Compared to a conventional monetary expansion, unconventional measures are particularly effective in reducing firms' financing costs and boosting credit.

The events since the collapse of Lehman Brothers in September 2008 led central banks around the world to employ unconventional monetary policy (UMP) measures to fulfill their mandate of price stability. In the case of the ECB, the monetary policy response to the crisis has been shaped by the particularly large degree of heterogeneity across euro area member states, and spillovers between those states. In this vein, ECB President Mario Draghi stated:

> "We faced severe impairments to the transmission of monetary policy across the euro area, with marked heterogeneity from country to country. This called for unconventional measures tailored to the specific frictions at hand." Draghi (2014)

> "Today's economic and monetary union is larger and more diverse than a single country, such as Germany. It is highly integrated but still at times fragmented. And it comprises a very large number of policy-makers on fiscal, structural and other economic matters. All policy-makers have to recognise that we belong to EMU together and that policies as well as policy inaction create spillovers for other members. This is an enormous responsibility for governments and other economic policymakers." Draghi (2013)

These remarks suggest that assessing the effectiveness of recent ECB UMP measures requires dealing with heterogeneity and interdependence across members of the euro area. In this paper we tackle these issues by estimating a global vector autoregressive model (GVAR), a multi-country model which exploits panel variation across all current members of the monetary union. Two features of this framework are particularly attractive. First, being a multi-country model, the GVAR deals with country heterogeneity and allows for an assessment of asymmetries in the transmission of UMP measures. And second, the model allows monetary policy to affect a given economy not just directly, but also indirectly via cross-country interactions. By taking into account spillovers across members of the euro area, the GVAR allows for a more precise identification of the impact of UMP shocks.

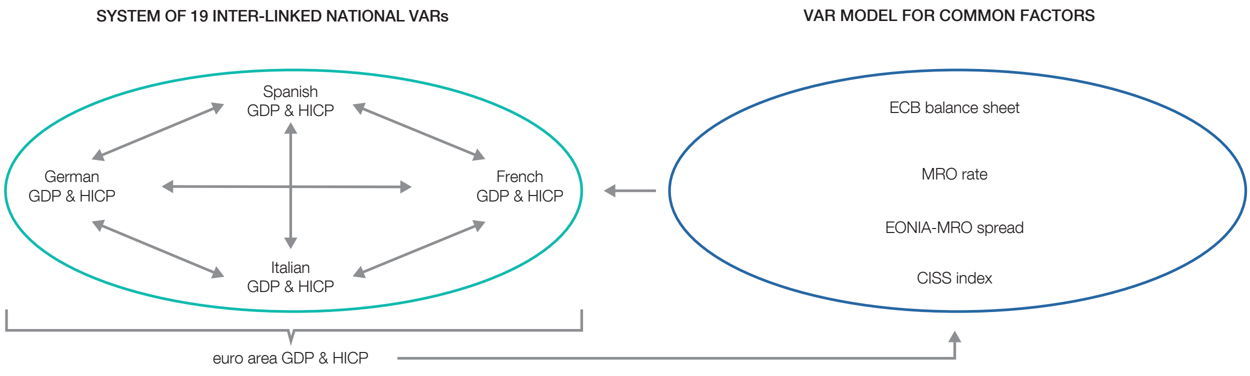
Methodology

We explicitly model each member economy of the euro area in the spirit of the mixed cross section GVAR developed in Georgiadis (2015). The model consists of two blocks: a system of 19 national VAR models in which cross-country interactions are explicitly modeled; and a VAR model for common factors which affect all euro area countries, for instance the ECB's monetary policy. Figure 1 depicts a stylized graph of the structure of the model. Monetary policy shocks affect a given economy not just directly, but also indirectly via cross-country interactions. Moreover, the common monetary policy depends on economic developments at the euro area level, hence the model accounts for the endogenous two-way feedback loops between countries and the common monetary policy of the ECB.

Specifically, each national economy consists of a VAR model which includes three sets of variables: (i) *national variables,* which represent the domestic macroeconomic and financial conditions of the economy, namely GDP, consumer prices, real exchange rate, a measure of credit risk (developed in Gilchrist and Mojon, 2014) and new lending, as well as a measure of asset prices; (ii) *foreign-specific variables,* which represent the influence of the main economic partners of a given economy and capture the relative spillovers, and are calculated as weighted averages of the corresponding domestic variables of other countries, with weights based on bilateral trade flows; (iii) *common variables,* such as monetary policy indicators, which affect all countries simultaneously.

STRUCTURE OF THE GVAR

FIGURE 1



The VAR model of the common factors includes five aggregate euro area indicators: growth in Eurosystem balance sheet assets, the interest rate on the main refinancing operations, the spread between that rate and the overnight interest rate (Eonia), a financial stress indicator (the CISS index of Holló *et al.* 2012), and long-term inflation expectations. In addition, the model includes a set of feedback variables that capture the effects of macroeconomic developments at the euro area level on the common factors, constructed as weighted averages of all countries' domestic variables, with weights are based on GDP shares.

Estimating the macroeconomic effects of the ECB's unconventional monetary policies is a complex exercise. There is no precedent for the extent to which central banks have used non-standard instruments since the onset of the financial crisis in 2007, which means that the empirical analysis must be concentrated on a relatively short period. An added difficulty is the wide range of non-standard measures that the ECB has used in the various phases of the crisis. We use a combination of sign restrictions and zero restrictions on the impulse responses to identify UMP shocks.

In line with the most recent literature, the model uses the change in the Eurosystem balance sheet as a variable to capture the interventions of the monetary authority. Concretely, following the approach of Boeckx *et al.* (2017), non-standard monetary policy decisions are identified by two restrictions. First, they should represent exogenous balance sheet expansions: that is, expansions that are not responses to heightened financial stress. Second, they should reduce the spread between short-term interbank rates and the interest rate on the main refinancing operations. The first condition excludes changes in the ECB's balance sheet that arise from banking system liquidity requirements in the face of stress situations. This is especially relevant in a setting in which the monetary authority has kept to its liquidity-providing policy with full allotment of the demand for liquidity. The second condition identifies measures that actually increase the level of banks' excess reserves, which should bring very short-term money market rates (Eonia) closer to the ECB's deposit facility rate[1].

For comparison purposes, standard conventional monetary policy shocks are also identified, by requiring that lowering the official policy rate increases output and inflation of the euro area. At the same time, changes in the policy rate are required not to move the ECB's balance sheet, so as to disentangle conventional policies from UMP shocks.

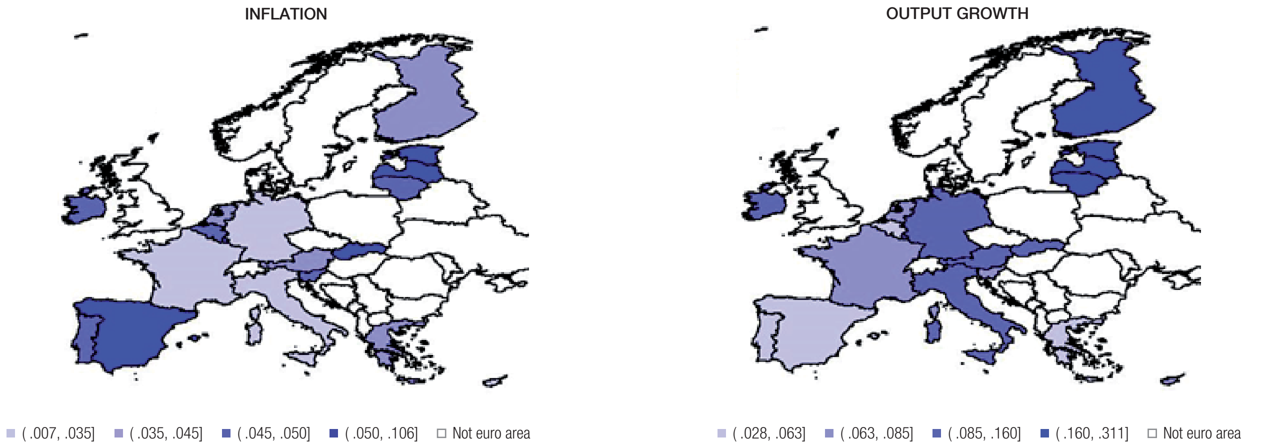
Results

We estimate the model using monthly data over the period January 2007 - September 2015, and we examine the effects of UMP shocks both for the whole euro area and for all member countries individually. From the euro area perspective, exogenous UMP shocks have beneficial effects on activity, credit, inflation, and equity prices, and lead to a depreciation of the exchange rate.

At the disaggregated level, most euro area members benefit from these measures: the UMP shock leads to significant increases in output growth and inflation in most of the countries, with effects that on average fade out after roughly six months. However, the effects are substantially heterogeneous across countries. Figure 2

1 See results and related discussion in Banco de España (2015).

GEOGRAPHIC VARIATION OF RESPONSES TO UMP SHOCKS FIGURE 2



plots the peak responses of inflation and output growth, grouped by interquartile ranges, to a UMP shock which increases the annual rate of growth of the ECB's total assets by one percent.[2] Regarding the effects on inflation, Estonia features the highest increase (about 0.10%), followed by Latvia, Luxembourg, and Spain (about 0.06%), while the smallest effects are observed in France, Germany, and Italy (about 0.03%). With respect to the effects on output growth, Baltic countries feature the highest increases, while interestingly, effects are negligible in Spain, or not statistically significant in Portugal and Greece.

In order to assess the role of cross-country spillovers in the transmission of unconventional monetary policies, the previous results are compared with those obtained in a model in which cross-country linkages are not taken into account. Figure 3 plots the peak responses of output growth and inflation, decomposed into direct effects and spillovers. We point out two results. First, spillover effects dramatically amplify the effects: once accounting for spillovers, the average peak effects on output growth and inflation roughly double (from 0.03% to 0.06% for output, from 0.03% to 0.05% for inflation). Second, a substantial part of the heterogeneity in effects is due to cross-country interactions: when spillover effects are taken into account, the range of responses of output growth increases (from [0.02% - 0.12%] to [0.03% - 0.31%]), as does the range of responses of inflation (from [0% - 0.07%] to [0.01% - 0.11%]).

[2] Note that sign restrictions identify a portion of the parameter space, rather than a unique parameter estimate. Therefore, when we report the effect of a UMP shock we are referring to the median estimate from a distribution of effects associated with many different parameterizations consistent with our sign restrictions.

We then turn to investigate which structural features of the economy may be good predictors of this heterogeneity in effects. To this end, we regress the estimated effects over a set of country-specific variables: real GDP per capita, as a proxy for the level of economic development of a country; an index of soundness of the banking sector, which is proxied by the share of capital in total assets held by banks; the unemployment rate, as a proxy for various factors such as aggregate demand conditions and labor market frictions; and an index of ease of doing business developed by the World Bank, to account for all those frictions and barriers which may impede the creation of new firms.

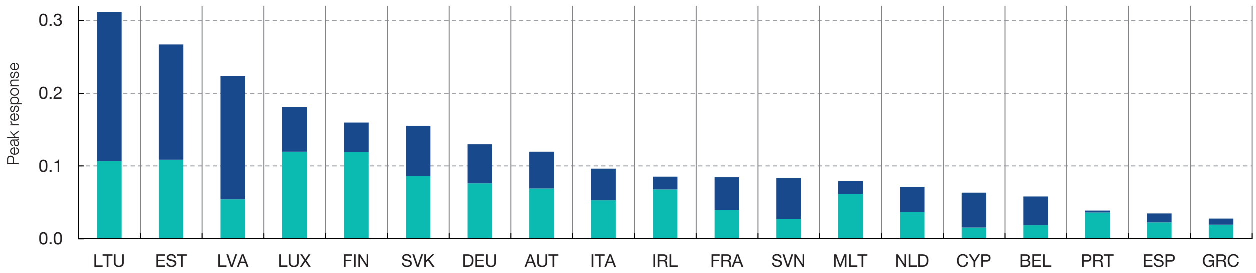
A preliminary inspection of the data shows that there is substantial correlation between the effects of UMP shocks and the soundness of each national banking system. Figure 4 plots for each country the peak responses of inflation and output growth against its banks' capital ratio. Countries with less fragile banking systems benefit the most from unconventional monetary policy measures, and this correlation holds when controlling for alternative country-specific characteristics in the regressions. This result suggests the existence of a potential bottleneck in the effectiveness of unconventional monetary policies which works via the bank lending channel, as already shown in Boeckx *et al.* (2017). Indeed, expansionary policies should benefit from the soundness of the banking system, but these stimuli may not necessarily translate into additional lending and economic activity if banks need to re-establish the solidity of their balance sheets.

Finally, Figure 5 compares the effects of unconventional monetary policy measures with those arising from standard conventional monetary policy shocks, and

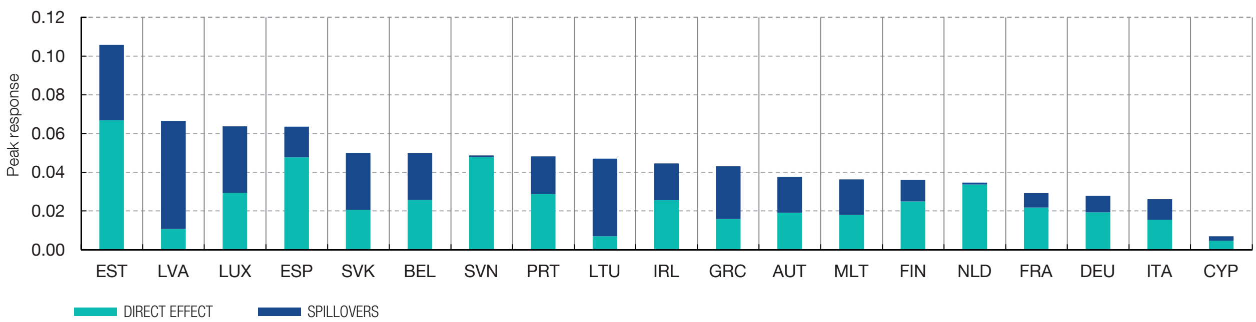
DIRECT AND SPILLOVER EFFECTS OF UNCONVENTIONAL MONETARY POLICY SHOCKS

FIGURE 3

OUTPUT GROWTH



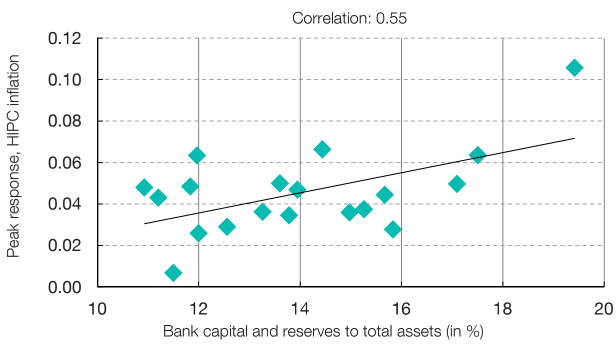
INFLATION



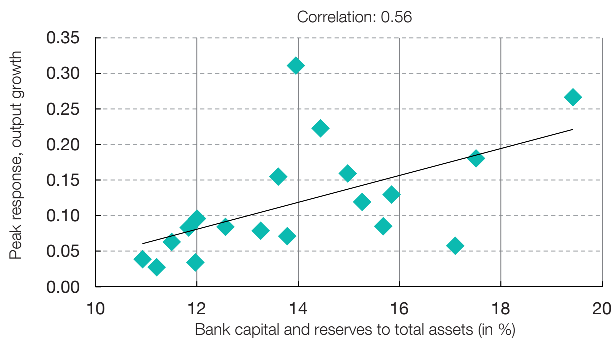
EFFECTS OF UNCONVENTIONAL MONETARY POLICY SHOCKS AND BANKS' CAPITAL RATIO

FIGURE 4

INFLATION



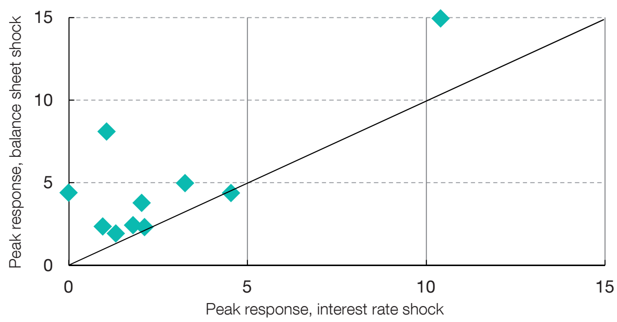
OUTPUT GROWTH



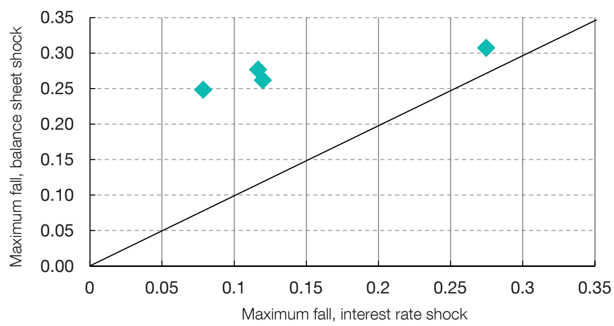
EFFECTS OF UNCONVENTIONAL AND CONVENTIONAL MONETARY POLICY SHOCKS

FIGURE 5

NEW CREDIT OPERATIONS



COST OF CREDIT



NOTES TO FIGURE 5: the *x*-scale measures the country-specific effects of a reduction in the official interest rate (conventional monetary policy shock), while the *y*-scale measures the effects of an expansion of central bank's balance sheet (unconventional monetary policy shock). Both shocks are scaled to give a 1% peak effect on output growth of the euro area. For new credit operations we report the peak response, while for cost of credit we report the maximum fall, which equals the trough response with reversed sign. 45 degrees line in solid black. In our sample, data on new credit operations and cost of credit are available for ten and four countries, respectively.

shows that unconventional measures have been particularly effective in reducing firms' financing costs and boosting credit.

Conclusions

We provide an assessment of the macroeconomic and financial effects of the ECB´s recent unconventional monetary policies by estimating a global VAR which includes all the current members of the monetary union. The multi-country structure of the GVAR explicitly takes into account national macro-financial dynamics as well as cross-country interdependencies. This allows us to better capture the relevant transmission channels of monetary policy, as well as to properly assess the size and dispersion of the effects of UMP shocks across euro area countries.

Unconventional monetary policies have beneficial effects on aggregate output and inflation, confirming their role as a stabilization tool. Most euro area members benefit from UMP shocks, but with a substantial degree of heterogeneity. Part of this dispersion is attributable to spillover effects, which substantially amplify the effects of UMP shocks. Interestingly, countries with less fragile banking systems benefit the most from unconventional monetary policies. This result suggests the existence of a potential bottleneck in the effectiveness of unconventional monetary policies which works via the bank lending channel. When comparing the effects of UMP shocks with those arising from conventional reductions in the official rate, we find that unconventional measures are particularly effective in reducing firms' financing costs and boosting credit. We read this evidence as suggesting that the ECB's unconventional monetary policies, thanks to their more targeted nature, have helped reduce financial fragmentation and thus to expand credit.

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ON THE DETERMINANTS OF FISCAL NON-COMPLIANCE

MAR DELGADO, VICTOR LLEDÓ AND JAVIER PÉREZ

WORKING PAPER Nº 1632

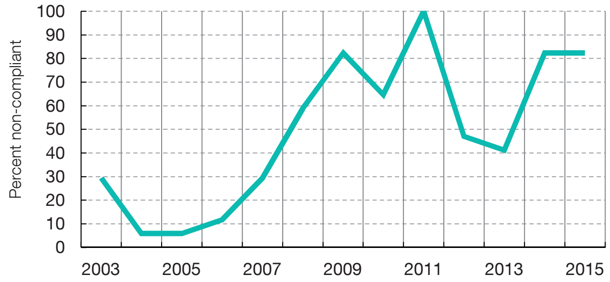
1 Motivation[1]

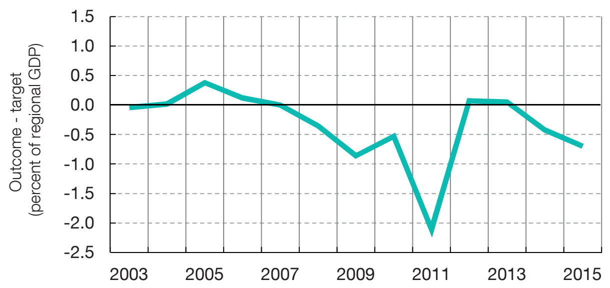
The process of fiscal consolidation that has taken place in Europe in the aftermath of the global and euro sovereign debt crisis has brought the challenges posed by enforcement of fiscal discipline in federal or decentralized countries to the forefront of policy discussions. A number of papers have looked at this issue from a cross-country perspective, but some lessons can also be extracted by looking at regions within a country. Typically, extant studies focus on understanding the determinants of cross-country or regional fiscal non-compliance, defined as the difference between fiscal targets and outcomes.

There are two strands of the literature that analyses determinants of non-compliance. One focuses on "soft government budget constraints", while the other looks at factors determining fiscal forecast errors. The former is rooted in the fiscal federalism theory: non-compliance with fiscal targets is due to the presence of soft budget constraints at the subnational level, which arise from the inability of the Central Government (CG) to credibly commit to not bailing out Subnational Governments (SNGs). As a result, SNGs do not restrain fiscal outcomes as firmly as economic fundamentals would require. Soft budget constraints have been shown to be driven by political motives. They are aggravated by flawed intergovernmental fiscal institutions, including large vertical fiscal imbalances (VFIs), weak fiscal rules, and limited market discipline[2]. The second strand of the literature is a smaller, but growing, body of empirical work dealing with the implementation of fiscal consolidations. Rather than asking why fiscal outcomes cannot be constrained ex ante, and targets enforced, it investigates whether fiscal targets, and the forecasts on which they are based, are set appropriately.

This paper considers a new framework that unifies aspects of both these approaches. Our framework distinguishes between voluntary and involuntary non-compliance, taking into account both the capacity and the willingness to comply. The study analyses Spain's regions, which make for a relevant case study, given the high degree of fiscal decentralization of the country, which has evolved steadily over the past decades. In spite of its strict framework of national and supranational fiscal rules, Spain's regions have displayed persistent fiscal non-compliance over the past twelve years, as shown in the following chart. Moreover, this non-compliance led to the implementation of bail-out funds by the CG, which provided market-based funding to SNGs in exchange for heightened control over the conduct of regional fiscal policies. In many Spanish regions, the VFI is very large.[3] In fact, the average VFI in 2014 was near 65%, with a minimum of 30% and a maximum near 100%.

EVOLUTION OF REGIONS' NON-COMPLIANCE WITH FISCAL DEFICIT TARGETS FIGURE 1





1 This entry is based on the paper "On the determinants of fiscal non-compliance: an empirical analysis of Spain's regions", by Mar Delgado-Tellez, Victor Lledó, and Javier J.Pérez, Banco de España Working Paper 1632. Forthcoming in *Fiscal Politics* (2017), edited by Victor Gaspar, Sanjeev Gupta, and Carlos Mulas-Granados (Washington: IMF).

2 See, e.g., Rodden, J., G. Eskelund, and J. Litvack, 2003, "Introduction and Overview" in Rodden, J., G. Eskelund. G., and J. Litvack, eds, *Fiscal Decentralization and the Challenge of Hard Budget Constraints,* pp. 1–31, (Cambridge: MIT Press), and Ter Minassian, T., 2015, "Promoting Responsible and Sustainable Fiscal Decentralization", in Ahmad, E. and G. Brosio, eds., *Handbook of Multilevel Finance,* (Cheltenham: Edward Elgar Publishing).

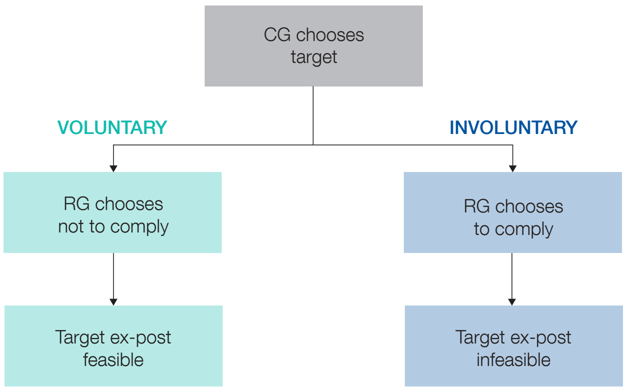
3 This study measures a region's VFI as $1\text{-}^{r}/_{s}$, where own revenue r corresponds to a region's total revenue minus transfers received by the SNG from the central government and other public entities, while own spending s is a region's total spending minus transfers paid by the SNG to the central government and other public entities.

2 Framework and main results

2.1 Game specification

The model differentiates voluntary from involuntary non-compliance, considering it as voluntary when the SNG has the capacity but not the incentives to comply, and involuntary when despite the willingness to comply, the SNG is not capable of doing so.

The classification can be interpreted in terms of a dynamic game. SNG non-compliance occurs in two situations: whenever the target chosen by the CG is feasible but the Regional Government chooses not to comply (voluntary non-compliance), and when the target chosen is not feasible (involuntary non-compliance).



A possible cause of involuntary non-compliance is that in periods of fiscal stress, CGs face increasing (domestic or supranational) political pressures to ensure that fiscal consolidation targets at the general government level are met. To minimize the political costs such pressures entail, CGs may "pass the buck" of the adjustment down to SNGs. This leads to ambitious, but (initially) feasible centre-imposed SNG fiscal targets that may become infeasible once fiscal and macro shocks materialize.

2.2 Empirical Analysis

The empirical analysis will therefore focus on the determinants of the fiscal compliance margin, defined as the difference between the fiscal outcome and the target: $f^e = f - f^*$, a positive margin meaning compliance. The analysis is based on a dynamic panel regression following the Arellano-Bond first-difference generalized method of moments approach. The regression model is based on the following equation:

$$f^e_{it} = \alpha f^e_{it-1} + \gamma INVOL_{it} + \delta VOL_{it} + \eta_i + \rho_t + \epsilon_{it},$$

where INVOL and VOL are vectors including the involuntary and voluntary determinants, respectively; η and ρ are, respectively, country and time fixed effects, α measures the persistence of the non-compliance behaviour, and γ and δ measure the relative impact of involuntary and voluntary factors on fiscal compliance.

2.3 Main Hypotheses

In decentralised countries, fiscal compliance of all tiers of government is crucial to ensure fiscal stability. The distinction between voluntary and involuntary determinants of SNG fiscal non-compliance enables a better understanding of regional fiscal behaviour.

Involuntary non-compliance should depend negatively on favourable economic shocks such as unexpectedly high economic growth, and favourable conditions such as growth or inflation above the average of other regions. Hence, the growth forecast error and the deviations of growth and inflation from the mean are expected to have a positive impact on the fiscal compliance margin (see table below). Another variable that may explain involuntary non-compliance is the required fiscal adjustment, which is defined as the difference between the fiscal target and the fiscal outcome in the previous year. Therefore, greater required adjustment implies a stricter target that is more difficult to comply with.

Meanwhile, voluntary non-compliance could depend on multiple factors: region size, fiscal autonomy, market discipline, fiscal rules, political representation, electoral years and political autonomy. First, a SNG may avoid compliance because the region is relatively big (measured by GDP or by population), giving it stronger negotiating power to convince the Central Government to rescue it. But on the other hand, in the case of a small region, the SNG may avoid compliance because of the small cost of its bailout. Given these offsetting effects on the bargaining situation, the impact of regional size is expected to be ambiguous.

The degree of fiscal autonomy would be expected to have a positive impact on the compliance margin, since regions with larger fiscal autonomy would have more capacity to adapt their income and spending. Likewise, the degree of market discipline, and the strength of fiscal rules, would also be expected to have a positive impact, as they are directly related with the negative consequences of non-compliance.

On the other hand, upcoming electoral dates are expected to have a negative impact on compliance behaviour, since compliance could entail a politically

DETERMINANTS OF FISCAL COMPLIANCE, f^e

TABLE 1

Channel	Variable	Expected effect	Empirical results
	I) Voluntary		
Spillovers	Region size: Region weight in National Population, GDP, and GDP per capita	positive/negative	—
Fiscal Autonomy	Tax autonomy	positive	—
	Share of investment in total expenditure	positive	negative
	Share of basic servicies in total expenditure	positive	negative
	Vertical Fiscal Imbalances	negative	negative
Market discipline	Lagged annual change in implicit interest	positive	positive
	Lagged annual change in rating	negative	—
	Ratio securities over loans	positive/negative	—
Fiscal Rules	Fiscal rules strength	positive	—
Political Representation	Size of parliamentary representation	negative	—
	Congruence of regional and national coalitions	negative	negative
Elections	Regional election year	negative	negative
	National election year	negative	negative
Political Autonomy	Regional representation of pro-autonomy parties	negative	—
	II) Involuntary		
Shocks	Growth forecast error	positive	positive
	Regional/national real GDP growth differential	positive	negative
	Regional/national CPI growth differential	positive	negative
Required adjustment	Fiscal target minus previous year's fiscal outcome	negative	negative
	III) Others		
Inertia	Compliance of previous years	positive	positive

costly social spending cut or tax increase. Similarly, other political factors may also affect compliance behaviour, because if the region is politically strong, it may expect to avoid sanctions for fiscal non-compliance.

2.4 Empirical results

The empirical results bore out some of the key hypotheses. All the variables expected to affect involuntary non-compliance seem to have a significant impact. Growth forecast errors and required adjustment work in the expected direction, while regional GDP growth and CPI differentials over national growth have a significant effect of unexpected sign. The impact of the required adjustment is arguably attributable to ambitious and rigid fiscal targets set by the CG as a result of national and supranational pressures for General Government consolidation, as discussed above. Overall, these variables are related with the difficulty of meeting the target, because if GDP grows less than expected or the required adjustment is too large, the target could be infeasible. In addition, the compliance margin appears to have a strong inertial behaviour.

In relation with voluntary non-compliance, VFIs have a negative impact on compliance, as expected, since a large disequilibrium between own income and expenditure implies less incentives to comply. That is, large VFIs imply a lack of co-responsibility, which allows SNGs to blame non-compliance on the design of the financing system. We also hypothesized that a larger share of investment and basic social services over total spending would have a positive impact on compliance, because it would entail greater expenditure autonomy. Nevertheless, the estimated impact is negative, probably showing that these particular expenditures tend to be more rigid, and difficult to adjust to economic shocks. In relation with market discipline, only the implicit interest rate seems to have a direct and significant impact on the compliance margin. Interest rates rose during the first years of the crisis, while falling in later years, due to the implementation of Central Government funds to finance SNG debt.

Finally, while fiscal rules do not seem to have had a significant impact, electoral dates do. The compliance margin seems to fall whenever there are regional or national elections, suggesting that SNGs prefer not to cut expenditure or raise taxes when they face the polls, because of the unpopularity of these measures. Also, when the ruling political party of the CG coincides with the one in power at the regional level, the compliance margin falls, perhaps because of the expectation of an easier bailout.

3 Policy discussion

The main policy lesson of our analysis is that enhancing fiscal compliance in multi-level governance systems requires a comprehensive assessment of inter-governmental fiscal arrangements that goes beyond strengthening formal rule-monitoring and enforcement procedures. Key issues to consider include: (i) the assignment of revenue-raising and spending mandates (to deal with VFIs); and (ii) how the burden of fiscal consolidations should be shared, and how this affects the setting of fiscal deficit targets. The assessment should be accompanied by a focus on making CG enforcement politically credible. From the latter perspective, our findings are mainly tailored to the fiscally decentralized setting of Spain, but also bear some lessons for multi-country arrangements.

More specifically, as regards the rules-based framework, our analysis suggests that there is still scope to further strengthen existing fiscal control procedures by making their activation more automatic and by tightening the legal requirements to publicly explain deviations from fiscal targets.[4] Such measures may prove particularly important during election years, when the political costs for the CG in enforcing targets are more salient and our results show that non-compliance is more pervasive. Concerning inter-governmental fiscal responsibilities, our analysis highlights the need to revisit, and possibly reduce, existing VFIs by ensuring SNGs' revenue-raising and borrowing mandates are consistent with their spending mandates.[5] This would help strengthen SNG fiscal autonomy and policy accountability, and could make the enforcement of SNG fiscal deficit targets politically less costly and more credible. Finally, as to burden sharing in consolidations, our results suggest that the credibility of fiscal targets is linked to their feasibility.

These policy conclusion need some qualifications, though. First, reasonable fiscal targets that consider each region's initial situation may be crucial for a credible target policy, as unachievable targets tend not to be binding. Nevertheless, individualized targets may lead to moral hazard, reducing the incentives for sound fiscal policy in good times, as SNGs come to expect additional room for manoeuver if they enter a crisis in a weak fiscal position. The strict implementation of fiscal rules is crucial for promoting *ex ante* fiscal margins against adverse shocks, and to guarantee that the heterogeneity of structural fiscal positions among regions in normal times is minimized. Second, our results for Spain show that the occurrence of subnational fiscal crises cannot be ruled out even when national fiscal rules are fairly credible and intergovern-mental fiscal responsibilities are appropriately assigned. From this point of view, the recent Spanish experience suggests that granting regions additional instruments to prevent liquidity crises could be useful, so that pressure on the CG to support or bail out SNGs is reduced. In particular, the development of tools to support regions' continued access to financial markets even in periods of fiscal stress is crucial.[6]

[4] Lledó, V., 2015, "Coordinating Fiscal Consolidation in Spain: Progress, Challenges, and Prospects", in IMF (ed), "Spain: Selected Issues", IMF Country Report No. 15/233, (Washington: IMF).

[5] This is in line with previous work looking at the effectiveness of subnational fiscal rules (Kotia and Lledó, 2015).

[6] Delgado Tellez, M., C. I. González and J. J. Pérez, 2016, "Regional government access to market funding: international experience and recent developments", Banco de España Economic Bulletin, February 2016.

EDUCATION, LABOUR MARKET EXPERIENCE AND COGNITIVE SKILLS: EVIDENCE FROM PIAAC [1]

JUAN FRANCISCO JIMENO, AITOR LACUESTA,
MARTA MARTÍNEZ-MATUTE, AND ERNESTO VILLANUEVA

WORKING PAPER Nº 1635

1 Introduction

Formal education and labour market experience are often assumed to be good proxies of workers' skills and, hence, of labour productivity. Recently, the OECD Program for the International Assessment of Adult Competences (PIAAC), an international study assessing adults' numeracy and literacy, has provided new evidence regarding the impact of different types of work experience and formal education on objective measures of skills. Among other things, it makes it possible to analyse how different tasks performed by workers of different education levels correlate with measures of cognitive abilities (see OECD, 2013).

To estimate the impact of experience and education on workers' skills using this data, there are some identification issues (unobserved heterogeneity in initial skills and human capital, and selection into jobs requiring different tasks) that need to be tackled. We do so by constructing relative measures of skills for each individual, using both the results of the numerical and the literacy test, and constructing alternative measures of job tasks. Results suggest that for individuals with compulsory schooling, work experience substitutes for formal education in the acquisition of skills, since the number of years of working experience correlates positively with performance in PIAAC tests, particularly among less-educated individuals. Moreover, young people with low levels of schooling who are employed at jobs intensive in numeric tasks, relative to reading tasks, also perform better on the numeracy section of the PIAAC test than the reading part. Overall, given the size of the impact and its heterogeneity across groups, the contribution of on-the-job learning to skill formation is a quarter of that of compulsory schooling in the countries we analyze.

Data

Between August 2011 and March 2012, PIAAC collected data on literacy and numeracy, as well as on the tasks performed at work, for adults aged 16-65 in 24 countries or sub-national entities. Our sample is restricted to the thirteen countries (the Czech Republic, Spain, Estonia, Finland, France, Ireland, Italy, Korea, the UK (excluding Scotland and Wales), the Netherlands, Norway, the Slovak Republic and Sweden) with the largest sample sizes and more detailed information about the number of years of working experience and age. We pool employed and unemployed individuals as well as females and males between 16 and 55 years of age but exclude those workers who have not had any labour market experience.

With this information, we construct the following variables:

- *Formal education.* We group individuals in three schooling levels (primary education or less, baccalaureate studies or forms of non-university vocational training, and university education). The fraction of prime workers with basic schooling only is 19% in the full sample, being highest in Italy (47%) and lowest in the Czech Republic (6%).

- *Tasks.* We classify tasks as either numeracy-related (elaborating a budget, using a calculator, reading bills, using fractions or percentages, reading diagrams, elaborating graphs or using algebra) or literacy-related (reading email, reading guides, reading manuals, writing emails, writing reports, reading articles, reading academic journals, reading books and writing articles). We use the number of tasks performed within each class, and the frequency with which they are performed at work, to construct intensity-adjusted indicators of numeric and literacy tasks. We also distinguish between simple and advanced tasks.

The fraction of individuals who report having performed at most a basic task is larger among those with basic schooling than among those with college. Moreover, the fraction of respondents having performed advanced tasks increases with schooling in all the countries. Finally, between one quarter and one third of individuals with basic schooling perform at least one of the simplest tasks. The variation in the fraction of

1 The working paper on which this feature is based was written as support material to the presentation report of the PIAAC study. We thank Luis Miguel Sanz, Francisco García Crespo and Ismael Sanz their help with the database and, especially, Inge Kukla for her excellent assistance.

DIFFERENTIAL NUMERACY-LITERACY SCORE VS. DIFFERENTIAL TASKS (RESPONDENTS WITH PRIMARY SCHOOLING)

Figure 1
BY OCCUPATION (a, b, c)

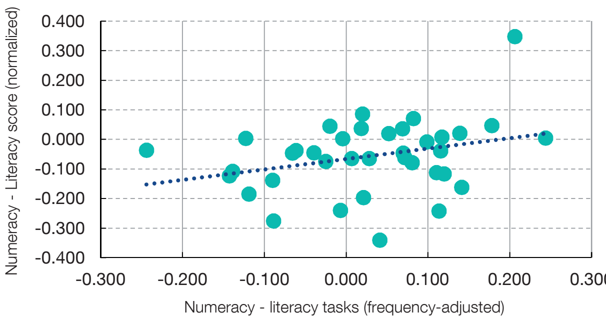


Figure 2
BY INDUSTRY (a, d)

SOURCE: PIAAC.

a Sample includes respondents 16 to 45 old with basic schooling only.
b Data from Spain, Italy, Ireland, UK, Sweden, Norway, Estonia and Netherlands (countries with larger samples of individuals with basic schooling).
c Y axis: differential score between the numeric and literacy test. X axis: difference between the (frequency-adjusted) proportion of numeric tasks done at least once during the last month over all plausible numeric tasks and the (frequency-adjusted) proportion of literacy tasks done at least once during the last month over the all plausible literacy tasks.
d Y axis: differential score between the numeric and literacy test. X axis: the difference between the proportion of numeric tasks performed at least once during the last month relative to the proportion of literacy tasks.

respondents with a college degree who report having performed advanced tasks is much higher. Thus, there is a nontrivial share of individuals with basic schooling who perform simple tasks at their jobs –having at least the possibility of using and acquiring some skills. For example, among workers with basic schooling, salespersons or builders are specialized in numerical tasks, while personal care or health workers are much more likely to report reading tasks. As preliminary evidence of the correlation of particular job market experiences and workers' skills, Figures 1 and 2 plot relative task specialization against the difference in test scores, both at the two-digit occupation level and across industries. Workers in occupations or sectors where math-oriented tasks prevail perform relatively better in the numeracy test.

Methodology

To measure whether on-the-job experience helps build skills, we study the following relationship:

$$C_m = \alpha_{0,m} + \alpha_{1,m} S + \alpha_{2,m} J + \alpha_{3,m} J * S + C_0 + \varepsilon_m \qquad m = n, l$$

where C_m in the PIAAC score (in either numerical, n, or literacy, l, tests),[2] S is formal education, J is the task-content of their job, C_0 (unobserved) is initial endowment of human capital (or some measure of the innate ability of a worker). J denotes the specific skill content of the current or last job, and reflects the extent to which an individual performs *particular tasks with numeracy or literacy content.* Finally, ε_m is an unobserved factor which is uncorrelated with the initial overall ability C_0, but which reflects the initial endowment of a particular type of human capital C_m. Our parameter of interest is α_2, that is, the impact of tasks on the job on the skills measure C_m.

If workers of greater overall ability perform more tasks, the coefficient $\alpha_{2,m}$ in the previous equation will overestimate the effect of task performance on skill accumulation. Hence, to address unobserved heterogeneity in overall ability, we instead study the relation between *specialization* in numerical tasks relative to reading and *differential* performance in numeracy tests relative to literacy tests, For this purpose, we assume that the impact of on-the-job numerical tasks on numerical ability and the impact of on-the-job literacy tasks on reading ability have a similar order of magnitude. That is, imposing $\alpha_{2,n} = \alpha_{2,l}$, we estimate the following equation:

$$C_n - C_l = [\alpha_{0,n} - \alpha_{0,l}] + [\alpha_{1,n} - \alpha_{1,l}] S + \alpha_2 [n-l] + \alpha_3 [n-l] * S + \varepsilon_n - \varepsilon_l$$

Our emphasis on relative performance reflects studies in the economics of education which have used students' scores to study subject-specific interventions on cognitive ability – see Bietenbeck (2014) or Silva *et al.* (2012).

Another source of bias in the estimation of α_2 is that workers with higher values of $\varepsilon_n - \varepsilon_l$ (those with a comparative advantage in numeracy tasks) are likely to sort into jobs with a relatively heavier math content –i.e., with a higher level of $[n-l]$. Sorting thus generates

[2] To be precise, in our regressions, C_m is the PIACC score in test m, normalized by the standard deviation of the score on that test.

a positive correlation between the numeracy content of a job and initial endowment of numeracy-related human capital. We deal with this problem by exploiting the heterogeneity in the degree of task sophistication, which allows us to identify a group of the population for which all the difference between measured numeracy and literacy skills is due to selection. Thus, we assume that *performing simple numeric tasks at the job does not have a causal effect on the difference between numeracy and literacy skills for workers with a college or high school degree.* This assumption formalizes the finding that once relevant individual characteristics are held constant, workers who are overskilled for their job do not earn higher wages than better matched workers – see Mavrovaras *et al.* (2013) or Leuven and Osterbeek (2011). On the other hand, survey data on voluntary job movers does support the hypothesis that workers sort into jobs that match their skills. For example, very few German workers move voluntarily to jobs requiring skills different from those they have, and those who do require sizeable wage increases – see Villanueva (2007).

Under these two identifying assumptions, we proceed as follows. We first restrict the sample to workers with only basic schooling, and regress the difference between the (normalized) numeracy and literacy scores on the performance of simple numeric tasks relative to reading tasks. The resulting estimate of α_2 measures both the causal impact of performing numeric tasks on the normalized numeracy score plus a sorting component. The second step is to estimate the same regression for a sample of individuals with either a high school or a college degree, for whom the corresponding coefficient only reflects sorting. We then measure the coefficient of interest as the difference between the estimates of α_2 in the two previous regressions. One can view this approach as a difference-in-difference strategy, where the treatment is the presence of tasks on the job and the control group are workers with a college or high school degree. Knowing that the second assumption might be too strong, at least the identification strategy should provide a lower bound for the average effect on the least educated, since one might argue that the effect of basic tasks on the test score should be most pronounced for workers with less education, while the selection issue should be most important for more educated workers.[3]

[3] See for example Charles *et al.* (2016), for evidence that highly-educated workers are more mobile than those with less education.

Results

Table 1 presents the estimates of the impact of numerical job tasks on numerical skills, both in relative terms with respect to literacy tasks and skills. We use two different samples for the estimation, young workers (16-35 years of age) and the whole sample (individuals aged 16-55). We also present two different measures of job task intensity. The first column of each sample measures specialization in the numerical task as the difference between the proportion of numerical and literacy tasks reported performed. The second column presents a similar measure, adjusted by the fraction of working time devoted to each task. We report only the coefficients for the pooled samples of 13 countries.

Consistently across all the estimated regressions, relative to workers whose jobs have a similar incidence of numeric and literacy tasks, workers with basic schooling in jobs that fully specialize in numerical tasks (implying $n\text{-}l=1$) perform 15.6% of one standard deviation better in the numeracy test than in the reading test (Table 1, row 1, specification (3)). When adjusting by the fraction of time devoted to numerical tasks, we find that workers who fully specialize in numerical tasks by conducting *all* numerical tasks on their jobs *every day* score 20% of one standard deviation higher in the numeracy than in the reading score (Table 1, row 1, specification (4)). The impact of full specialization in numerical tasks is largest among the youngest cohorts and, among youths, it is reduced to a half among workers with a high school or a college degree. Overall, the results are consistent with the notion that conducting particular tasks on the job increases the skills of workers with basic schooling, and that the effect is strongest for the youngest cohorts, who are accumulating their first years of experience.

As mentioned above, we can recover an estimate of the degree of sorting into numeracy-intensive jobs by examining how basic (as opposed to advanced) tasks increase test scores within groups with higher-than-basic schooling levels (with either a high school or a college degree). Those estimates are presented in Table 2.

Adjusting for the frequency of tasks on the job, a respondent with basic schooling who performs *everyday all the basic* numerical tasks we consider performs between 11.7% and 25% of one standard deviation better in the numerical test than in the reading one, compared to a worker who does not specialize (Table 2, row 1, specifications (4) and (2)). The 11.7% estimate is obtained in a sample that includes individuals aged 16-55, while the impact of 25% is

THE IMPACT OF TASK SPECIALIZATION ON RELATIVE PERFORMANCE IN NUMERACY AND LITERACY SCORE (ALL FORMS OF TASKS) (a, b, d, e, f)

TABLE 1

Variables	Dependent variable: (Normalized numeracy score-Normalized literacy score)			
	Respondents 16-35 years of age		Respondents 16-55 years of age	
	(1)	(2)	(3)	(4)
1. (Numeracy-Literacy tasks)	0.173***	0.338***	0.156***	0.199***
	(0.024)	(0.064)	(0.018)	(0.036)
2. (Numeracy-Literacy tasks) * High school	-0.081***	-0.161**	-0.053***	-0.031***
	(0.025)	(0.069)	(0.0212)	(0.0217)
3. (Numeracy-Literacy tasks)*College	-0.044***	-0.12***	-0.047**	0.010**
	(0.0269)	(0.069)	(0.020)	(0.039)
Average number of obs.	18,779		50,608	
Average R2	0.090	0.086	0.075	0.075

ADJUSTING FOR SELECTION: THE IMPACT OF SPECIALIZATION ON BASIC TASKS ON RELATIVE PERFORMANCE IN NUMERACY AND LITERACY SCORE (a, c, d, e, f)

TABLE 2

Variables	Dependent variable: (Normalized numeracy score-Normalized literacy score)			
	Respondents 16-35 years of age		Respondents 16-55 years of age	
	(1)	(2)	(3)	(4)
1. (Numeracy-Literacy tasks) $_{basic}$	0.124***	0.253***	0.069***	0.117**
	(0.037)	(0.045)	(0.022)	(0.026)
2. (Numeracy-Literacy tasks) $_{basic}$ * High school	-0.069*	-0.156***	-0.012	-0.012
	(0.041)	(0.050)	(0.021)	(0.029)
3. (Numeracy-Literacy tasks) $_{basic}$ * College	-0.083*	-0.140**	-0.023	-0.008
	(0.043)	(0.051)	(0.026)	(0.030)
4. (Numeracy-Literacy tasks) $_{advanced}$	0.034	0.048	0.049	0.109*
	(0.034)	(0.055)	(0.033)	(0.041)
5. (Numeracy-Literacy tasks) $_{advanced}$ * High school	0.01	0.036	0.010	-0.039
	(0.037)	(0.072)	(0.037)	(0.044)
6. (Numeracy-Literacy tasks) $_{advanced}$ * College	0.066**	0.082	0.047	0.00
	(0.037)	(0.070)	(0.037)	(0.044)
Obs.	18,779		50,608	
R2	0.085	0.086	0.098	0.104

SOURCES: PIAAC in Czech Republic, Spain, Estonia, Finland, France, Ireland, Italy, Korea, UK (excluding Scotland and Wales), Netherlands, Norway, Slovak Republic and Sweden.

a The dependent variable is the individual-specific difference between the score in the numeracy test and the score in the literacy test, each normalized by its standard deviation.

b In Columns (1) and (3), "numeracy tasks" is the fraction of all numeracy tasks that the respondent reports having performed on the job (current or last). "Literacy tasks" is the fraction of literacy tasks reported.
The difference "numeracy-literacy tasks" is the degree of specialization in one type of tasks. It takes value 1 if the individual performs all the numeric tasks on the job, and none of the literacy ones.

c In Columns (1) and (3), "Basic numeracy (literacy) tasks" is the fraction of basic numeracy (literacy) tasks that the respondent reports having performed on the job (current or last). The difference between the two indicates the degree of specialization in one type of basic tasks.
Basic (advanced) numeracy tasks include elaborating a budget, using a calculator, reading bills, using fractions or percentages or reading diagrams (elaborating graphs or using algebra).
Basic (advanced) reading tasks include reading email, reading guides, reading manuals, writing emails, writing reports or reading articles (reading academic journals, books or writing articles).

d In Cols. (2) and (4), numeracy and literacy tasks are defined as in Cols. (1) and (3), but each task is weighted by its frequency.

e The additional regressors (not shown) include a quadratic polynomial of years of working experience, two indicators of the educational level of the respondent (high school and college), the interaction between education and years of working experience, and age dummies (grouped in 5 year bands), among others. Each estimate is the average of 10 different regressions. Standard errors are adjusted by multiple imputation and, within each implicate, by heteroscedasticity.

f ***,**,* over an estimate denote that the estimate is statistically different from zero at the 99th, 95th and 90th confidence level, respectively.

estimated in the sample of respondents who were between 16-35 years of age in 2011-2012.

When we estimate the degree of sorting, we find that a respondent with a high school or college degree who fully specializes in basic tasks performs about 10% of one standard deviation better in the numeracy test relative to the reading test, compared to a similar worker who does not specialize. For example, among 16-35 year old high-school educated respondents, by summing the coefficients in the first two rows for specification (2), we find that full frequency-adjusted specialization in numerical tasks increases relative performance on the numeracy test by 9.7% (0.253 - 0.156 = 0.097), an effect we attribute to sorting. Similar estimates are obtained across different cohorts (comparing specifications (1) and (2) to (3) and (4)), and are little changed by estimating sorting by looking at college-educated rather than high-school educated workers (looking at row 3 rather than row 2).

Overall, the results are consistent with the hypothesis that for young workers with basic schooling, on-the-job learning may be a substitute for formal schooling. However, that is a qualitative assessment. Our more conservative estimates suggest that, among 16-35 year-olds, individuals with basic education who are specialized in numeracy tasks obtain a numerical score that is about 12.4% of one standard deviation higher (Table 2, row 1, specification (1)). If we further assume that there are selection effects which can be identified by the impact of specialization in basic numerical tasks on numeracy scores among college graduates (this impact is 0.124 - 0.083 = 4.1%), then the implied estimate of the skill-accumulation effect on those with basic schooling would be 8.3% of one standard deviation.

Under the (again) conservative assumption that workers conducted numerical or literacy tasks during 12 years of experience (the sample average), one year of experience increases numeracy skills by between 0.67% (= 8.3/12) and 1% (= 12.4/12) of one standard deviation (the first estimate accounts for sorting, while the second does not). Hanushek *et al.* (2015) estimate that increasing compulsory education by one year increases skills by between 2.7% and 2.9% of one standard deviation in the United States. Hence, one extra year of schooling would be equivalent to between 2.7 (= 2.7/1) and 4.3 years (= 2.9/0.67) of on-the-job learning.

Concluding remarks

This paper studies how on-the-job learning contributes to the acquisition of numeracy and literacy skills in a pool of countries that implemented the PIAAC survey, focusing on individuals with low levels of schooling. Our findings have some implications for the design of active labour market policies and specifically whether funds should be directed to training or other types of instruments such as orientation or targeted social security rebates. A large fraction of the unemployed have basic schooling. Our results imply that their previous experience and tasks –even in basic jobs – are useful predictors of their skills and future employability. Secondly, performing specific tasks on the job might contribute to increasing cognitive skills for less-educated individuals. While the tentative rate of return to on-the-job training that we have estimated is about a quarter of that of formal schooling, the costs of increasing school attendance for prime aged workers may be substantial.

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A SPECTRAL EM ALGORITHM FOR DYNAMIC FACTOR MODELS

GABRIELE FIORENTINI, ALESSANDRO GALESI AND ENRIQUE SENTANA

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We make two complementary contributions to efficiently estimate dynamic factor models: a frequency domain EM algorithm and a swift iterated indirect inference procedure for ARMA models with no asymptotic efficiency loss for any finite number of iterations. Although our procedures can estimate such models with many series without good initial values, near the optimum we recommend switching to a gradient method that analytically computes spectral scores using the EM principle. We successfully employ our methods to construct an index that captures the common movements of US sectoral employment growth rates, which we compare to the indices obtained by semiparametric methods.

SPANISH PUBLIC FINANCES THROUGH THE FINANCIAL CRISIS

FRANCISCO MARTÍ AND JAVIER J. PÉREZ

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Spain's public finances have been under significant stress during the crisis, despite precrisis fiscal surpluses and low levels of public debt. The impact of the crisis and an initial phase of counter-cyclical activism exacerbated the existing (structural) fiscal vulnerabilities. To correct the fiscal imbalances, a significant number of bold policy actions were taken, affecting taxation, public spending, national fiscal rules and the structure of the public sector. In this paper we discuss the evolution of public finances in Spain during the financial crisis, framing crisis-related fiscal policy measures within medium-term economic trends and focusing on policy responses to the financial crisis. We also touch upon the main policy challenges ahead.

THE DETERMINANTS OF LONG-TERM DEBT ISSUANCE BY EUROPEAN BANKS: EVIDENCE OF TWO CRISES

ADRIAN VAN RIXTEL, LUNA ROMO GONZÁLEZ AND JING YANG

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This paper is one of the first to investigate the determinants of bond issuance by European banks. We use a unique database of around 50,000 bonds issued by 63 banks from 14 European countries to test explicitly a broad set of hypotheses on the drivers of bond issuance. The sample covers the two major financial crises that caused severe dislocations in bank funding structures, i.e. the global financial crisis of 2008-2009 and the euro area financial crisis of 2010-2012. Our findings suggest that "market timing" (low interest rates) drove issuance before but not during the crisis, when access to funding became more important than its cost. Moreover, during the crisis years, country-risk characteristics became drivers of bond issuance, while for banks from the euro area periphery central bank liquidity substituted for unsecured long-term debt. We also show that heightened financial market tensions were detrimental to bond issuance, and more strongly so during crisis episodes. We find evidence of "leverage targeting" by means of the issuance of long-term debt during the crisis years. The positive and significant coefficient for the capital ratio supports the "risk absorption" hypothesis, suggesting that larger capital buffers enhanced the risk-bearing capacity of banks and allowed them to issue more debt. Moreover, banks with deposit supply constraints and relatively large loan portfolios issued more bonds, both before and after the crisis years. We find, too, that higher rated banks were more likely to issue bonds, also during the crisis period. Stronger banks issued unsecured debt in particular, while weaker banks resorted more to issuance of covered bonds. Overall, our results suggest that stronger banks – including those from peripheral countries – maintained better access to longer-term funding markets, even during crisis periods.

WHEN FISCAL CONSOLIDATION MEETS PRIVATE DELEVERAGING

JAVIER ANDRÉS, ÓSCAR ARCE AND CARLOS THOMAS

WORKING PAPER Nº 1622

We analyze the interaction between fiscal consolidation and private-sector deleveraging in an economy within a monetary union. Pre-existing long term collateralized private debt – a core ingredient of the deleveraging process – plays a critical role in shaping fiscal multipliers. By buffering the short-run fall in debtors' spending capacity, long-run private debt reduces the short-run multipliers of aggressive (large and/or fast) consolidations. However, absent credibility concerns, aggressive consolidations raise the intensity and length of private deleveraging, causing higher output losses over the medium run. In terms of discounted output losses and welfare, this latter effect dominates, so that larger and faster consolidations are relatively costlier than smaller and more gradual ones. Also, in this environment, alternative budgetary instruments generate sizable differences in terms of their incidence on private deleveraging dynamics and, hence, on the overall output costs of fiscal consolidations.

THE EFFECT OF ELECTORAL SYSTEMS ON VOTER TURNOUT: EVIDENCE FROM A NATURAL EXPERIMENT

CARLOS SANZ

WORKING PAPER Nº 1623

I exploit the unique institutional framework of Spanish local elections, where municipalities follow different electoral systems depending on their population size, as mandated by a national law. Using a regression discontinuity design, I compare turnout under closed-list proportional representation and under an open-list, plurality-at-large system where voters can vote for individual candidates from the same or different party lists. I find that the openlist system increases turnout by between one and two percentage points. The results suggest that open-list systems, which introduce competition both across and within parties, are conducive to greater voter turnout.

OPTIMAL MONETARY POLICY WITH HETEROGENEOUS AGENTS

GALO NUÑO AND CARLOS THOMAS

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See Features section.

OIL PRICE AND ECONOMIC GROWTH: A LONG STORY?

MARÍA DOLORES GADEA, ANA GÓMEZ-LOSCOS
AND ANTONIO MONTAÑÉS

WORKING PAPER Nº 1625

This study investigates changes in the relationship between oil prices and the US economy from a long-term perspective. Although neither of the two series (oil price and GDP growth rates) presents structural breaks in mean, we identify different volatility periods in both of them, separately. From a multivariate perspective, we do not observe a significant effect between changes in oil prices and GDP growth when considering the full period. However, we find a significant relationship in some subperiods by carrying out a rolling analysis and by investigating the presence of structural breaks in the multivariate framework. Finally, we obtain evidence, by means of a time-varying VAR, that the impact of the oil price shock on GDP growth has declined over time. We also observe that the negative effect is greater at the time of large oil price increases, supporting previous evidence of nonlinearity in the relationship.

STOCK MARKET CYCLES AND SUPPLY SIDE DYNAMICS: TWO WORLDS, ONE VISION?

PAUL DE GRAUWE AND EDDIE GERBA

WORKING PAPER Nº 1626

This paper compares two state-of-the-art but very distinct methods used in macroeconomics: rational-expectations DSGE and bounded rationality behavioural models. Both models are extended to include financial frictions on the supply side. The result in both frameworks is that production, supply of credit and the front payment to capital producers depend heavily on stock market cycles. During phases of optimism, credit is abundant, access to production capital is easy, the cash-in-advance constraint is lax, risks are undervalued, and production booms. But with a reversal in market sentiment, the contraction in all these parameters is deep and sometimes asymmetric. This is all the more evident in the behavioural model, where economic agents' cognitive limitations exacerbate the contraction. While both models capture the empirical regularities very well, the validation exercise is even more favourable to the behavioural model.

THE EVOLUTION OF INFLATION EXPECTATIONS IN EURO AREA MARKETS

RICARDO GIMENO AND EVA ORTEGA

WORKING PAPER Nº 1627

This paper explores the behaviour of inflation expectations across countries that share their monetary policy, in particular those of the European Monetary Union. We investigate the possible common features at the various horizons, as well as differentials across euro area countries. A multi-country dynamic factor model based on Diebold *et al.* (2008), where we also add a liquidity risk component, is proposed and estimated using daily data from inflation swaps for Spain, Italy, France, Germany and the euro area as a whole, and for a wide range of horizons. It allows us to calculate the proportion of common vs country-specific components in the term structure of inflation expectations. We find sizable differences in inflation expectations across the main euro area countries only at short maturities, while in general a common component predominates throughout the years, especially at long horizons. The common long-run level of inflation expectations is estimated to have fallen since late 2014, while an increased persistence of lower expected inflation and for longer horizons is estimated from 2012. There has been no reversal in either of these characteristics following the announcement and implementation of the ECB's unconventional monetary policy measures.

THE DYNAMIC EFFECT OF PUBLIC EXPENDITURE SHOCKS IN THE UNITED STATES

SUSANA PÁRRAGA RODRÍGUEZ

WORKING PAPER Nº 1628

This paper estimates the dynamic aggregate effect of exogenous shocks to two key components of public expenditure in the United States: government income transfers and government spending. The identification strategy positions the structural shocks to public expenditures in an SVAR framework with exogenous measures of public expenditure changes. Transfers shocks are based on a new narrative variable of legislated increases in U.S. social security benefits. I demonstrate that shocks to different types of public expenditure do not have the same macroeconomic impact. The estimated government spending multiplier is between 0 and 1, while increases in transfers generate a multiplier effect above 1.

THE AGGREGATE EFFECTS OF GOVERNMENT INCOME TRANSFER SHOCKS - EU EVIDENCE

SUSANA PÁRRAGA RODRÍGUEZ

WORKING PAPER Nº 1629

This paper estimates the aggregate effect of government income transfer shocks for a sample of EU countries. The new measure of transfer shocks builds on a dataset by public finance experts of the European System of Central Banks (ESCB). The identification strategy consists of a narrative analysis of the old-age pension-related policy actions reported in the ESCB dataset. Increases in old-age pensions are found to have a positive impact on aggregate expenditure components and employment consistent with a multiplier effect of between 0 and 1.

CREDIT, CRISIS AND CONTRACT ENFORCEMENT: EVIDENCE FROM THE SPANISH LOAN MARKET

JUAN S. MORA-SANGUINETTI, MARTA MARTÍNEZ-MATUTE AND MIGUEL GARCÍA-POSADA

WORKING PAPER Nº 1630

A number of theoretical and empirical studies have shown that the development of credit markets is affected by the efficacy of enforcement institutions. A less explored question is how these institutions interact with turns in the economic cycle and the impact of different types of legal procedures on credit market performance. This paper fills these gaps by analysing how differences in the availability of credit and in non-performing loans ratios may be partially explained by regional variations in the quality of loan contract enforcement during recent periods of sustained growth (2001-2007) and recession (since 2008) in the Spanish economy. This research concludes that a rise in the clearance rate of executions (i.e. when a judge enforces the repayment of a debt) increases the ratio of total credit to GDP. However, the declaratory stage of proceedings (i.e. when a debt is first verified by a judge) does not seem to be statistically significant. A possible explanation of this finding is that, throughout the economic cycle, a significant proportion of the defaults declared are strategic (i.e. defaults by a solvent debtor). Furthermore, it is observed that, in regions where declaratory procedures are more efficient, less credit is declared as non-performing. The latter effect, however, is only observed after the onset of the "Great Recession" in 2008. This may be related to the increase in non-strategic defaults during a downturn.

UNCOVERING THE HETEROGENEOUS EFFECTS OF ECB UNCONVENTIONAL MONETARY POLICIES ACROSS EURO AREA COUNTRIES

PABLO BURRIEL AND ALESSANDRO GALESI

WORKING PAPER Nº 1631

See Features section.

ON THE DETERMINANTS OF FISCAL NON-COMPLIANCE: AN EMPIRICAL ANALYSIS OF SPAIN'S REGIONS

MAR DELGADO TÉLLEZ, VÍCTOR D. LLEDÓ AND JAVIER J. PÉREZ

WORKING PAPER Nº 1632

See Features section.

PORTFOLIO REBALANCING AND ASSET PRICING WITH HETEROGENEOUS INATTENTION

OMAR RACHEDI

WORKING PAPER Nº 1633

Can households' inattention to the stock market quantitatively account for the inertia in portfolio rebalancing? I address this question by introducing an observation cost into a production economy with heterogeneous agents. In this environment inattention changes endogenously over time and across agents. I find that inattention explains the inertia in portfolio rebalancing and its heterogeneity across households. Inattention also rationalises the limited stock market participation observed in the data, and improves the asset pricing performance of the model. Finally, I present a novel testable implication linking the effects of inattention on portfolio choices and asset prices to households' funding liquidity.

THE VARIATION OF EXPORT PRICES ACROSS AND WITHIN FIRMS

JUAN DE LUCIO, RAÚL MÍNGUEZ, ASIER MINONDO AND FRANCISCO REQUENA

WORKING PAPER Nº 1634

This paper uses transaction-level trade data to analyse the differences in export prices across and within Spanish manufacturing firms in the year 2014. The transactional nature of the database uncovers sizable differences in the price that an exporter charges for the same product and destination. These differences are related to the number of goods covered within each product category, volume discounts and vertically differentiated varieties. Export prices are positively correlated with firms' productivity, destination markets' GDP per capita and distance to Spain. These latter results suggest that Spanish exporters compete in quality.

EDUCATION, LABOUR MARKET EXPERIENCE AND COGNITIVE SKILLS: EVIDENCE FROM PIAAC

JUAN FRANCISCO JIMENO, AITOR LACUESTA, MARTA MARTÍNEZ-MATUTE AND ERNESTO VILLANUEVA

WORKING PAPER Nº 1635

See Features section.

IMPLICIT PUBLIC DEBT THRESHOLDS: AN EMPIRICAL EXERCISE FOR THE CASE OF SPAIN

JAVIER ANDRÉS, JAVIER J. PÉREZ AND JUAN A. ROJAS

WORKING PAPER Nº 1701

We extend previous work that combines the Value at Risk approach with estimation of the correlation pattern of the macroeconomic determinants of public debt dynamics by means of Vector Autoregressions (VARs). These estimated models are used to compute the probability that the public debt ratio exceeds a given threshold, by means of Monte Carlo simulations. We apply this methodology to Spanish data and compute time-series probabilities to analyse the possible correlation with market risk assessment, measured by the spread over the German bond. Taking into account the high correlation between the probability of crossing a pre-specified debt threshold and the spread, we go a step further and ask what would be the threshold that maximises the correlation between the two variables. The aim of this exercise is to gauge the implicit debt threshold or "prudent debt level" that is most consistent with market expectations as measured by the sovereign yield spread. The level thus obtained is consistent with the medium-term debt-to-GDP ratio anchor of 60% of GDP.

BUSINESS CYCLE ESTIMATION WITH HIGH-PASS AND BAND-PASS LOCAL POLYNOMIAL REGRESSION

LUIS J. ÁLVAREZ

WORKING PAPER Nº 1702

Filters constructed on the basis of standard local polynomial regression (LPR) methods have been used in the literature to estimate the business cycle. We provide a frequency domain interpretation of the contrast filter obtained by the difference between a series and its long-run LPR component and show that it operates as a kind of high-pass filter, meaning it provides a noisy estimate of the cycle. We alternatively propose band-pass local polynomial regression methods aimed at isolating the cyclical component. Results are compared to standard high-pass and band-pass filters. Procedures are illustrated using the US GDP series.

DYNAMIC PANEL DATA MODELLING USING MAXIMUM LIKELIHOOD: AN ALTERNATIVE TO ARELLANO-BOND

ENRIQUE MORAL-BENITO, PAUL ALLISON AND RICHARD WILLIAMS

WORKING PAPER Nº 1703

The Arellano and Bond (1991) estimator is widely-used among applied researchers when estimating dynamic panels with fixed effects and predetermined regressors. This estimator might behave poorly in finite samples when the cross-section dimension of the data is small (i.e. small N), especially if the variables under analysis are persistent over time. This paper discusses a maximum likelihood estimator that is asymptotically equivalent to Arellano and Bond (1991) but presents better finite sample behaviour. Moreover, the estimator is easy to implement in Stata using the xtdpdml command as described in the companion paper Williams *et al.* (2016), which also discusses further advantages of the proposed estimator for practitioners.

CREATING ASSOCIATIONS AS A SUBSTITUTE FOR DIRECT BANK CREDIT. EVIDENCE FROM BELGIUM

MIKEL BEDAYO

WORKING PAPER Nº 1704

Firms' incentives to join up with other firms to apply collectively for a single loan are studied empirically in this paper. When several firms make a joint application for a single loan an association of firms is created. We identify the associations that had access to credit in Belgium over the period 2001-2011 and the firms that made up each association, observing the amount of credit that both the firms and the associations obtained from each financial institution they used. We analyse the amount of credit obtained by firms according to whether or not they belonged to an association, the likelihood of firms forming associations, the impact of belonging to an association on the amount of credit firms receive from banks and the effect of firms not obtaining any direct credit on the amount obtained by the associations formed by such firms. We also analyse whether associations formed by common-ownership firms are able to access more credit than other associations. We find that large and long-established firms are more likely to join up with other firms to make joint loan applications and that associations obtain more credit if all their members use the same bank as the association does to obtain credit. Furthermore, the lower a firm's credit over the previous year, the more likely it is to form an association to obtain credit, and we show that associations comprising small firms with no credit history are especially credit constrained.

THE EVOLUTION OF REGIONAL ECONOMIC INTERLINKAGES IN EUROPE

MARÍA DOLORES GADEA-RIVAS, ANA GÓMEZ-LOSCOS AND DANILO LEIVA-LEON

WORKING PAPER Nº 1705

This paper studies the dynamics of the propagation of regional business cycle shocks in Europe and uncovers new features of its underlying mechanisms. To address the lack of high frequency data at the regional level, we propose a new method to measure timevarying synchronization in small samples that combines regime-switching models and dynamic model averaging. The results indicate that: (i) in just two years, the Great Recession synchronized Europe twice as much as the European Union integration process did over several decades; (ii) Ile de France is the region acting as the main channel for the transmission of business cycle shocks in Europe; followed by Inner London and Lombardia; and (iii) we identify a nonlinear relationship between sectoral composition and regional synchronization, which was amplified in the wake of the Great Recession. Similarities in services sectors are primarily responsible for this nonlinear relationship.

THE CRUCIAL ROLE OF SOCIAL WELFARE CRITERIA FOR OPTIMAL INHERITANCE TAXATION

ESTEBAN GARCÍA-MIRALLES

WORKING PAPER Nº 1706

This paper calibrates the full social optimal inheritance tax rate derived by Piketty and Saez (2013) and shows that different assumptions on the form of the social welfare function lead to very different optimal inheritance tax rates, ranging from negative (under a utilitarian criterion) to positive and large (even assuming joy of giving motives). The paper also calibrates the optimal tax rate by percentile of the distribution of bequest received, as Piketty and Saez do, but accounting for heterogeneity in wealth and labor income. The result is that the optimal tax rate from the perspective of the non-receivers varies significantly, contrary to the constant tax rate obtained by these authors.

SERVICE REGULATIONS, INPUT PRICES AND EXPORT VOLUMES: EVIDENCE FROM A PANEL OF MANUFACTURING FIRMS

MÓNICA CORREA-LÓPEZ AND RAFAEL DOMÉNECH

WORKING PAPER Nº 1707

Using a panel of firm-level data from Spanish manufacturers, this study shows that better service regulation reduces the price of intermediate inputs paid by downstream firms. The beneficial cost effects of services reforms extend to both large and small-to-medium sized corporations (SMEs), but the former tend to enjoy greater gains. This feature also manifests itself in international markets. We identify an input cost channel through which service regulations affect the volume of exports of large manufacturers, while the evidence of such channel is weaker for SMEs. Our estimates indicate that, from 1991 till 2007, large firms increased their volume of exports by an average of 22% as a result of the direct input cost effect of services reforms, such that the firms that benefited the most typically belonged to industries more dependent on service inputs. Furthermore, convergence to the "best practice" regulatory framework in services would have raised exports at least by an additional 10%. We conclude that firm size is relevant for the connection between services reforms, intermediate input prices and export volumes.

DISSECTING US RECOVERIES

MARÍA DOLORES GADEA, ANA GÓMEZ-LOSCOS
AND GABRIEL PÉREZ-QUIRÓS

WORKING PAPER Nº 1708

We propose a set of new quantitative measures to characterise more fully the features of economic recoveries. We apply these measures to post-war US expansions and use cluster analysis to determine that there are two different types of recoveries in recent US economic history, with most expansions before 1984 (Great Moderation) looking quite different from those after.

DIRECT DEMOCRACY AND GOVERNMENT SIZE: EVIDENCE FROM SPAIN

CARLOS SANZ

WORKING PAPER Nº 1709

Direct democracy is spreading across the world, but little is known about its effects on policy. I provide evidence from a unique scenario. In Spain, national law determines that municipalities follow either direct or representative democracy, depending on their population. Regression discontinuity estimates indicate that direct democracy leads to smaller government, reducing public spending by around 8%. Public revenue decreases by a similar amount and, therefore, there is no effect on budget deficits. These findings can be explained by a model in which direct democracy allows voters to enforce lower special interest spending.

FISCAL DELEGATION IN A MONETARY UNION: INSTRUMENT ASSIGNMENT AND STABILIZATION PROPERTIES

HENRIQUE S. BASSO AND JAMES COSTAIN

WORKING PAPER Nº 1710

Motivated by the failure of fiscal rules to eliminate deficit bias in the euro area, this paper analyzes an alternative policy regime in which each Member State government delegates at least one fiscal instrument to an independent authority with a mandate to avoid excessive debt. Other fiscal decisions remain in the hands of member governments, including the allocation of spending across different public goods, and the composition of taxation. We study the short - and long-run properties of dynamic games representing different institutional configurations in a monetary union. Delegation of budget balance responsibilities to a national or union-wide fiscal authority implies large long-run welfare gains due to much lower steady-state debt. The presence of the fiscal authority also *reduces* the welfare cost of fluctuations in the demand for public spending, in spite of the fact that the authority imposes considerable "austerity" when it responds to fiscal shocks.

TFP GROWTH AND COMMODITY PRICES IN EMERGING ECONOMIES

IVÁN KATARYNIUK AND JAIME MARTÍNEZ-MARTÍN

WORKING PAPER Nº 1711

In this paper we aim at empirically testing cross-country impacts of commodity price shocks to aggregate TFP growth for a sample of emerging economies. Under a growth accounting framework, we estimate country-specific TFP growth (1992-2014) and select the attendant robust determinants by means of a Bayesian Model Averaging (BMA) approach. To identify the effects of structural shocks, we propose a Bayesian panel VAR model and calculate cyclically adjusted TFP growth net of demand shocks (i.e. output gap) and commodity prices. Our results suggest that: i) the relationship of commodity prices to TFP growth has been very high in small commodity-exporting economies (i.e. an increase of 10% in commodity prices is associated with a sizable expansion of TFP growth in a year for an average commodity exporter); ii) although our evidence is not sufficient to empirically distinguish among theoretical explanations, our results favour an interpretation that weights short-term effects of commodity prices on productivity, either through transitional dynamics to the manufacturing sector or through mismeasurement of TFP; and iii) cyclically adjusted TFP growth highlights the importance of negative supply shocks in commodity-exporting countries. All in all, much of the increase in TFP growth in the last decade was related to a favourable cyclical environment, a result with potentially significant policy implications for commodity-dependent economies.

TOP-DOWN VS. BOTTOM-UP? RECONCILING THE EFFECTS OF TAX AND TRANSFER SHOCKS ON OUTPUT

SEBASTIAN GECHERT, CHRISTOPH PAETZ AND PALOMA VILLANUEVA

WORKING PAPER Nº 1712

Using the bottom-up approach of Romer and Romer (2010), we construct a narrative dataset of net-revenue shocks for Germany by extending the tax shock series of Hayo and Uhl (2014) and coding a shock series for social security contributions, benefits and transfers. We estimate the multiplier effects of shocks to net revenues, taxes, social security contributions, benefits and transfers in a proxy SVAR framework [Mertens and Ravn (2013)] and compare them with the top-down identification [Blanchard and Perotti (2002)]. We find multiplier effects of net-revenue components between 0 and 1 for both approaches. These estimates are comparably low and we investigate the differences.

HAS THE FED RESPONDED TO HOUSE AND STOCK PRICES? A TIME-VARYING ANALYSIS

KNUT ARE AASTVEIT, FRANCESCO FURLANETTO AND FRANCESCA LORIA

WORKING PAPER Nº 1713

In this paper we use a structural VAR model with time-varying parameters and stochastic volatility to investigate whether the Federal Reserve has responded systematically to asset prices and whether this response has changed over time. To recover the systematic component of monetary policy, we interpret the interest rate equation in the VAR as an extended monetary policy rule responding to inflation, the output gap, house prices and stock prices. We find some time variation in the coefficients for house prices and stock prices but fairly stable coefficients over time for inflation and the output gap. Our results indicate that the systematic component of monetary policy in the US, i) attached a positive weight to real house price growth but lowered it prior to the crisis and eventually raised it again, and ii) only episodically took real stock price growth into account.

THE IMPACT OF FIRMS' FINANCIAL POSITION ON FIXED INVESTMENT AND EMPLOYMENT. AN ANALYSIS FOR SPAIN

FÁTIMA HERRANZ GONZÁLEZ AND CARMEN MARTÍNEZ-CARRASCAL

WORKING PAPER Nº 1714

Using a large sample of Spanish companies, this paper investigates the impact that firms' financial health has on their investment and employment decisions. The results indicate that firms' financial position is important for explaining firms' capital expenditures and their employment levels, since cash flow, indebtedness and the debt burden appear to be relevant for explaining investment and employment dynamics. Likewise, the results obtained point to a non-linear impact of financial position on these decisions, this being larger for companies in a less sound financial situation, and suggest that the role of financial factors in explaining investment and employment dynamics is likely to be greater in recessionary periods.

FINANCIAL STABILITY JOURNAL

The Financial Stability Journal (Revista de Estabilidad Financiera) is a half-yearly journal published by the Banco de España that aims to act as a platform for communication and dialogue regarding issues related to financial stability, with a particular focus on prudential regulation and supervision. Its board of editors comprises internal and external professionals. All articles appearing in the journal, which may be authored by Banco de España staff or researchers from other institutions, are refereed by at least one member of the board of editors.

LA REGULACIÓN DE LOS ÍNDICES DE REFERENCIA Y LA REFORMA DEL EURÍBOR

MARÍA JOSÉ GÓMEZ YUBERO

ESTABILIDAD FINANCIERA 31, NOVEMBER 2016, 9-26

This paper reviews the main measures adopted by the international authorities in response to the G20's mandate to strengthen benchmark indices (such as LIBOR, EURIBOR and TIBOR) and to reduce the possibilities of manipulation. The author specifically focuses on the European Regulation on Indices used as Benchmarks, which was recently approved with the aim of ensuring that the indices produced and used in the European Union are reliable, representative, suited to purpose and not prone to manipulation. The regulation clarifies the responsibilities that may arise from the production of indices and subjects this activity to supervision, along with the institutions involved. The critical indices, such as EURIBOR, are subject to stricter rules. The article concludes setting out the status of the EURIBOR reform under way and the challenges outstanding.

MACROPRUDENTIAL THEORY: ADVANCES AND CHALLENGES

HENRIQUE S. BASSO AND JAMES S. COSTAIN

ESTABILIDAD FINANCIERA 31, NOVEMBER 2016, 27-42

The authors review the academic literature on macroprudential policies, including recent theoretical work analysing the causes of financial instability, its consequences for the macroeconomy and the potential macroprudential response to these causes and consequences. The article focuses on the information asymmetries under which transactions occur in banking and financial markets in general, and on the strategic complementarities between the decisions of agents operating on different markets, as underlying elements common to the causes and consequences of financial fragility. To conclude, the current challenges for macroeconomic modelling and for the design of regulation and public policy in the macroprudential field are discussed.

RIESGO DE LIQUIDEZ SISTÉMICA. INDICADORES PARA EL SISTEMA BANCARIO ESPAÑOL

MATÍAS LAMAS RODRÍGUEZ

ESTABILIDAD FINANCIERA 31, NOVEMBER 2016, 43-62

The author proposes a non-exhaustive list of indicators proxying the exposure of the Spanish banking system to systemic liquidity risk, understood as institutions' underestimation of the possibility of not being able to obtain funding on the markets or to dispose of a sufficient volume of liquid assets at a fair price. The indicators consider two key elements: aspects of the banks' balance sheets related to the stability of their funding sources and to their buffers of liquid financial assets (funding liquidity risk), and the actual liquidity that Treasury debt can provide as part of the buffer of liquid assets (market liquidity risk). The article concludes that there is fairly sound evidence that bank balance sheets have gained "liquidity" in recent years, while the results of the analysis of market liquidity are still rather inconclusive.

THE NET STABLE FUNDING RATIO: THEORETICAL BACKGROUND AND ANALYSIS OF THE SPANISH BANKING SECTOR

ITZIAR IRANZO MARCO

ESTABILIDAD FINANCIERA 31, NOVEMBER 2016, 63-96

This paper proposes a methodology for calculating the net stable funding ratio (NSFR) and estimates, on this basis, the level of this ratio for the main Spanish banks in 2013 and 2015. The results show the gradual increase in the estimated average liquidity ratio across the banks surveyed, from 95% in 2013 to 106% in 2015. In addition, the article shows the analysis of the specific balance sheet rearrangement measures aimed at enhancing the ratio, focusing particularly on those affecting credit supply and the volume of deposits. While a disparity of reallocation methods across banks is observed, the article concludes that adjustment towards the NSFR does not necessarily entail a reduction in lending or increased deposits.

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NEWS AND EVENTS

NEWS

NEW OCCASIONAL VISITING SCHOLAR PROGRAM

The ADG Economics and Research has recently launched an Occasional Visiting Scholar Program aimed at maintaining a high standard of achievement in the research output of the Banco de España. The program brings distinguished scholars for a few one-week stays, in order to advise on specific projects of the research staff. This year the Banco de España will host the following scholars:

Pol Antràs (Harvard University).
Jesús Fernández-Villaverde (University of Pennsylvania).
Tano Santos (Columbia University).

BANCO DE ESPAÑA ECONOMISTS APPOINTED TO COORDINATE ESCB RESEARCH CLUSTERS

The ECB and the national central banks of the European Union, which together make up the European System of Central Banks (ESCB), have recently established three Research Clusters to promote collaborative work across ESCB institutions.

The Banco de España is pleased to announce that two of its staff will be involved in organizing these networks. Research Cluster 1, to address monetary economics, will be coordinated by Carlos Thomas (Banco de España) and Alessandro Secchi (Banca d'Italia). Research Cluster 2, which will address macroeconomic policy issues related to the context of a monetary union, including international macroeconomics, fiscal policy, labor economics, competitiveness, and EMU governance, will be coordinated by James Costain (Banco de España) and Antoine Berthou (Banque de France). Research Cluster 3, addressing financial economics, will be coordinated by Hiona Balfoussia (Bank of Greece) and David Marqués (ECB).

This year, the Banco de España will host the Annual Workshops of Clusters 1 and 2 in October and November, respectively. For further details, see the ANNOUNCEMENTS section.

BANCO DE ESPAÑA ECONOMIST APPOINTED TO CO-CHAIR EUROSYSTEM WORKING GROUP ON ECONOMETRIC MODELLING

The Working Group on Econometric Modelling (WGEM) is one of the three substructures assisting the Monetary Policy Committee (MPC) of the Eurosystem, along with the Working Group on Forecasting and the Working Group on Public Finances.

The WGEM gathers macroeconomic modelers of the ECB and the national central banks of the European Union. The WGEM has a double mandate in its role of assisting the MPC. On the one hand, it aims at promoting improvements in the macro-econometric modelling toolkit to meet the needs of the Eurosystem, and for that purpose it is a key forum for fostering model development and sharing related information across its members. On the other hand, the WGEM assesses analytical and technical issues of interest to the MPC through specific reports elaborated by dedicated teams, several of which have been published as ECB Working Papers or Occasional Papers.

Traditionally chaired by ECB staff from DG-Research only, the chairmanship of the WGEM has been opened to national central banks for the first time. The newly-appointed co-chairs are Matteo Ciccarelli (Senior Adviser, ECB DG-Research) and Eva Ortega (Head of the Modelling Unit in the Modelling and Macro Analysis Division, Banco de España).

RECENT CONFERENCES

LINK TO CONFERENCES PAGE

SECOND JOINT RESEARCH WORKSHOP

MADRID, 18 APRIL 2017

On the morning of April 18, 2017, the Banco de España and the Centro de Estudios Monetarios y Financieros (CEMFI) celebrated their second Joint Research Workshop. Two economists from each institution presented their recent research to an audience drawn from the two institutions and from the local economics community. The speakers on this occasion were Joan Monras and Paula Bustos of CEMFI, and Mario Alloza and Dominik Thaler of the Banco de España. The two institutions anticipate that workshops of this type will be repeated regularly in the future, in order to strengthen ties and promote joint research projects.

RECENT ECONOMIC RESEARCH SEMINARS

LINK TO SEMINARS PAGE

FINANCIAL AND FISCAL SHOCKS IN THE GREAT RECESSION AND RECOVERY OF THE SPANISH ECONOMY

RAFAEL DOMENECH

BBVA RESEARCH,

9 SEPT. 2016

BANKS, LIQUIDITY MANAGEMENT AND MONETARY POLICY

SAKI BIGIO

UNIV. OF CALIFORNIA, LOS ANGELES,

14 SEPT. 2016

MONETARY POLICY FOR A BUBBLY WORLD

ALBERTO MARTIN

CREI, UNIV. POMPEU FABRA,

21 SEPT. 2016

THE EFFECTS OF A MONEY-FINANCED FISCAL STIMULUS

JORDI GALÍ

CREI, UNIV. POMPEU FABRA,

27 SEPT. 2016

REALLOCATION OF INTANGIBLE CAPITAL AND SECULAR STAGNATION

ANDREA CAGGESE

UNIV. POMPEU FABRA,

19 OCT. 2016

LABOR MARKET IMPLICATIONS OF UNEMPLOYMENT BENEFIT EXTENSIONS

KURT MITMAN

INSTITUTE FOR INTERNATIONAL ECONOMIC STUDIES,

26 OCT. 2016

INFLATION, DEFAULT AND THE DENOMINATION OF SOVEREIGN DEBT

LAURA SUNDER-PLASMAN

UNIV. OF COPENHAGEN,

2 NOV. 2016

AMBIGUOUS POLICY ANNOUNCEMENTS
CLAUDIO MICHELACCI
EINAUDI INSTITUTE,
3 NOV. 2016

IMF FISCAL MONITOR
MARIALUZ MORENO BADIA
INTERNATIONAL MONETARY FUND,
8 NOV. 2016

ON THE DOUBLE TAXATION OF PROFITS
ALEXIS ANAGNOSTOPOULOS
STONY BROOK UNIVERSITY
10 NOV. 2016

KEYNESIAN ECONOMICS WITHOUT THE PHILLIPS CURVE
ROGER FARMER
UNIV. OF WARWICK,
16 NOV. 2016

FINANCIAL LITERACY EXTERNALITIES
MICHAEL HALIASSOS
GOETHE UNIVERSITY FRANKFURT,
23 NOV. 2016

WORKSHOP IN APPLIED FINANCIAL MACROECONOMICS
MARCO LOMBARDI
BANK FOR INTERNATIONAL SETTLEMENTS,
SIMON VAN NORDEN
HEC MONTREAL,
12 DEC. 2016

ARE THE SPANISH LONG-TERM UNEMPLOYED UNEMPLOYABLE?
JOSE IGNACIO GARCIA PEREZ
UNIV. PABLO DE OLAVIDE,
19 DEC. 2016

POLITICAL DISTRIBUTION RISK AND BUSINESS CYCLES
JESUS FERNANDEZ-VILLAVERDE
UNIV. OF PENNSYLVANIA,
22 DEC. 2016

MACROECONOMIC EFFECTS OF OFFICIAL DEBT RESTRUCTURING: EVIDENCE FROM THE PARIS CLUB
AITOR ERCE
EUROPEAN STABILITY MECHANISM,
17 FEB. 2017

RESOLUTION OF COLLATERAL CRISES
MARTIN GONZALEZ-EIRAS
UNIVERSITY OF COPENHAGEN,
22 FEB. 2017

CHANGES IN THE COST OF BANK EQUITY AND THE SUPPLY OF BANK CREDIT
STEVEN ONGENA
UNIVERSITY OF ZURICH,
27 FEB. 2017

LOCAL LABOR MARKET EFFECTS OF PUBLIC EMPLOYMENT
JOSE SILVA
UNIVERSITAT DE GIRONA,
1 MARCH 2017

MEASURING RISK SHARING IN EUROPE AND CHARACTERIZING COUNTRY HETEROGENEITY
PILAR PONCELA
JOINT RESEARCH CENTRE OF THE EUROPEAN COMMISSION,
6 MARCH 2017

DEMAND AND SUPPLY OF POPULISM
HELIOS HERRERA
WARWICK UNIVERSITY,
13 MARCH 2017

A THEORY OF COLLATERAL FOR THE LENDER OF LAST RESORT
TANJU YORULMAZER
UNIV. OF AMSTERDAM,
15 MARCH 2017

THE COLLAPSE OF THE LIBERAL ORDER
MANUEL MUÑIZ
IE SCHOOL OF INTERNATIONAL RELATIONS AND HARVARD UNIVERSITY,
21 MARCH 2017

THE BLACK-WHITE GAP IN EARNINGS AND EMPLOYMENT
ARNAU VALLADARES-ESTEBAN
UNIV. OF SOUTHAMPTON,
22 MARCH 2017

OPTIMAL AUTOMATIC STABILIZERS
ALISDAIR MCKAY
BOSTON UNIVERSITY,
29 MARCH 2017

PROFILES

CARLOS THOMAS

Head of Monetary Policy Unit
Monetary Policy and Euro Area Division
DGA Economics and Research

RU: Over the years, you have written a number of policy-relevant papers. At the London School of Economics, your thesis supervisor was Kosuke Aoki, a monetary economist, but you also studied with Christopher Pissarides, a Nobel Prize winner in labor economics. So you have worked in both those fields, starting mostly in labor, but gradually shifting towards monetary and financial economics. Could you start by telling us about your dissertation, on monetary policy in an economy with a frictional labor market?

When I started my PhD, there was a growing literature that studied inflation and unemployment jointly, by integrating the New Keynesian model of monetary policy transmission with the search and matching framework of equilibrium unemployment, developed in part by Pissarides. But there were few studies of optimal policy up to that time; my job market paper was one of the first normative studies in that literature. In particular, I analyzed the optimal monetary policy, under commitment, in a New Keynesian model with search and matching in the labor market. A first result was that, as long as wages are flexible (bargained between workers and firms in every period), then the optimal policy is zero inflation at all times.

RU: And that is not just a steady-state finding, but also the optimal policy after any shock?

Yes, it is the optimal policy at any point in time. As I said, that assumes flexible wage bargaining, but it also requires a technical assumption about the relative bargaining power of firms and workers (the so-called Hosios condition).

That result is an interesting benchmark, implying that the same policy which achieves price stability also guarantees that unemployment tracks its natural value. It extends the finding typical of standard New Keynesian models (without labor market frictions), namely that the same policy which stabilizes inflation also stabilizes output optimally – which Blanchard and Galí (2007) called the “divine coincidence”.

But a more realistic case obviously is one in which wages are not perfectly flexible. So I also studied a version of the model with both search and matching, and sticky wages. I showed that, if nominal wages are bargained infrequently, in a staggered fashion (following Gertler and Trigari, 2009), then strict inflation targeting is no longer optimal. For instance, in response to a negative supply shock, the central bank should allow inflation to rise temporarily above target. This facilitates the adjustment of real wages towards their lower natural value, mitigating the increase in unemployment.

RU: So if there are both labor market frictions and nominal wage rigidities, this brings back the traditional view, that central banks face a tradeoff between unemployment and inflation.

Exactly. This result rationalizes why central banks face a tradeoff between stabilizing unemployment and stabilizing inflation, for example after a negative supply shock.

Now, my dissertation also explored other issues related to the integration of the New Keynesian and search and matching frameworks. Most previous models assumed (for tractability) that some firms made hiring decisions, while other different firms made pricing decisions. My second paper showed that this assumption is not innocuous. If the firms that control hiring also set prices, then the New Keynesian Phillips Curve is flatter: any given output gap produces lower inflationary pressures. The reason is that hiring frictions make labor specific to the firm, which means firms' marginal cost curves are upward sloping, in contrast to a frictionless labor market where firms can hire as much labor as they need at the market wage, so that marginal costs are flat.

RU: At a first impression, it sounds like that might make the Phillips curve steeper, not flatter.

Yes, it might sound that way at first, but let me explain. Upward-sloping marginal costs mean price-setting firms have an incentive to keep their prices in line with the overall price level; this is known as "strategic complementarity" in prices. For example, a firm that considers a price cut will prefer not to deviate too much from the prices of other firms, because if it has to meet much higher demand its marginal costs will rise. As a result, the aggregate price level responds less to aggregate shocks. An important corollary is that, by muting price responses, this mechanism amplifies fluctuations in economic activity and unemployment. Since these models tend to underpredict unemployment volatility (Shimer´s "critique" of search and matching models), this mechanism therefore helps bring the model closer to the data.

Finally, my thesis also included a joint paper with Francesco Zanetti, which analyzed how labor market reform (in the form of reductions in unemployment benefits and firing costs) would affect price stability in a New Keynesian model with matching frictions. We showed that in this framework, real marginal costs can be separated into three components: wage costs, hiring costs, and firing costs. So if labor market regulation affects hiring and firing costs, it will also affect inflation volatility. Nonetheless, quantitatively, estimating the model for the euro area, we found that hiring and firing costs were only a small component of real marginal cost, suggesting that labor market reform would do little to change the effectiveness of monetary policy, at least in this class of models.

RU: Here at the Banco de España you continued to study labor market reforms. Spanish unemployment has been extraordinarily variable, compared with other countries, so labor market reforms have been a hot topic. What aspects of the Spanish labor market have you studied?

To start, I would say that two key problems of the Spanish labor market are, first, the duality between permanent and temporary contracts (due to the large gap in firing costs across contract types), and second, the downward rigidity of wages (largely due to the inefficiencies of the collective agreement regulations). The two main labor market reforms, of 2010 and 2012, both aimed to make collective bargaining more flexible, by facilitating the adjustment of each firm's wages to its particular situation, and also to reduce duality by narrowing the gap in firing costs between contract types. In one paper, written with James Costain and Juan F. Jimeno, we showed that, while reducing labor market duality may have an ambiguous effect on the level of unemployment (lower firing costs stimulate hiring, but they also increase firing, as many papers have arged), it definitely reduces unemployment volatility.

In a second paper, also with Juan F. Jimeno, we showed that, since firms are heterogeneous within each sector, organizing collective wage bargaining at the sectoral level is not really a good idea. It compresses wages within each sector, which unambiguously increases unemployment relative to a scenario where wages are negotiated at each firm, to reflect its cost and demand conditions. Interestingly, in our model, rather than dismantling sector-level bargaining altogether, it suffices to allow each firm and its workers to opt out of the sector-level agreement by mutual agreement. We call that "efficient opting-out", since it happens only if both workers and firms prefer to leave the sectoral bargain. So these analyses suggest that the two Spanish labor market reforms where important steps in the right direction, namely that of reducing the average level of unemployment and also making it less sensitive to cyclical fluctuations.

RU: So do you think we need to push further in the direction of those two reforms, or would the priorities be different if Spanish labor markets were reformed again?

In terms of labor market duality, I think there is more room for reduction— the gap in firing costs between temporary and permanent contracts is still large. But also, notably, there seems to be a consensus that active labor market policies in Spain are not particularly successful. Overhauling active labor market policies, to improve matching and retraining and labor mobility, might bring many workers back to the labor market.

RU: Together with Óscar Arce and Samuel Hurtado, you also asked how structural reforms fit together with other macroeconomic policies. What did you learn about the optimal policy mix now, as Europe recovers?

The idea of our project was to understand the interaction between national and supranational policies in a monetary union. We considered a two-country monetary union (call it "core" and "periphery") that finds itself in a liquidity trap. We considered a policy package in which the core implements a fiscal stimulus, consistent with the perception that core countries have space for further fiscal expansion; the periphery implements structural reforms, consistent with the lack of fiscal space in Spain and other peripheral countries; and third, the area-wide monetary authority offers forward guidance about its policy rate. Interestingly, we found sizeable synergies between these policies: each policy is more effective when implemented together with the other two than it would be in isolation. For instance, structural reforms are typically deflationary, so they could be contractionary when the zero lower bound is binding, by raising real interest rates. But if monetary and fiscal stimuli are applied at the same time, their inflationary effects may undo the short-run deflationary impact of the reforms, without offsetting their longer-run expansionary effects. This suggests that euro area authorities (both national and supranational) should support each other on the monetary, fiscal and structural reforms fronts, as this will benefit everyone.

RU: Perhaps you should clarify exactly what you mean by "forward guidance".

The forward guidance in our model is a commitment by the central bank to keep nominal interest rates at zero longer than its policy rule would otherwise prescribe, keeping interest rates lower for longer. But other expansionary forms of forward guidance would also be likely to complement peripheral reforms and core fiscal stimulus.

RU: Your latest research has focused more on money and banking. Your paper with Óscar Arce and Javier Andrés finds sharper tradeoffs across different monetary policy goals as the banking system becomes more competitive, implying that the macroeconomy may become more volatile too. Could you explain the mechanism?

That paper considers a New Keynesian model with financial frictions. In particular, there are heterogeneous agents, some of them lending, and some borrowing, subject to collateral constraints. Interestingly, in this context the central bank should not only worry about inflation and output stabilization, but should also try to ensure efficient consumption risk sharing between borrowers and lenders. In a first-best equilibrium, borrowers and lenders consume the same amount, since they have the same preferences. But in equilibrium in our economy, borrowers' spending is tightly linked to the value of their collateral. And since collateral values are very volatile in these models, borrowers' consumption becomes excessively volatile. So we show that the way to strike a better balance between inflation and output stabilization, on one hand, and consumption risk sharing on the other, is to cut nominal interest rates more aggressively in response to a contractionary financial shock (such as a decrease in the loan-to-value ratio available in the market). That way the central bank avoids an excessive fall in asset prices and collateral values and, ultimately, in borrowers' spending capacity and consumption.

Now, as you mentioned, we also showed that greater banking competition may actually lead to excessive macroeconomic volatility. I should emphasize that in our model, a more competitive banking sector has a positive effect on the level of economic activity — that is rather obvious. But at the same time there is a tradeoff, because it may increase volatility. The reason is that more competition and hence lower lending rates give borrowers an incentive to increase their financial leverage, which naturally leads to larger fluctuations in asset prices and spending, given the same exogenous shocks.

RU: And is this result is specific to your model, or is it in line with previous findings in the literature?

My co-authors' previous paper already showed that stronger banking competition leads to larger macroeconomic fluctuations. But in this paper we also analyze welfare effects. Stronger banking competition not only implies more volatility, but also a larger welfare loss from those fluctuations. To repeat, this is notwithstanding the beneficial effects of stronger banking competition on the level of economic activity.

RU: Also, motivated by the crisis, you have studied the relation between commercial banking and "shadow" banking institutions that face less legislative restrictions. You found that the leverage of the shadow banking sector grew rapidly during the boom, and then fell quickly during

the financial crisis. First of all, isn't that well known? What is really new about your empirical results?

As far as the empirical findings are concerned, yes, we follow research by Adrian and Shin, who found a positive comovement between the leverage ratio and the total assets of US financial intermediaries. As they described it, when US banks expand their balance sheets, they borrow more, instead of raising new equity. Following their lead, Galo Nuño and I studied the comovement of leverage with GDP, which is a more conventional way of measuring cyclicality. And indeed, we found that US bank leverage is also procyclical with respect to GDP. So in recessions, bank leverage tends to contract, and vice versa in expansions. This cyclicality is more pronounced for the shadow sector, but it is also true for US charter depository institutions.

RU: So how does your model explain these fluctuations in leverage, and what does it imply about their real effects?

We constructed a general equilibrium model with financial intermediaries to replicate and explain these facts. In our model, banks face an endogenous leverage constraint, due to the coexistence of limited liability and a moral hazard problem. That is, when banks receive funds from their own creditors, they may prefer to finance inefficiently risky projects; because of limited liability the banks get the upside of that risk, while their creditors get the downside.

Hence, certain types of shocks can reproduce the patterns of cyclicality seen in the data. In particular, increased uncertainty about the returns on banks' assets forces them to deleverage. The reason is that banks' creditors, who bear the downside risk because of banks' limited liability, will protect themselves against increased risk by demanding that banks deleverage. Fixing banks' equity, this implies a contraction in their credit supply to the real economy, and hence in investment and GDP. This way, our model predicts volatile and procyclical bank leverage, as in the data.

Also, I should emphasize that an increase in volatility is a real shock, not a shock to the financial system *per se.* It would have no effect whatsoever in a conventional "real business cycle" model, since (under our assumptions) it only affects the variance of returns across banks, not the mean. But with an endogenous leverage constraint, this real shock feeds through the financial sector to slow down the real economy.

And finally, we showed that the model explains the fall in bank leverage, bank assets and GDP in the US during the Great Recession fairly well, given the measured increase in sector-specific uncertainty in those years. We were happy to see that a relatively parsimonious model could reproduce those fluctuations quantitatively.

RU: What are the monetary policy implications of the model?

Well, the model is entirely real, so currently it says nothing about conventional monetary policy. We might extend it to a New Keynesian framework with nominal rigidities, so that conventional monetary policy would have real effects. But even in our real model, unconventional monetary policies, such as asset purchase programs, could stabilize the economy. Gertler and Kiyotaki simulated some policies like that in their paper, which also abstracts from nominal frictions. We have not tried that yet, but it could be interesting.

RU: So, as you have shifted towards research on monetary policy and banking, last year you were named Head of the Monetary Policy Unit here at the Banco de España. For readers unfamiliar with the Eurosystem, what does our Monetary Policy Unit do? Obviously, the Banco de España no longer has its own monetary policy. What is our role, in the context of the Eurosystem?

First, I should stress that while Spain no longer has its own monetary policy since 1999, the Banco de España has a voice and a vote, through our Governor, on the ECB's Governing Council. That is the body that conducts monetary policy in the euro area, so we participate directly in the process of setting monetary policy.

So our main task is to analyze the macroeconomic implications of different monetary policy strategies, to underpin the position of the Banco de España regarding euro area monetary policy. This includes the development of theoretical and empirical models to analyze how different monetary policy interventions affect the macroeconomy, and the different channels through which this impact occurs. More generally, we provide the top management of the Bank with analysis and advice on many issues related to monetary policy implementation in the Eurozone. That takes many different formats, from research-based analyses to policy presentations and discussions with top management.

RU: Central bankers have emphasized in recent years that monetary policy can't stabilize the macroeconomy alone; other policies are essential too. But the Eurosystem is still being asked to help Europe exit its long slump. What can monetary policy do at this point to meet that goal? Which instruments are most relevant now?

Within the context of changes that could be more feasible now for the ECB, one issue with current strategy is the way the ECB communicates its inflation target. Officially, it aims for an inflation rate close to, but below, 2%. But what exactly "close to" means has never been made precise. So there is room for clarifying the ECB's inflation mandate. One possibility would be to announce that the current extraordinary measures will remain in place until inflation, or forecasted inflation, surpasses 1.9% in a sustained manner, without further monetary stimulus. But there could be other ways to do this. In any case, I think a serious, formal debate of this issue would be useful.

RU: Finally, the European System of Central Banks (ESCB), which means the ECB plus all the national central banks in the European Union, recently set up several networks to coordinate research across all the ESCB institutions. You have just been appointed as one of the two coordinators of the Monetary Policy Research Cluster. What do you see as the research agenda for that network?

The Research Clusters are networks open to ESCB researchers, that aim to foster awareness of ongoing policy-relevant studies and to stimulate collaboration across institutions. Current concerns for the Monetary Economics cluster (which I will coordinate with Alessandro Secchi of the Banca d'Italia) include issues such as: transmission, effectiveness and side-effects of unconventional monetary measures; drivers of actual and expected inflation; the role of heterogeneity in the monetary transmission mechanism; challenges for monetary policy when growth and inflation are low; monetary policy, banks and financial markets; interactions across monetary, fiscal, structural and macroprudential policies; and the monetary framework in the so-called "new normal" towards which we are converging in the longer term. But the topics we consider will certainly evolve.

Concretely, the cluster's main activity will be an Annual Workshop, which Banco de España will host in October this year. But the Cluster may expand into further activities in the future.

Research page:
http://www.bde.es/investigador/en/menu/research_staff_a/Thomas__Carlos.html

NEW FACES

BING XU

International Financial Markets Division
ADG International Affairs

BING XU jointed the International Financial Markets Division of the Banco de España as a staff economist in November 2016. Prior to his current position, he worked as visiting researcher at the Bank of Finland and at the Hong Kong Monetary Authority, and as a research assistant at the Banco de España. He holds an M.Sc. in Financial Economics from Durham University, an M.A. in Economics from Universidad Carlos III de Madrid, and is expecting to obtain his Ph.D. in Economics from Carlos III in May 2017. During his Ph.D. studies, he worked as teaching and research assistant for various courses.

Bing's research interests center primarily on applied financial economics, banking, and the Chinese economy. He has published several research papers at the Bank for International Settlements, the Bank of Finland, the Hong Kong Monetary Authority, and the Banco de España, and in journals such as *Applied Economics.* He has also published articles on major news and policy portals including VoxEU, Xinhua News, and Chinese Financial News, and his work was discussed in *The Wall Street Journal.* His current projects investigate i) the impact of legal reforms on corporate leverage in China; ii) soft budget constraints and monetary policy transmission in China using micro-level data; and iii) the "too big to fail" hypothesis, using information from primary bond yields of European banks.

His latest project studies how the expansion of the scope of permissible collateral can affect firm leverage, using the Chinese Property Law reform in 2007 as an exogenous shock. Difference-in-differences tests show firms operating with *ex ante* more movable assets expanded their access to bank credit, prolonged the maturity of their debt structure, and reduced demand for informal credit such as account payables. However, the reform did not improve the efficiency of credit allocation, as *ex ante* low-quality firms expanded their leverage following the reform, while better access to bank credit did not lead to better firm performance. This research adds to the recent literature on collateral channels and capital structure.

DANILO LEIVA LEÓN

Conjunctural Analysis Division
DG Economics, Statistics and Research

DANILO LEIVA LEÓN joined the Conjunctural Analysis Division of the Banco de España in April 2017. After obtaining his PhD in Economics from the University of Alicante in 2013, he joined the International Economics Department of the Bank of Canada. In 2015, Danilo started to work for the Central Bank of Chile as a Senior Economist at the Research Department. From December 2016 until March 2017, he visited the Banco de España as a Research Fellow in the Modelling and Macroeconomic Analysis Division.

Danilo is the author of a number of articles published in the *Journal of Econometrics,* the *Journal of International Economics,* the *Oxford Bulletin of Economics and Statistics,* and *Macroeconomic Dynamics,* among other journals. His research interests include applied macroeconomics, business cycles, forecasting, monetary policy and empirical finance. During his fellowship at the Banco de España, he worked on analyzing the regional economic linkages in Europe and their main drivers, focusing on identifying the regions that act as the main conduits in the propagation of business cycle shocks. Currently, Danilo is working on a range of economic topics, including econometric issues, such as the estimation of large dimensional factor models subject to heterogeneous nonlinearities; macro-financial issues, such as the dynamic relationship between credit sentiment and the business cycle; policy issues, such as the role of sectoral comovement in the propagation of monetary policy shocks; and international issues, such as the drivers and propagation of aggregate volatility between developed and developing countries.

Research page:
https://sites.google.com/site/daniloleivaleon/

JACOPO TIMINI

International Economics Division
ADG International Affairs

JACOPO TIMINI joined the International Economics Division within the ADG International Affairs of the Banco de España in December 2016. Prior to joining the Banco de España, Jacopo was a consultant (economic analyst) at the United Nations World Food Programme in Rome; a Marie-Curie Research Fellow at University Carlos III Madrid (UC3M); and a Research Assistant at the Centre for European Policy Studies in Brussels. Jacopo is a Ph.D. Candidate at UC3M, and holds an M.A. in European Economic Studies (College of Europe, Belgium), and B.Sc. and M.Sc. degrees in Economics (Ca' Foscari University of Venice, Italy).

Jacopo's research focuses in international economics (with particular interest on trade and market integration), economic growth, and economic history. In his latest paper, he studies currency union dynamics and trade. Exploiting a recently created historical database on international bilateral trade flows, his work tests for potential heterogeneous effects. In addition, it assesses whether trade effects – if any – were related to the credibility that markets attached to the underlying economic foundation of the union, to the (changing) rules entrenched in the monetary agreements, or both.

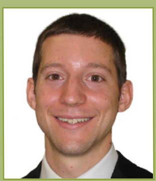
His current projects include research on the margins of trade, institutional isomorphism, and trade protectionism.

Research page:
http://portal.uc3m.es/portal/page/portal/dpto_ciencias_sociales/profesorado/Jacopo%20Timini

JOSÉ RAMÓN MARTÍNEZ RESANO

Country Risk Service
ADG International Affairs

JOSE RAMON MARTINEZ RESANO joined the Country Risk Service of the Banco de España in September 2016. He previously served in the Markets and Operations Directorate of the Banco de España covering a diverse range of topics, including capital markets and market infrastructure issues as well as monetary policy implementation and central bank finance or risk management subjects. His research during that period addressed selected topics in central banking, capital markets practice and regulation, and financial stability issues. Jose Ramon also has experience as a debt manager thanks to his period in the funding unit of the Spanish Treasury, and has acted as occasional consultant for the World Bank and IMF. He has represented the Banco de España in the OECD Working Party on debt management, in the EU Sovereign Debt Markets Committee of the European Commission, in the Paris Club, and in the Risk Management Committee of the ECB. His research interests in the new phase of his professional career revolve around similar subjects albeit from a more internationally-oriented perspective.



MIKEL BEDAYO

Prudential Policy Analysis Division
DG Financial Stability and Resolution

MIKEL BEDAYO joined the Financial Stability Department of the Banco de España in July 2016. He obtained his M.Sc. and Ph.D. in Economics from the Université Catholique de Louvain, and he also holds an M.A. in Economics and a B.Sc. in Business from the Universidad del País Vasco. Mikel has also been a visiting scholar in North Carolina State University and the European University Institute, and has worked at the National Bank of Belgium.

Mikel's research activity focuses on corporate finance, firm-bank relations and financial stability. His most recent studies shed light on firms' credit access and credit conditions, and which characteristics of firms and banks correlate with the cyclicality of their credit. In one of his papers he analyzes firms' incentives to join together to apply collectively for a single loan. He finds that large and long-established firms are more likely to join up with other firms to make joint loan applications, and that all firms obtain more credit if they demand credit from the same bank. Mikel is currently working on a project to determine whether innovative and non-innovative firms suffered equally from the credit crunch during the last financial crisis.

RAQUEL VEGAS SÁNCHEZ

Prudential Policy Analysis Division
DG Financial Stability and Resolution

RAQUEL VEGAS SÁNCHEZ joined the Prudential Policy Analysis Division in the Financial Stability Department of the Banco de España in May 2016, after 9 months working at the Directorate General Economics, Statistics and Research. Prior to joining the Banco de España, Raquel was an advisor to the Minister of Health, Social Services and Equality (2012-2015), a research fellow in CEMFI (2011) and a research analyst at FEDEA (2008-2011). She holds a Ph.D. in Economics from Universidad Carlos III de Madrid (May 2011) with an outstanding thesis award, and an undergraduate degree in economics from the same university (specialising in macroeconomics, monetary economics, and finance).

Raquel is an applied economist. Her research interests range from labor and health issues –the gender wage gap, immigration, discrimination and aging- to macro finance –firms' bankruptcies and business cycles. She has published research papers in *Annals of Economics and Statistics;* the *Middle East Development Journal* and *Labour Economics.* Her current research projects analyze the relationship between bank lending and firm productivity over the business cycle in Spain, and the linkages between judicial efficiency in insolvency procedures and firm performance.

VISITING FELLOWS

EMILIANO SANTORO

Associate Professor
University of Copenhagen

Emiliano Santoro is visiting the Macroeconomic Analysis Unit of ADG Economics and Research, from February to April, 2017. He obtained a PhD in Economics from the University of Cambridge in 2009 and is currently an Associate Professor at the University of Copenhagen and a visiting fellow at Danmarks Nationalbank. Previously, he has held visiting positions at CREI, Barcelona (2010) and EIEF, Rome (2013).

Emiliano's broad interests are in macroeconomics and monetary economics. His research has revolved around three main topics: i) the role of sectoral production linkages for both business cycle and monetary policy analysis; ii) the formation of heterogeneous inflation expectations; iii) firm dynamics and business cycle asymmetries. His current research agenda mainly focuses on the role of occasionally binding credit constraints for the emergence of non-linearities in the business cycle.

In one of his ongoing projects (with Jensen, Ravn and Petrella) he shows that since the mid-1980s, despite the Great Moderation, recessions have become more severe, reflected in the skewness of the business cycle becoming increasingly negative. This finding can be explained by the concurrent increase in leverage of both households and firms. To this end, a dynamic general equilibrium model with collateralized borrowing and occasionally binding credit constraints is devised. Easier credit access increases the likelihood that constraints become slack in the face of expansionary shocks, while contractionary shocks are further amplified due to tighter constraints. As a result, as the fraction of binding credit constraints increases, busts gradually become deeper than booms.

Research page:
Research Page: http://www.econ.ku.dk/esantoro/

FRANCESCO FURLANETTO

Senior Researcher
Norges Bank

FRANCESCO FURLANETTO visited the Banco de España from January to mid-March 2017. He holds a PhD from the University of Lausanne and has been a postdoctoral visiting scholar at CREI in Barcelona, before joining Norges Bank where he is currently employed as a Senior Researcher. He works on theoretical and empirical analysis of the business cycle. On the theoretical side, he has worked on New Keynesian models with different kinds of frictions and studied the role of structural factors in explaining unemployment dynamics. On the empirical side, he has used VAR models identified with sign restrictions to study financial shocks, the importance of labor supply factors to explain the decline in the US labor force participation rate, and the role of immigration for macroeconomic dynamics. His research at the Banco de España investigates empirically the response of the monetary policy authority to stock prices and house prices.

Reseach page:
http://www.norges-bank.no/en/about/Research/economists/Furlanetto-Francesco/

YUNUS AKSOY
Reader, Dept. of Economics, Mathematics and Statistics
Birkbeck, University of London

Yunus Aksoy will be visiting the ADG Economics and Research of the Banco de España during the period from April to July, 2017.

He is a Reader in Economics at Birkbeck, University of London. He is currently the Director of the Birkbeck Centre for Applied Macroeconomics (BCAM), and he is a CESIfo Research Network Fellow. He holds a B.A. from Boğaziçi Üniversitesi and a Ph.D. from Katholieke Universiteit Leuven. His research has appeared in leading journals of macroeconomics, among them the *Journal of Monetary Economics,* the *Economic Journal* and the *European Economic Review.* His current work on monetary and macroeconomics is concerned with i) the interactions between financial markets and macroeconomic outcomes at the business cycle frequency and ii) the impact of demographic structures on the macroeconomy in the medium run.

During his Banco de España visit he will be working on two projects. The first studies the impact of changing age profiles on consumption behaviour by using household level data. The second is related to the effects of aging populations on global liquidity conditions.

Research page:
http://www.bbk.ac.uk/ems/faculty/aksoy

ANNOUNCEMENTS

UPCOMING CONFERENCES

LINK TO CONFERENCES PAGE

HOW MUCH OF A FISCAL UNION FOR THE EMU?

MADRID, MAY 18-19, 2017

A central question in the development of Europe is how much of a Fiscal Union is needed to have a stable and resilient Euro Area and EU. This has been a recurrent question through the euro crisis, where the ECB has played a major role, like that played by the Fed during the financial crisis, although the latter could count on the backing of the US Treasury. Brexit and the current developments in the global economy (migration crisis, US elections, etc.) have exacerbated the need to address this question and find viable solutions for the EMU institutional framework.

On Thursday and Friday, May 18-19, 2017, the Banco de España will host a conference organized by the Horizon 2020 Project ADEMU - "A Dynamic Economic and Monetary Union", focusing on this question. The aim of the conference is to present and discuss current research on the topic and debate policy experiences and proposals. The conference will also discuss how the recent political events and current trends may affect the EMU fiscal and monetary framework.

More detailed information regarding the conference and related activities is available at the ADEMU website:

http://ademu-project.eu/.

25TH CEPR EUROPEAN SUMMER SYMPOSIUM IN INTERNATIONAL MACROECONOMICS (ESSIM)

RODA DE BARÁ, TARRAGONA, 23-26 MAY 2017

The 25th CEPR European Summer Symposium in International Macroeconomics (ESSIM) will take place from Tuesday to Friday, May 23-26, 2017, at the Banco de España facilities in Tarragona, Spain.

ESSIM is an annual meeting that brings together about 75 economists from across Europe and key researchers from outside the region to focus on international economics and other areas of macroeconomics. It provides a unique opportunity for macroeconomists from different institutions and countries to discuss research, and for young researchers to meet and discuss their work with senior economists, combining workshop sessions with time for collaboration and consultation.

Sessions on Tuesday and Wednesday, May 23-24, will focus on the CEPR programme area of Monetary Economics and Fluctuations. Thursday and Friday, May 25-26, will feature parallel sessions on the areas of International Money and Finance, and Macroeconomics and Growth. Plenary sessions relevant to all three programme areas will take place late on Wednesday and early on Thursday.

The conference organizers are Philippe Bacchetta (University of Lausanne and CEPR), Francesco Caselli (LSE and CEPR), Wouter den Haan (LSE and CEPR), and James Costain (Banco de España).

link to CEPR events page

FIRST CONFERENCE ON FINANCIAL STABILITY

MADRID, 24-25 MAY 2017

The Banco de España, together with the Centro de Estudios Monetarios y Financieros (CEMFI) is starting a series of biennial conferences to promote the research and discussion of topics related to financial stability among academics, practitioners, and policy-makers. The first conference will be held at the Banco de España's headquarters in Madrid on 24-25 May 2017. Mario Draghi, President of the European Central Bank, will be the keynote speaker, and Luis M. Linde, Governor of the Banco de España, will open the conference.

link to conference webpage

NEW FACES IN MACRO: MADRID WORKSHOP IN QUANTITATIVE MACROECONOMICS

MADRID, 29-30 MAY, 2017

In May, the Banco de España and the Universidad Carlos III de Madrid are jointly organizing a meeting entitled "New Faces in Macro: Madrid Workshop in Quantitative Macroeconomics". The goal of this workshop is to provide a forum for junior economists based in Europe with a special interest in quantitative macroeconomics, and to establish an academic network among this group. The organizers are Juan Francisco Jimeno, Yuliya Kulikova, and Omar Rachedi of the Banco de España; Nezih Guner and Josep Pijoan of CEMFI; and Andrés Erosa, Felix Wellschmied, and Emircan Yurdagul (Carlos III).

The workshop will last two days. The first day will be hosted by the Banco de España, whereas the second day will be hosted on the Getafe campus of Univ. Carlos III. Each day will feature 7 presenters and 7 discussants.

Although the workshop will cover a variety of topics, ranging from fiscal policy up to human capital accumulation, most of the papers will emphasize the macroeconomic implications of heterogeneity across households.

5TH WORLD BANK - BANCO DE ESPAÑA RESEARCH CONFERENCE

MADRID, 12 JUNE 2017

The Banco de España and the World Bank are organizing their fifth joint research conference, which will take place in Madrid on June 12, 2017. The conference, entitled *"The Future of Globalization and Economic Integration in Europe and Latin America: Implications for Growth and Social Equality",* aims to foster dialogue between academics and policy makers working on globalization, economic integration, and development. It will focus on the challenges and opportunities associated with globalization. Drawing on state-of-the-art economic research, participants will discuss new evidence on the consequences of globalization for growth and development, as well as employment levels, wages, and inequality. The conference will also address possible policy responses. The focus of the conference will be global, but special consideration will be given to emerging markets broadly and to Latin America in particular.

8TH ANNUAL CONFERENCE OF THE SPANISH ASSOCIATION OF LAW AND ECONOMICS

MADRID, JUNE 29-30, 2017

On June 29-30, the Universidad Carlos III de Madrid will host in its new downtown Madrid campus the 8th Annual Conference of the Spanish Association of Law and Economics. It will be coorganized by María Gutiérrez Urtiaga (Univ. Carlos III), Josep Tribó Giné (Univ. Carlos III), Juan S. Mora-Sanguinetti (Banco de España) and Maribel Sáez Lacave (Univ. Autónoma de Madrid). The conference will cover all topics related to Law and Economics (including, but not limited to structural policies, taxation, antitrust, regulation or corporate governance).

This year, the keynote speaker will be Colin Mayer (Saïd Business School, Oxford University). The conference will also host a special session on "New Ways of Financing Innovation" in collaboration with the Business Department of Univ. Carlos III, and a special session organized with the Fundación para la Investigación sobre el Derecho y la Empresa (FIDE).

Further information is available at http://www.car3fin.es/aedeconference/ (or by contacting the organization: aede2017@uc3m.es).

FIRST BANCO DE ESPAÑA ANNUAL RESEARCH CONFERENCE

MADRID, AUGUST 31 – SEPTEMBER 1, 2017

On August 31 and September 1, 2017, the Banco de España will host its First Annual Research Conference in its Madrid headquarters.

In much of the industrialized world, including the euro area, the macroeconomic landscape is characterized by sluggish growth, inflation persistently below target, low interest rates (including short-term nominal rates close to their effective lower bounds), and increasing risks to financial stability. Against this background, economic policy-makers, including fiscal, monetary and macroprudential authorities, face the formidable challenge of promoting a faster economic recovery and the return of inflation to its target level, while ensuring financial stability. The aim of the conference is to bring together world leading scholars and policy-makers in order to discuss the causes of these macroeconomic developments and the policy measures to address them. Tobias Adrian, Ricardo Caballero, Gauti Eggertsson, Emmanuel Farhi, Jesús Fernández-Villaverde, Jordi Galí, Nobuhiro Kiyotaki, Morten Ravn, Tano Santos and Frank Smets have already confirmed their participation.

More generally, our Annual Research Conference is aimed at becoming the Banco de España's flagship research conference, and at reaffirming the Banco de España's commitment to research as an indispensable tool for improving economic policy-making.

CALLS FOR PAPERS

THIRD SEMINAR IN ECONOMIC HISTORY

MADRID, OCTOBER 5, 2017

On October 5, 2017, the Banco de España will host its Third Seminar in Economic History. As on previous occasions, presentations will include the results of research projects on Economic History financed by the Banco de España, together with other submitted papers on Spanish and international economic history. Scholars are invited to submit their proposals before May 30th.

Call for Papers

FIRST ANNUAL WORKSHOP: ESCB RESEARCH CLUSTER 1 "MONETARY ECONOMICS"

EUROPEAN SYSTEM OF CENTRAL BANKS

MADRID, 9-10 OCTOBER 2017

On October 9 and 10, the Banco de España will host the First Annual Workshop of the ESCB Research Cluster on "Monetary Economics", a network of ESCB researchers aimed at fostering awareness on monetary policy-relevant studies and stimulating collaborations across ESCB institutions in the area of monetary economics and monetary policy.

ESCB economists are invited to submit either theoretical or empirical contributions. Workshop topics include the transmission, effectiveness and side-effects of unconventional monetary measures; drivers of actual and expected inflation; the role of agent heterogeneity in the monetary transmission mechanism; challenges for monetary policy in a low-growth, low-inflation environment; monetary policy, banks and financial markets; interactions among monetary, fiscal, structural and macroprudential policies; monetary policy strategy and the operational framework in the "new normal".

Keynote lectures at the conference will be delivered by Prof. Jordi Galí (CREI, UPF and Barcelona GSE) and Prof. Ricardo Reis (LSE). ESCB researchers are invited to submit a paper in PDF format to cluster1escb@bde.es by 15 June.

THIRTEENTH ANNUAL CONFERENCE ON REAL-TIME DATA ANALYSIS, METHODS, AND APPLICATIONS IN MACROECONOMICS AND FINANCE

MADRID, OCTOBER 19-20, 2017

On October 19-20, 2017, the Banco de España will organize the 13th Annual Conference on Real-Time Data Analysis, Methods, and Applications in Macroeconomics and Finance.

The conference will bring together leading researchers in real-time analysis of economic data. It will cover topics such as real-time macroeconometrics and financial econometrics and forecasting. Likewise, it will cover macroeconomic policy analysis, where real-time data analysis has become an essential part of the toolkit for policy evaluation.

This annual conference has usually been organized by the Philadelphia Fed and HEC Montreal in previous years. For the first time, the conference is being held outside of North America, and the Banco de España was selected to organize the event.

Interested researchers are invited to respond to the Call for Papers by June 30, 2017.

FIRST ANNUAL WORKSHOP: ESCB RESEARCH CLUSTER 2 "MEDIUM- AND LONG-RUN CHALLENGES FOR EUROPE"

EUROPEAN SYSTEM OF CENTRAL BANKS

MADRID, 16 – 17 NOVEMBER, 2017

Europe has been tested by multiple shocks and stresses in recent years; sluggish growth, current account imbalances and other asymmetries remain challenging for monetary and macroeconomic policy makers. Hence, major improvements of governance structures still appear essential for the long-run stability of EMU. Even in the best case, difficult long-run trends loom, including supporting aging populations, and adapting workforces to new technologies that may amplify inequality.

With these challenges in mind, submissions are invited from ECSB economists for the First Annual Workshop of ESCB Research Cluster 2, a network devoted to research on topics of international macroeconomics, fiscal policy, labor economics, competitiveness, and EMU governance. The Workshop, entitled *"Medium- and long-run challenges for Europe",* will take place at the Banco de España, in Madrid, on Thursday and Friday, November 16-17, 2017.

Keynote lectures at the conference will be delivered by Prof. Pol Antràs (Harvard University) and Prof. Giancarlo Corsetti (University of Cambridge). Conference organizers include representatives of six ESCB institutions. ESCB economists wishing to submit a paper, to participate as discussants, or simply to attend, should contact cluster2escb@bde.es. The deadline for paper submissions is June 15, 2017.

The Banco de España *Research Update* is edited by the **Directorate General Economics, Statistics and Research** of the Banco de España.

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