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## Macroeconomic Stabilisation and Emergency Liquidity Assistance

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### ABSTRACT

We introduce imperfect monetary policy transparency and strategic wage setting into a macro model where the central bank provides lender of last resort (LOLR) services to banks on top of its standard stabilisation policy. We study how, in the presence of adverse exogenous financial developments, macroeconomic and financial instability can be dampened by adjustments in policy institutions and economic structure. In a context of costly LOLR transactions and no moral hazard, the central bank has an incentive to save only large banks. Central bank opaqueness can help improve macroeconomic and financial stability by making wages closer to their competitive levels. Some results depend on initial conditions concerning monetary institutions; for instance, monetary strictness and wage bargaining centralisation help discipline wages and thus are stability-enhancing when central bank policies are initially seen as rather strict and transparent. Some consideration is given to the roles of trade openness and moral hazard behaviour on the part of banks.

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### Estabilización macroeconómica y asistencia de liquidez de emergencia

#### RESUMEN

Introducimos imperfecciones en la transparencia de la política monetaria y fijación estratégica de salarios dentro de un modelo macro donde el banco central provee servicios de prestamista de última instancia (PUI) a bancos comerciales además de la habitual política de estabilización. Estudiamos cómo, en presencia de eventos financieros adversos de carácter exógeno, la inestabilidad macroeconómica y financiera puede ser amortiguada a través de ajustes en las instituciones políticas y la estructura económica. En un contexto de transacciones de PUI costosas y ausencia de riesgo moral, el banco central tiene un incentivo a rescatar sólo bancos grandes. La opacidad del banco central puede ayudar a mejorar la estabilidad macroeconómica y financiera al inducir los salarios a aproximarse a su nivel competitivo. Algunos resultados dependen de las condiciones iniciales relativas a las instituciones monetarias; por ejemplo, la restricción monetaria y la centralización en las negociaciones salariales ayudan a disciplinar los salarios y así a estabilizar la economía cuando la política monetaria es inicialmente percibida como bastante estricta y transparente. Damos alguna consideración a los roles de la apertura comercial y al comportamiento de riesgo moral por parte de los bancos.

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### 1. Introduction

In numerous countries the main goal of monetary policy is to maintain price stability. To do so, the central bank (CB) follows a policy rule enjoying a substantial degree of independence. Suitably

designed, monetary policy rules may deliver price stability as well as maintain output close to its potential. The ongoing worldwide financial crisis has made clear that, beyond price stability, financial stability (comprising the provision of CB liquidity and the use of prudential rules) is and remains an essential objective. In recent years, there has been a sizeable increase in the provision of lender of last resort (LOLR) services to individual commercial banks, whereby CBs stand ready to inject high-powered money into the banking system

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whenever a bank is solvent but suffers from temporary liquidity problems.<sup>1</sup> LOLR services to individual commercial banks have been a common practice, although in theory failures of banks could be prevented by implementing appropriate systems of bank regulation and supervision or private safety nets. These instruments are thus deemed insufficient to prevent CBs from intervening in the banking sector.

Despite the relevance of financial stability considerations, the economics profession does not offer a workhorse model for how macroprudential actions interact with the more traditional inflation-fighting role of monetary policy. It has been emphasised that, in the present context, multiple objectives require multiple instruments (Blanchard et al., 2012). But a better understanding is needed of issues such as what instruments should monetary and other authorities use to achieve these macroprudential goals, how large are the relevant trade-offs between macroeconomic performance and financial stability, and how economic uncertainty affects the conduct of CB policies.<sup>2</sup>

It has been argued that the CB should provide liquidity to the market and should not lend to individual banks, which would be able to borrow in the interbank market if they are considered to be solvent (Goodfriend and King, 1988). This view, however, assumes that interbank markets work perfectly and that the market is as well or better informed than the CB about the relative solvency of a bank short of liquidity. Moreover, LOLR transactions could obey to a macro rather than a micro motivation. Four valuable formal approaches have deviated from such view and contributed to understanding why CBs provide LOLR services:

- First, some studies shed light on the question of why commercial banks might be reluctant to make use of LOLR services in connection with a coordination failure (Rochet and Vives, 2004). A coordination problem may arise when there is any large-scale need to redirect reserves, but there is no incentive for any individual commercial counterparty to sort out the problem by assuming the credit risk and undertaking the transaction costs involved. This occurred, for example, when the operation of many markets were severely disrupted as the Bank of New York computer malfunctioned in 1985 and in the events of September 11 (2001), when the Federal Reserve System hugely expanded its discount window lending to many individual banks (McAndrews and Potter, 2002).
- Second, some authors focus on the micro-aspects of CB intervention in dealing with market failure. Using the framework of Diamond and Dybvig (1983), Freixas et al. (2004) analyse the moral hazard problem caused by bank managers' incentive to choose an inefficient technology that gives them some private benefit.<sup>3</sup> In this asymmetric information context, liquidity shocks affecting banks might be undistinguishable from solvency shocks.<sup>4</sup> Bianchi et al. (2012) model the interaction between

credit frictions, financial innovation, and learning.<sup>5</sup> In the decentralised equilibrium each household fails to internalise the effect of its borrowing decisions on asset prices, leading to excessive debt accumulation and too frequent crises. When the CB has better information than banks about the economic outlook, macroprudential policy would be justified since it can help offset the pecuniary externality generated by the collateral constraint.

- Third, Goodhart and Huang (2005) assess the role of both contagious risks and moral hazard at the macro-level. If an illiquid, but solvent, bank is forced into closure, it is more likely that this will have significant adverse implications for the financial system as a whole the bigger that bank is. Thus, Goodhart and Huang's (2005) model in a static setting suggests that the CB would only rescue banks that are "too big to fail".<sup>6</sup> The authors find that this result is broadly robust to a dynamic extension, in which setting contagious considerations dominate the role of moral hazard.
- Fourth, Berlemann and Zeidler (2009) propose a model where the primary motive for providing LOLR transactions is macro rather than micro. The authors argue that, following the closure of commercial banks, fractional reserve banking systems are prone to liquidity crises whenever the public changes its preferences towards holding more high-powered money. In such a setting, LOLR transactions can contribute to lowering uncertainty about the money multiplier, and thus dampening variability in both inflation and output. Given the costs incurred in unsuccessful LOLR transactions, CBs have an incentive to save only the large banks, while the small banks are closed. A benevolent CB will thus accept greater macroeconomic variability when facing such LOLR costs.

The present paper examines the role of LOLR provision for macroeconomic stabilisation. LOLR provision, by adjusting banks' access to liquidity, can be combined with standard monetary policy to rebalance macroeconomic and financial stability. The main object is to investigate how the trade-off between financial instability and macroeconomic variability (as created –say– by financial shocks) can be improved by dampening fluctuations in inflation and output via adjustments in monetary institutions and the economic structure. Institutions (as given by the monetary policy setup, wage bargaining and the non-cooperative game involved between the CB and wage setters) affect the ability of policymakers to successfully undertake LOLR actions,<sup>7</sup> as does the economic structure (as captured by the link between trade openness and the responsiveness of aggregate supply).

We start from a setup where the CB provides LOLR services to banks on top of its standard stabilisation policy, in the context of an endogenous determination of output distortions (operating via the labour market). Concerning the representation of the banking sector, we follow Goodhart and Huang (2005), who –in the presence of bank closures– assume that the public may move out of failing

1. Even prior to the latest crisis, there is empirical evidence of LOLR transactions from a wide variety of experiences (Bordo, 1986; Dowd, 1999; Eichengreen and Portes, 1987; Humphrey and Keleher, 1984).

2. There have been changes in the institutional arrangements for handling financial crises. While CBs tackled such crises in most countries largely on their own, crises are becoming increasingly managed by a committee of public sector agencies. Thus far, the literature has not addressed the challenge of formally modelling such a development.

3. Moral hazard is a standard feature in models of bank behaviour. Moral hazard arises in the presence of informational frictions and 'agency problems' between bank managers and owners (Gorton and Rosen, 1995). Better capitalised banks have less moral hazard incentives (Jeitschko and Jeung, 2005) and are more prone to adopt careful practices to reduce costs. Regulators can force banks to increase the amount of capital commensurably with the amount of risk taken (Gropp and Heider, 2010). Hellman et al. (2000) argue that banks could also respond to regulatory actions forcing them to hold more capital by increasing portfolio risk.

4. For an alternative approach, see Cordella and Levy Yeyati (2003).

5. The presence of learning distinguishes Bianchi et al. (2012) from studies assuming that agents form rational expectations with full information, such as Benigno et al. (2013), Bianchi (2011), Bianchi and Mendoza (2010), Jeanne and Korinek (2010), Korinek (2013), Lorenzoni (2008), and Stein (2012). Concerning the role of credit frictions and imperfect information, Bianchi et al. (2012) relate to the financial accelerator models of Aiyagari and Gertler (1999), Bernanke et al. (1999), and Kiyotaki and Moore (1997).

6. As large banks have a higher chance of being saved, this may trigger bank mergers, implying lower funding cost (Hunter and Wall, 1989; Boyd and Graham, 1991; Benson et al., 1995; Penas and Unal, 2004; DeYoung et al., 2009, and Rose and Wieladek, 2012). Another rationale for large bank size is inadequate corporate governance enabling bank managers to pursue high-growth strategies at the expense of shareholders. In the latest crisis, the too-big-to-fail argument may have been mitigated by the severe deterioration in the public finances, which reduces countries' ability to guarantee bank liabilities and makes large banks subject to greater market discipline (Demirguc-Kunt and Huizinga, 2013a and 2013b; see also Acharya et al., 2013).

7. The general issue of the role of coordination failure for the performance of institutional reform is discussed in Fanelli (2007).

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