



## The light and dark side of TARP

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### ARTICLE INFO

#### Article history:

Received 30 March 2012

Accepted 9 February 2013

Available online 5 March 2013

#### JEL classification:

G14

G21

G28

#### Keywords:

Financial crisis

TARP

Market efficiency

Event study

### ABSTRACT

This paper empirically investigates the impact of the first announcement of TARP, the announcement of revised TARP, respective capital infusions under TARP–CPP and capital repayments on changes in shareholder value and the risk exposure of supported US banks. Our analysis reveals a light and a dark side of TARP. While announcements as well as capital repayments may provoke positive wealth effects and a decrease in bank risk, equity capital injections to banks are observed to be a severe impediment to restore market confidence and financial stability. Furthermore, while TARP announcements and capital injections may increase systemic risk, no significant effect on systemic risk is found for capital repayments.

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### 1. Introduction

The 2007–2009 global financial crisis triggered a unique liquidity shock affecting a number of banks worldwide. As a response, comprehensive governmental capital assistance programs have been introduced in many countries. As regards the US, under the “*Troubled Asset Relief Program*” (TARP) the Department of the Treasury provided USD 204.9 billion in capital to 707 institutions in 48 states helping banks to absorb losses from toxic and illiquid assets (U.S. Treasury, 2010). Similarly, in Europe 20 bank debt guarantees and 15 bank recapitalization schemes as well as 44 cases of individual bank aid were dealt with by the European Commission under the state aid rules during the crisis period. At the height of the crisis, the total of aid effectively committed amounted to 13% of the GDP of the EU (CEPS, 2010).

In most cases capital assistance programs were politically justified by the objective of liquidity creation to restore confidence in the banking industry, with the ultimate goal of overcoming the “loan freeze problem” by stimulating the banks’ lending activities and promoting financial stability for the economy as a whole. Nevertheless, partial nationalization of large banking groups revived the debate concerning the benefits and costs of providing a lender of last resort and government ownership of banks.

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In this context, in particular capital injections into banks are questioned for the following aspects. It is argued that the effectiveness of bailout assistance may be challenged by an insufficient monitoring of supported banks in combination with inadequate reporting requirements as regards the supported banks’ reinvestment strategies after having received capital injections. Accordingly, although capital assistance is given to increase bank stability and to reduce incentives to take excessive risks, it was also given with the understanding that the injected capital would be used to expand lending during a period of financial crisis. Taking this into account capital assistance may plant the seed of future distress by exacerbating moral hazard problems triggering excessive bank risk-taking through “zombie lending”. As a consequence, revitalizing bank lending activities and promoting financial stability may not work when market confidence is still weak (Beck et al., 2010).

Against this background and since no empirical consensus exists yet on whether capital assistance programs are reliable instruments, the analysis at hand empirically investigates if the U.S. “*Troubled Asset Relief Program*” may have contributed to restore market confidence and to promote financial stability. In particular, employing data on supported US banks we analyze the impact of the first announcement of TARP, the announcement of revised TARP, respective capital infusions and capital repayments on changes in bank shareholder value and bank risk as perceived by the capital market through share price reactions.

Empirical results reveal a light and a dark side of TARP. While the first and revised announcement of TARP as well as capital

repayments may provoke an increase in bank shareholder value and a decrease in systematic risk, equity capital injections are observed to be a severe impediment to restore market confidence and to promote financial stability. Furthermore, while TARP announcements and capital injections may increase systemic risk, no significant effect on systemic risk is found for capital repayments. Baseline regressions results hold even when performing a large variety of robustness checks while subsample regressions reveal further important insights into the impact of the four TARP events on bank shareholder value and risk.

Our analysis complements and extends previous event studies on TARP (Kim and Stock, 2012; Elyasiani et al., 2011; Veronesi and Zingales, 2010; King, 2009) for several aspects. *First*, to the best of our knowledge this is the first comprehensive study that empirically investigates the impact of the entire set of four TARP events on wealth effects and systematic risk. *Second*, additionally analyzing the decomposition of the beta factor (idiosyncratic risk and systemic risk) allows a deeper insight into the drivers of the change in bank systematic risk due to the four TARP events. *Third*, as regards the variability of systematic and systemic risk during respective event windows we allow for (a) different model parameters of systematic and systemic risk before, during and after the event window and (b) gradually changing systematic and systemic risk within the event window. Consequently, our analysis reveals a significant change in systematic and systemic risk during the event window period which has remained undetected by related event studies on this issue so far. *Finally*, while previous studies have not accounted for conditional variance at all, we employ a GARCH structure throughout all regressions in order to address volatility clustering in our time series of bank stock returns which is even more important during periods of financial stress.

The remainder of the paper is organized as follows. Section 2 presents a brief description of TARP and introduces the theoretical background and related empirical studies. While Section 3.1 describes data and sources, the econometric approach is presented in Section 3.2 and elaborated in more detail in the Technical Appendix. Baseline regressions, robustness checks and subsample regressions are discussed in Section 4. Finally, Section 5 concludes.

## 2. Theoretical background and literature review

### 2.1. The Troubled Asset Relief Program (TARP)

As a response to the collapse of the US investment bank *Lehman Brothers* on September 15, 2008 and in order to prevent further financial market distortions, the U.S. Department of the Treasury introduced a first draft of TARP on September 19, 2008. After having initially been rejected by the U.S. Congress on September 29, 2008 a modified and more detailed version of TARP finally passed the congress and was established under the *Emergency Economic Stabilization Act (EESA)* on October 3, 2008.

TARP was originally proposed as a means to insure US banks' "toxic" and illiquid mortgage-related assets up to a value of USD 700 billion in order to provide financial institutions with necessary liquidity. However, though TARP was considered to be the largest government intervention into financial markets in the US history so far, the announcement of TARP did not significantly restore confidence in financial markets. Given signs of a credit crunch it became obvious that US banks needed additional funds by more rapid actions to sustain their business during the financial turmoil and economic downturn in the US. As a consequence, the Department of the Treasury decided to revise the primary TARP framework by additionally launching the Capital Purchase Program (CPP) as a sub-program of TARP (henceforth TARP–CPP) on October 14, 2008. In this context, USD 250 billion of the entire USD 700 bil-

lion from TARP were allocated to TARP–CPP in order to faster recapitalize the financial sector by purchasing preferred stocks and warrants from viable "qualifying" financial institutions. In this context, the nine largest US commercial banks were forced by government to accept capital infusions in this manner of in total USD 125 billion while the remaining USD 125 billion were provided for qualifying financial institutions of all sizes and types. On October 28, 2008 first tranches (USD 115 billion) of TARP–CPP equity capital infusions via TARP were allocated to the eight largest US commercial banks.<sup>1</sup> During the entire time period the U.S. Department of the Treasury provided capital to in total 707 financial institutions in 48 states, trying to restore capital market investors' confidence by helping banks to absorb losses from toxic and illiquid assets.

### 2.2. Literature review

Related literature provides contradictory evidence concerning the impact of governmental capital assistance programs on bank shareholder value and risk. This may be explained by the fact that likely effects may generally be attributed to *two different "transmission channels"*, i.e. (1) the direct impact of providing capital assistance on a supported bank's leverage and its liquidity position (*direct effect*) and (2) the influence of capital assistance on a bank's investment policy ex post and in particular a bank's risk taking behavior (*indirect effect*).

As regards the *direct effect*, it is commonly suggested that capital assistance may increase financial stability of supported banks since capital infusions may directly provoke a decrease in bank leverage as well as an increase in its liquidity position in the short-run (e.g., Mehran and Thakor, 2011; Bayazitova and Shivdasani, 2012). However, it is also pointed out, that the impact of a recapitalization on bank risk may predominantly depend on the financial position of the supported bank ex ante. Thus, equity capital injections into banks with large portfolios of illiquid or distressed assets may not necessarily prevent future underpriced "fire sales" with its adverse consequences on bank financial soundness (Diamond and Rajan, 2011, 2010).

Furthermore, taking into account capital market expectations, public capital infusions may serve as a quality signaling device towards external investors. Accordingly, it is suggested that the bailout may reduce costs of financial distress and may induce a decrease in information asymmetries between the bank's management and external investors, finally resulting in stronger incentives for shareholders to participate in subsequent equity capital offerings supporting the government intervention (Mehran and Thakor, 2011). In contrast, however, it is also proposed that external investors may interpret bank bailouts as signals of significantly higher expected credit default risks inherent in the bank's asset portfolio (Hoshi and Kashyap, 2010). In addition, investors may also expect that capital-supported banks will be protected again in case of future distress. Under this interpretation, the bailout is expected to encourage risk-taking by protected banks by reducing investors' monitoring incentives and increasing moral hazard (Flannery, 1998). Accordingly, capital assistance to banks may not definitely increase the risk bearing capacity of the financial system in the medium-run resulting in lower incentives of bank shareholders to participate in subsequent equity capital offerings (Hoshi and Kashyap, 2010).

The *indirect effect* of capital infusions to banks primarily depends on the bank's reinvestment policy ex post, i.e. the bank's incentives to bear more risk to fulfill capital market expectations,

<sup>1</sup> First tranches of capital infusions via TARP–CPP were allocated to the following eight banks: Goldman Sachs Group Inc., Morgan Stanley, J.P. Morgan Chase & Co., Bank of America Corp. (including Merrill Lynch), Citigroup Inc., Wells Fargo & Co., Bank of New York Mellon and State Street Corp.

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