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Supranational Rules, National Discretion: Increasing Versus Inflating Regulatory Bank Capital?

SAFE Working Paper No. 296

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Supranational Rules, National Discretion:

Increasing versus *Inflating* Regulatory Bank Capital?

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First version: November 2020

This version: January 2021

Link to most recent version

Abstract

We study how higher capital requirements introduced at the supranational and implemented at the national level affect the regulatory capital of banks across countries. Using the 2011 EBA capital exercise as a quasi-natural experiment, we find that affected banks inflate their levels of regulatory capital without a commensurate increase in their book equity and without a reduction in bank risk. This observed regulatory capital inflation is more pronounced in countries where credit supply is expected to tighten. Our results suggest that national authorities forbear their domestic banks to meet supranational requirements, with a focus on short-term economic considerations.

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For helpful comments and suggestions, we would like to thank Tobias Berg, Huyen Nguyen, Felix Noth, Lena Tonzer, Missaka Warusawitharana, and the conference and seminar participants at the SFI-Capco Institute Banking & Finance Forum 2019, the European Banking Authority (EBA), Goethe University Frankfurt, and the Federal Reserve Board. The views expressed in this paper solely reflect those of the authors and not necessarily those of the Federal Reserve Board, the Federal Reserve System as a whole, nor of anyone associated with the Federal Reserve System. Ongena acknowledges financial support from ERC ADG 2016 - GA 740272 lending.

International coordination among countries is the linchpin of the current global architecture in matters of defense, trade, the environment, and banking. However, international coordination is difficult and the rules may be complex and incomplete, thereby creating loopholes and, hence, opportunities for national discretion or forbearance. For the banking sector, for example, Acharya (2003) argues that supranational capital requirements without coordination on other dimensions of the regulatory framework may even be detrimental to financial stability. Yet, there is little empirical evidence on the interplay between supranational rules and national policies. Because the national implementation of a supranational regulatory framework is usually spread out over multiple years and policies, it is therefore difficult to study empirically.[1]

In this paper, we study how supranational rules imposed on banks affect the incentives of national authorities to engage in discretionary behavior. To that end, we focus on regulatory bank capital. Regulatory bank capital (which differs from book equity) provides an ideal testing ground to study the intricate interplay between supranational rules and national policies. As explained below, the rules governing the definition of regulatory bank capital include a plethora of deductions and instruments, resulting in a sizable wedge between a bank's book equity and its regulatory capital. While these rules aim to increase the loss absorptive capacity of regulatory capital, they are also frequently criticized for being too complex and too opaque (Haldane, 2012, 2013) and for providing considerable leeway to manipulate capital ratios. National authorities may assist banks' efforts to inflate their regulatory capital by exercising regulatory forbearance, such as by enacting favorable regulations or by making certain capital instruments eligible for regulatory capital. Regulatory capital inflation is an attractive option because it can achieve more "bang for the buck" than a reduction in risk-weighted assets.[2] Therefore, national discretion may effectively undermine well-intended supranational rules in practice.

The 2011 capital exercise, conducted by the European Banking Authority (EBA), provides a unique empirical setting to study the interplay between supranational rules and national discretion. The capital exercise raised the minimum required core tier 1 (CT1) capital ratio from 5% to 9% for a subset of European banks, while leaving requirements unchanged for other European banks.

[1] For example, Jones and Zeitz (2017) show that the adoption of the Basel II Pillar I Minimum Capital Requirements spanned over 10 years and resulted in a large variation in implementation levels across countries.

[2] For a bank with e.g. a 9 percent regulatory capital ratio, a marginal one dollar increase in regulatory capital increases the capital ratio as much as a marginal ten-dollar reduction in risk-weighted assets.

Although the EBA capital exercise was a uniform supranational regulatory intervention, national supervisors were ultimately in charge of approving the measures by which banks intended to increase their capital ratios (EBA, 2011a). This resulted in considerable national supervisory discretion and room to exercise forbearance regarding the approved measures taken by banks to reach the required capital ratio. The empirical setting of the EBA capital exercise naturally lends itself to a difference-in-differences research design. Our main measure of capital inflation is the ratio of regulatory capital relative to book equity, capturing the amount of regulatory capital a bank reports per euro of book equity. An increase in this ratio suggests that regulatory capital increased without a commensurate increase in book equity capital. For our baseline analysis, we compare changes in the ratio of regulatory capital relative to book equity between banks subject to the 2011 capital exercise (CE banks) and banks not subject to the exercise (non-CE banks).[3]

Our results are supportive of national forbearance and inflation of regulatory bank capital in response to an increase in capital requirements at the supranational level. First, we find that CE banks (i.e., our treatment group) increased their ratio of regulatory capital to book equity by 10 percentage points relative to comparable non-CE banks (i.e., our control group). The economic magnitude of this effect is substantial. The average CE bank increased its regulatory capital from 2010 to 2012 by 16.2 percent, but its book equity by only 6.1 percent. Thus, for the average CE bank more than half of the increase in regulatory capital came from capital inflation, and not from an increase in book equity. Consistent with weakly capitalized banks having a stronger incentive to engage in capital inflation to pass the EBA capital exercise, these results are driven by banks with ex-ante lower capital ratios. We further calculate a "shadow regulatory capital ratio" (book equity over risk-weighted assets) and investigate how this ratio changed compared to banks' officially reported capital ratios (regulatory capital over risk-weighted assets). We find that CE banks would not have achieved a material improvement in their reported capitalization relative to control group banks if they had not inflated their levels of regulatory capital.[4]

[3]We adopt the following terminology: capital exercise (CE) banks are banks selected into the 2011 EBA capital exercise and therefore subject to the increase in capital requirements (treatment group); non-capital exercise (non-CE) banks are other European banks not selected into the EBA capital exercise and therefore not subject to the increase in capital requirements (control group).

[4]Note that, in principle, banks can also increase their capital ratios by reducing risk-weighted assets, as shown in Gropp, Mosk, Ongena, and Wix (2019). In this paper, we abstract from changes in risk-weighted assets and focus on discretion in the calculation of the numerator of the capital ratio. In Section IV.D, we further study the relation between regulatory capital inflation and risk-weighted asset reduction.

The main objective of the capital exercise was to bolster confidence in the banking system by ensuring that banks are sufficiently capitalized to withstand unexpected losses. Thus, an increase in regulatory capital ratios should - in principle - reflect an increase in banks' safety and soundness. We therefore study the effect of the capital exercise on market- and accounting-based measures of bank risk. We find that changes in the CDS spreads of CE banks do not significantly differ from the CDS spread changes of control group banks, neither around the announcement date of the capital exercise nor between the start and end date of the capital exercise. Moreover, we find a reduction in the z-score of weakly capitalized CE banks between 2010 and 2012 relative to the control group, suggesting that the increase in regulatory capital ratios of CE banks did not reflect an improvement in their safety and soundness.

During the capital exercise, there was considerable heterogeneity in supervisory approaches across countries in Europe (Barth, Caprio, and Levine, 2013; Nouy, 2017). Our results thus far suggest that exercising discretion in the calculation of regulatory capital is undesirable from a prudential point of view and was fully understood by market participants. Supervisors should therefore be wary of regulatory capital inflation. However, national authorities might choose to be lenient on their domestic banks for a variety of reasons: they might be prone to regulatory capture and have a tendency to be too soft on their national champion banks (Goodhart, 2012; Schoenmaker, 2012; Haselmann, Singla, and Vig, 2018; Bruno and Carletti, 2019); they might want to minimize disruptions to the financial system and the real economy caused by bank failures (Brown and Dinç, 2011; Huizinga and Laeven, 2012; Walther and White, 2020); their actions might be constrained by political considerations and the electoral cycle (Brown and Dinç, 2005; Bian, Haselmann, Kick, and Vig, 2017); or government interventions in the banking sector might be infeasible due to fiscal budget constraints (Martynova, Perotti, and Suarez, 2019; Acharya, Borchert, Jager, and Steffen, 2020).

We document substantial heterogeneity across countries in the extent to which banks engaged in regulatory capital inflation, suggesting that national authorities played an important role. We provide anecdotal evidence of several forms of forbearance on behalf of national authorities, which allowed their CE banks to pass the capital exercise. National authorities acted as an underwriter for hybrid securities issued by CE banks, often explicitly citing the EBA capital exercise as the justification to boost banks' regulatory capital ratios. Besides direct capital support measures,

several countries implemented specific regulations which resulted in an increase of banks' regulatory capital, such as a favorable tax treatment of goodwill. Overall, we find that regulatory capital inflation is more pronounced in countries where national supervisors wield more discretionary power to exercise leniency[5], and in countries where credit supply is expected to tighten. These findings are consistent with the notion that local economic circumstances incentivize national authorities to exert discretion and forbearance, with an eye on short-term economic considerations.

Our paper contributes to several strands of literature. First, we add to the literature on centralized versus decentralized bank supervision (Dell'Ariccia and Marquez, 2006; Calzolari, Colliard, and Lóránth, 2019; Carletti, DellAriccia, and Marquez, 2020). Several studies show that local, national supervisors are more lenient than centralized, supranational supervisors in the day-to-day oversight of banks (Agarwal, Lucca, Seru, and Trebbi, 2014; Haselmann, Singla, and Vig, 2019b; Colliard, 2020). Our study shows how national authorities provide discretion to their domestic banks in response to a one-time uniform supranational intervention. Supranational cooperation in bank supervision may arise if the benefits outweigh the costs of cooperation (Beck, Silva-Buston, and Wagner, 2018). Our study shows that, after the initial formation of a supranational regulatory regime, a substantial tightening of the rules might trigger a heterogenous response of national authorities. To address this concern, one of the main objectives of the EU Single Supervisory Mechanism (SSM) is to harmonize supervisory practices. Although significant progress has been made, national authorities still have substantial room for national discretion (Nouy, 2017). Our results highlight that agency problems between supranational and national authorities can undermine the effectiveness of supranational regulation. In a similar vein, our results also inform the design and implementation of stress tests and banking supervision (Goldstein and Leitner, 2018). Investigating the 2014 ECB's asset quality review, Abbassi, Iyer, Peydró, and Soto (2020) document that banks engage in "window-dressing" to pass stress tests by shedding riskier assets off the balance sheet before the stress test and reloading them after successful compliance. Our findings show that, in order to pass stress tests, banks do not only embellish the asset side of their balance sheet, but also exploit discretion in the calculation of regulatory capital, with no substantial improvement in financial stability.

Second, our paper relates to the literature on supervisory leniency and regulatory forbear-

[5] As measured by the *Official Supervisory Power* index introduced by Barth, Caprio, and Levine (2013)

ance. Previous studies show that regulators and supervisors exercise forbearance by approving favorable regulations (Skinner, 2008), by allowing non-compliance of banks with existing regulations (Huizinga and Laeven, 2012), by implementing identical rules inconsistently (Agarwal, Lucca, Seru, and Trebbi, 2014), or by being less likely to close failing banks (Morrison and White, 2013; Brown and Dinç, 2011), with potentially adverse effects for the real economy (Gropp, Ongena, Rocholl, and Saadi, 2018). Such regulatory forbearance may arise from regulatory capture (Goodhart, 2012; Schoenmaker, 2012; Haselmann, Singla, and Vig, 2018; Bruno and Carletti, 2019), the attempt to avoid disruptions to the real economy and the financial system (Brown and Dinç, 2011; Huizinga and Laeven, 2012; Walther and White, 2020), political considerations (Brown and Dinç, 2005; Bian, Haselmann, Kick, and Vig, 2017), and fiscal constraints preventing interventions in the banking system (Martynova, Perotti, and Suarez, 2019; Acharya, Borchert, Jager, and Steffen, 2020). We contribute to this literature by documenting that national supervisors show discretionary leniency with regard to their own domestic banks' pursuit of regulatory capital inflation to pass a supranational recapitalization exercise.

Finally, our paper adds to the literature on informational and incentive problems in complex financial regulation. While a large number of studies investigate how manipulation of risk weighted assets results in inconsistent risk measurement (Mariathasan and Merrouche, 2014; Behn, Haselmann, and Vig, 2016; Plosser and Santos, 2018), the calculation of regulatory capital has received little attention so far. We contribute to this literature by investigating rules governing regulatory capital as an important instrument that banks and national supervisors use to inflate capital ratios.

The remainder of the paper proceeds as follows. Section I discusses the institutional background of the EBA capital exercise and the rules governing the calculation of regulatory capital. Section II describes our empirical strategy and the data. Section III reports our main results. Robustness checks are presented in Section IV. Section V concludes.

I. Institutional Background

A. The 2011 EBA Capital Exercise

The 2011 capital exercise, conducted by the European Banking Authority (EBA), was announced on October 26, 2011, and required 61 European banks to reach and maintain a 9% core

tier 1 (CT1) capital ratio by the end of June 2012.[6] This constituted an economically significant increase compared to the previously required 5%. Banks' inclusion into the capital exercise was determined by a country-specific selection rule based on bank size. In particular, for each country, the EBA included "banks in descending order of their market shares by total assets," such that the exercise covered "at least 50 percent of the national banking sectors in each EU Member State in terms of total consolidated assets as of end 2010" (EBA, 2011b). As the selection procedure was based on total assets as of year-end 2010, it was not influenced by bank-specific events in the months leading up to the exercise. Both the timing and the magnitude of this increase in capital requirements was unexpected. The capital exercise came only a few months after the EU-wide stress test in June 2011 and was described as a "quick-fire regulatory health check" (Halstrick and Framke, 2011). The Financial Times reported that the 9 percent requirement was "well beyond the current expectations of banks and analysts" (Atkins, Jenkins, and Spiegel, 2011).

Although the EBA capital exercise was a supranational regulatory intervention, national supervisors were ultimately in charge of approving the measures by which banks intended to increase their capital ratios (EBA, 2011a). CE banks were asked to submit their recapitalization plans to their respective national supervisory authorities, outlining how they intended to reach the set targets. The EBA did not specify enforcement actions related to their recommendations on how banks had to be recapitalized. This resulted in considerable discretion for national supervisors and room to exercise forbearance regarding the approved measures taken by banks to reach the required capital ratio.

B. Regulatory Capital and Book Equity

Just like banks' risk-weighted assets for regulatory purposes differ from book assets for financial reporting purposes, regulatory capital differs from book equity. This difference originates from the distinct objectives of financial reporting and prudential regulation. While the aim of financial reporting is to provide information about the economic performance and condition of businesses, the objective of prudential regulation is to promote the safety and soundness of banks and the banking

[6] See Gropp, Mosk, Ongena, and Wix (2019) for a detailed discussion of the institutional features of the 2011 EBA capital exercise, and Mésonnier and Monks (2015), Blattner, Farinha, and Rebelo (2019), Degryse, Karapetyan, and Karmakar (2018), and Haselmann, Kick, Singla, and Vig (2019a) for other papers exploiting the 2011 EBA capital exercise as a quasi-natural experiment.

system. The underlying principles of financial reporting and prudential banking regulation are therefore not always aligned (BCBS, 2015).

A bank's book equity mainly comprises common share capital and retained earnings. Regulatory adjustments to bank capital aim to reconcile the two approaches and deduct certain elements from a bank's book equity which are considered less effective in absorbing losses. Examples include goodwill and intangible assets, unrealized gains and losses on available-for-sale securities, deferred tax assets, and holdings in other financial institutions. This table in Online Appendix 1 details the calculation of regulatory capital via the application of regulatory adjustments to book equity according to the official Basel disclosure template (BCBS, 2011). The table thus illustrates the complexity of the rules governing the calculation of regulatory capital.

During the capital exercise, the EBA recommended that "banks should first use private sources of funding to strengthen their capital position to meet the required target, including retained earnings, reduced bonus payments, [and] new issuances of common equity" (EBA, 2011a). In the final report on the capital exercise, however, the EBA stated that "other mitigating measures directly impacting banks' capital position [stemming] from lower deductions from CT1 capital (e.g. depreciation/disposal of goodwill and intangible assets)" (EBA, 2012) amounted to 25.5 billion euros, a significant amount compared to the 50 billion euros of core capital raised by EBA banks with a capital shortfall. This is consistent with anecdotal evidence from banks' annual reports. For example, Deutsche Bank reported in its 2012 financial report that its "Common Equity Tier 1 (formerly referred to as Core Tier 1) capital increased to €38.0 billion from €36.3 billion" and that "the increase in [...] Tier 1 capital primarily reflected reduced capital deduction items"(Deutsche Bank, 2012).

C. Economic Mechanisms and Incentives

In line with the goals of prudential regulation, regulatory adjustments to book equity intend to increase the quality of a bank's capital by deducting items that may not fulfill their loss-absorbing function at all times (BCBS, 2015). An increase in a bank's regulatory capital relative to its level of book equity could therefore—in principle—reflect an increase in capital quality. In this case, we would expect an increase in regulatory capital to be associated with an increase in a bank's capability to absorb losses and thus with a reduction in bank risk. On the other hand, banks faced

with a sudden and substantial increase in capital requirements have a strong incentive to engage in regulatory capital arbitrage to boost their capital ratios. By doing so, they might be able to meet increased regulatory requirements without issuing costly equity or retaining additional earnings. Hence, these incentives are particularly strong for ex-ante weakly capitalized banks (Boyson, Fahlenbrach, and Stulz, 2016). However, if banks merely exploit discretion in the calculation of regulatory capital, their capitalization might improve "on paper" but without an associated improvement in safety and soundness. In this case, we would expect such regulatory capital inflation to not be associated with a reduction in bank risk.

While banks have an incentive to inflate their regulatory capital, national authorities might have an incentive to turn a blind eye or actively support such activities, thereby exercising regulatory forbearance. As documented in previous studies, national authorities are often keen on preserving their domestic national champions (Schoenmaker, 2012; Goodhart, 2012), either because of regulatory capture or to ensure financial stability (Haselmann, Singla, and Vig, 2018). To avoid disruptions to bank lending and the real economy (Huizinga and Laeven, 2012), supervisors might decide to forbear failing banks, especially when the banking sector is weak (Brown and Dinç, 2011), as it was the case in Europe during the time of the capital exercise. Moreover, when national authorities are fiscally constrained, they might prefer to "kick the can down the road" (Acharya, Borchert, Jager, and Steffen, 2020) and exercise forbearance to postpone costly capital injections (Martynova, Perotti, and Suarez, 2019). The implementation of the Basel framework in Europe granted national authorities substantial discretionary powers to exercise leniency towards their domestic banks (Maddaloni and Scopelliti, 2019). Therefore, national authorities might play an important role in the extent to which banks are able to engage in regulatory capital inflation.

II. Empirical Strategy and Data

A. Empirical Strategy

Identifying whether banks exercise discretion in the calculation of regulatory capital to inflate their capital ratios is challenging in the absence of a control group unaffected by these motives. We address this empirical challenge by exploiting the 2011 EBA capital exercise as an exogenous shock to banks' capital requirements and thus banks' needs to increase their regulatory capital

ratios. The setup of the capital exercise, whereby the EBA required a subset of European banks to reach a 9% CET1 capital ratio by the end of June 2012, while leaving requirements unchanged for other European banks, naturally lends itself to a difference-in-differences research design. The EBA selected banks according to an explicit selection rule based on bank size and included "banks in descending order of their market shares by total assets," such that the exercise covered "at least 50% of the national banking sectors in each EU Member State in terms of total consolidated assets as of end of 2010" (EBA, 2011b). This country-specific selection threshold yields a considerable overlap in size and other variables between banks selected and not selected into the capital exercise, which allows us to control for bank-specific characteristics.

To measure regulatory capital inflation, we study changes in the ratio of a bank's regulatory capital relative to its book equity. Table I illustrates the intuition of our measure using the example of the regulatory capital balance sheet of the Italian bank Intesa Sanpaolo for the years 2010 and 2012. In 2010, Intesa Sanpaolo had €54.6B in total book equity and €26.2B in regulatory CT1 capital. Due to capital deductions of €28.4B, only 47.9 percent of the bank's total book equity counted towards regulatory capital. Over the period from 2010 to 2012, around the EBA capital exercise, the total book equity of Intesa Sanpaolo decreased by €4.7B. At the same time, however, regulatory CT1 capital increased by €7.3B due to a reduction in capital deductions of €12.0B. The ratio of regulatory capital to book equity increased by 19.2 percentage points to 67.1 percent. In its 2011 Pillar 3 report, Intesa Sanpaolo reported that this increase in its regulatory capital ratio was partially driven by "the realignment of goodwill envisaged by Law Decree no. 98/2011 (+52 basis points on Core Tier 1)" (Intesa Sanpaolo, 2011). Thus, if banks increase their regulatory capital without a commensurate increase in their book equity, then this implies a reduction in regulatory deductions and, therefore, an increase in the ratio of regulatory capital to book equity.

[Table I about here]

To test whether the capital exercise incentivized banks to engage in regulatory capital inflation, we estimate the following baseline difference-in-differences regression specification:

$$Y_i = \alpha + \beta \times \text{CEB}_i + \delta \times (\text{CEB}_i \times \text{CT1 Ratio}_{2010,i}) + \sum_k \theta^k X_i^k + \gamma_c + \epsilon_i \tag{1}$$

where Y_i is the change in the ratio of regulatory core tier 1 (CT1) capital to total book equity from 2010 to 2012, i.e. $\Delta\,(\text{CT1 Capital/Total Book Equity})_{2010-2012,i}$. Our treatment variable CEB_i takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. As we expect weakly capitalized CE banks to have a stronger incentive to engage in regulatory capital inflation, we interact the treatment dummy with banks' pre-treatment capital ratios as of 2010. We control for the following bank characteristics X_i^k as of 2010: log total assets, CT1 ratio, customer loans as a share of total assets, net interest income as a share of total operating revenue, depository funding as a share of total assets, and net income over total assets. Additionally, we include country fixed effects γ_c and cluster standard errors at the country level.

B. Data

We use annual bank balance sheet data from the SNL Financial Company database. Our initial sample contains 61 CE banks and 494 non-CE European commercial and savings banks from the SNL Financial universe. We follow the sample construction procedure in Gropp, Mosk, Ongena, and Wix (2019) and exclude all subsidiaries of CE banks, non-CE banks, and foreign banks, all banks which were acquired during the sample period, all banks which received capital injections during the pre-treatment period, and all banks with negative levels of equity. This sample construction procedure finally leaves us with a sample of 48 CE banks (our treatment group) and 143 non-CE banks (our control group). The pre-and post-treatment periods in our analysis are 2010 and 2012, respectively, the years immediately before and after the capital exercise. All outcome variables are winsorized at the 5 percent level to reduce noise from extreme outliers. For our bank risk analysis, we obtain price data on five-year maturity CDS contracts on senior and junior bonds of European banks. During our sample period, CDS data are available for 45 CE banks and 11 non-CE banks.

Table II shows summary statistics and mean comparisons for CE banks and non-CE banks as of 2010, the year immediately prior to the capital exercise. Due to the capital exercise being carried out on the largest banks in each country, the average capital exercise bank is about 18 times larger than the average non-capital exercise bank. We address potential identification concerns regarding bank size throughout our analysis and, in Section IV.B, conduct a number of robustness checks employing a matching estimation strategy.

[Table II about here]

The crucial identifying assumption of a DID estimator requires that the ratio of regulatory capital to book equity (our main outcome variable) would follow a parallel trend for treated banks and non-treated banks in absence of the capital exercise. Figure 1 shows the evolution of this ratio relative to 2010 for CE banks and non-CE banks. Prior to the capital exercise, the ratio of regulatory capital to book equity was stable for both groups of banks. From 2010 to 2012, however, banks in the capital exercise significantly increased their levels of regulatory capital relative to book equity, implying a substantial reduction in capital deductions around the EBA capital exercise. In contrast, the ratio remained unchanged for non-CE banks in the control group.

[Figure 1 about here]

III. Results

A. Univariate Results

We first provide univariate descriptive statistics how CE banks in our treatment group and non-CE banks in our control group adjusted their regulatory capital and book equity around the capital exercise. Table III reports the changes in total book equity, capital deductions, regulatory core tier 1 (CT1) capital, and in the ratio of regulatory capital to book equity between 2010 and 2012 for the two groups of banks. CE banks increased their regulatory capital by on average 16.2 percent around the capital exercise, and therefore by about the same magnitude as non-CE banks with 16.3 percent. This finding, however, masks important differences in how the two groups of banks achieved this. While non-CE banks increased their book equity by 16.4 percent, CE banks did so by only 6.1 percent. CE banks achieved their increase in regulatory capital to a substantial degree via a 23.1 percent reduction in capital deductions. Thus, for the average CE bank, more than half of the increase in regulatory capital stems form a reduction in capital deductions and not from an increase in book equity. CE banks therefore achieved a similar increase in regulatory capital as non-CE banks, even though they increased their book equity by 10.4 percentage points less. Consequently, for CE banks, the share of book equity counting towards regulatory capital

increased by 8.7 percent from 2010 to 2012, while this ratio remained constant for non-CE banks over the same period.

[Table III about here]

B. Regulatory Capital Inflation

While the graphical evidence in Figure 1 and the univariate descriptive statistics in Table III are suggestive that CE banks exercised discretion in the calculation of regulatory capital, these changes could conceivably be driven by other bank-specific factors. Table IV therefore presents the estimation results of the difference-in-differences regression from Equation (1) in Section II. The first column provides the unconditional treatment effect of the capital exercise and shows that CE banks increased their regulatory capital relative to their book equity by 9.3 percentage points compared to non-CE banks. The second column additionally controls for 2010 pre-treatment levels of log total assets, CT1 ratios, deposits over total assets, loans over total assets, net interest income over total operating revenue, and net income over total assets. In this specification, CE banks increased their regulatory capital to book equity ratio by 7.4 percentage points compared to non-CE banks, alleviating concerns that our results are driven by either bank size, profitability, banks' business models, or funding strategies. The third column additionally includes country dummy variables and compares CE banks and non-CE banks within countries. In this specification, CE banks increased the regulatory capital to book equity ratio by 10 percentage points relative to non-CE banks.

[Table IV about here]

As we expect weakly capitalized CE banks to have a stronger incentive to engage in regulatory capital inflation, the fourth column includes the interaction of the CEB dummy with banks' pre-treatment capital ratios.[7] Consistently, we find that a higher (lower) pre-treatment capitalization of CE banks leads to a significant reduction (increase) in regulatory capital inflation around the capital exercise. For CE banks, a one standard deviation increase in the pre-treatment CT1 capital ratio is associated with an additional 9 percentage points reduction in the ratio of regulatory capital

[7] Lubberink (2014) reports that low solvency banks in the United States report values of Tier 1 regulatory capital that exceed book equity, benefiting from regulatory adjustments to inflate their capital ratios

to book equity. This result is consistent both with arbitrage-like behavior on behalf of banks, which is more pronounced for weakly capitalized banks (Boyson, Fahlenbrach, and Stulz, 2016), and with regulatory forbearance on behalf of national authorities, which are more likely to forbear weakly capitalized banks (Brown and Dinç, 2011; Acharya, Borchert, Jager, and Steffen, 2020).

Finally, the fifth column examines whether banks' engagement in regulatory capital inflation is driven by bank size. Bigger banks tend to have, for example, more intangible assets and a larger trading book. This results in higher levels of capital deductions that can be adjusted to inflate regulatory capital ratios, providing large banks with more potential arbitrage opportunities to exploit. We find, however, that regulatory capital inflation of CE banks is not related to their size. The coefficient on the bank size interaction term is insignificant and, moreover, the magnitudes of the other coefficients do not change. This finding alleviates concerns that differences in bank size between CE banks and non-CE banks constitute a confounding factor in our analysis of regulatory capital inflation.

The objective of the capital exercise was to restore confidence in the EU banking sector by improving the capitalization of the largest European banks. In its final report on the capital exercise, the EBA (2012) stated that "the vast majority of the banks involved in the EBA capital exercise show a CT1 [capital ratio], as of end of June, above the 9% [...]", but also that "other mitigating measures directly impacting banks' capital position [stemming] from lower deductions from CT1 capital (e.g. depreciation/disposal of goodwill and intangible assets)" amounted to 25.5 billion euros, a significant amount compared to the 50 billion euros of core capital raised by EBA banks with a capital shortfall. To what extent was the increase in CT1 ratios of CE banks achieved by regulatory capital inflation as opposed to an increase in book equity? To investigate this question, we calculate a *shadow capital ratio* defined as a bank's level of book equity over its risk-weighted assets. This shadow ratio thus has the same denominator as the regulatory CT1 capital ratio and only differs in terms of the capital definition used in the numerator. We estimate the regression specification in Equation (1) with the changes in reported CT1 ratios and shadow capital ratios as the dependent variable, respectively.

Table V reports the regression results of this analysis. The first two columns show that especially weakly capitalized CE banks significantly increased their reported CT1 ratios relative to non-CE banks around the capital exercise. However, as shown in the third and fourth column, this is not the

case for their shadow capital ratios. All coefficients are statistically insignificant and considerably smaller in magnitude. Since the two ratios only differ in terms of the definition of capital used in the numerator (regulatory capital versus book equity), these results suggest that weakly capitalized CE banks would not have achieved a material improvement in their reported capitalization without engaging in regulatory capital inflation.

[Table V about here]

C. Regulatory Capital Inflation and Financial Stability

Since the prudential goal of higher capital requirements is to improve a bank's ability to absorb losses, any increase in capital ratios should be associated with an increase in bank stability. However, if capital ratios only improve "on paper", either due to managerial discretion (i.e., arbitrage behavior on behalf of banks) or due to preferential regulatory treatment (i.e., forbearance on behalf of national authorities), then the riskiness of banks should not improve and remain unaffected. We therefore study the effect of the capital exercise on market- and accounting-based measures of bank risk.

We first investigate whether the capital exercise was associated with a change in the market's perception of bank risk. To that end, we conduct an event study and examine the reaction of CDS returns of CE banks and non-CE banks in a three-day time window around the announcement of the capital exercise on October 26, 2011. The first three columns in Panel A of Table VI show that the announcement of the capital exercise did not reduce the CDS spread of CE banks. Column 4 of Panel A tests for differences in the reaction of CDS returns between stongly and weakly capitalized CE banks. As the capital exercise aimed to improve the capital positions of weakly capitalized banks, we should expect their CDS spreads to shrink after the announcement—consistent with a reduction in bank risk. Column 4, however, shows that this interaction coefficient is insignificant. We further investigate the change in CDS spreads between the start date (October 2011) and end date (June 2012) of the capital exercise. We do not find significant effects, neither on senior nor on junior CDS spreads.

[Table VI about here]

Finally, Figure 2 plots the estimated difference in CDS spreads between CE and non-CE banks for each qurter over the period from 2011Q1 to 2012Q3. The figure illustrates that the CDS spreads of CE banks and non-CE banks follow a parallel trend in the quarters before the capital exercise and do not significantly diverge during and after the capital exercise. In summary, we do not find any evidence that the capital exercise was associated with a change in the market's perception of bank risk.[8]

[Figure 2 about here]

One drawback of this analysis is that CDS data are only available for a subset of 45 CE banks and 11 non-CE banks in our sample. Therefore, in Panel B, we investigate an accounting-based measure of bank risk and estimate the regression specification from Equation (1) with the change in banks' z-scores from 2010 to 2012 as the outcome variable. We follow Beck, De Jonghe, and Schepens (2013) and calculate a bank's z-Score as:

$$Z_i = \frac{ROA_i + \left(\frac{E}{A}\right)_i}{\sigma\left(ROA\right)_i} \tag{2}$$

where ROA is the return on assets, E/A is the ratio of book equity to total assets, and $\sigma\left(ROA\right)$ is the standard deviation of the return on assets over a three-year rolling time window. The z-score measures a bank's distance to insolvency such that higher values indicate that the bank is more stable (Laeven and Levine, 2009).

Panel B of Table VI reports the results for our z-Score analysis. The first three columns show that there was no increase in the z-Score of CE banks around the capital exercise and that the magnitude of the coefficient is negative, albeit statistically insignificant. The fourth column shows that especially for weakly capitalized banks, the z-Score even significantly decreased, indicating a higher probability of default and an increase in bank risk. This finding is consistent with our results in Table IV that especially weakly capitalized banks inflated their levels of regulatory capital inflation to boost their capital ratios.[9]

[8] This is consistent with the evidence provided in Mésonnier and Monks (2015), who also report that the EBA capital exercise did not give rise to large changes in banks' CDS spreads.

[9] Our results are also in line with the findings of Bostandzic, Irresberger, Juelsrud, and Wei (2020) who show that the EBA capital exercise did not result in an improvement of various risk measures (i.e., Value-at-Risk, the inverse z-score, systematic risk, marginal expected shortfall, market-based leverage ratio, and SRISK) for banks in the capital exercise.

In summary, our results are inconsistent with the notion that the increase in regulatory capital ratios of CE banks via reduced capital deductions is associated with an improvement of banks' safety and soundness. While CE banks improved their capitalization "on paper", this did not translate into a reduction of non-regulatory market- and accounting-based measures of bank risk.[10] Hence, regulatory capital inflation has at best no, and at worst detrimental effects on financial stability and is therefore undesirable from a prudential point of view.

D. Regulatory Capital Inflation and Regulatory Forbearance

The extent to which banks are able to engage in regulatory capital inflation likely depends on the leeway they are given by their regulatory and supervisory authorities. During the EBA capital exercise, banks had to submit their recapitalization plans to their respective National Supervisory Authorities (NSAs) which were ultimately in charge of approving the measures by which banks intended to increase their capital ratios (EBA, 2011a). Moreover, during the capital exercise, there was considerable heterogeneity in supervisory approaches across countries in Europe (Barth, Caprio, and Levine, 2013; Nouy, 2017). Our empirical setting, in which a sudden supranational regulatory intervention was implemented with considerable national discretion, uniquely allows us to investigate the degree and drivers of regulatory forbearance across countries.

We first document that there was substantial cross-country heterogeneity in the extent to which CE banks engaged in regulatory capital inflation. We estimate the following regression specification:

$$Y_i = \alpha + \beta \times \text{CEB}_i + \sum_c \delta^c \left(\text{CEB}_i \times \text{CY}_c\right) + \sum_k \theta^k X_i^k + \gamma_c + \epsilon_i \tag{3}$$

where, as before, Y_i is the change in the ratio of regulatory core tier 1 (CT1) capital to total book equity from 2010 to 2012; and CEB_i is a dummy variable which takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. CY_c is a battery of country dummy variables, which take on the value 1 for country c, and 0 otherwise.

Figure 3 plots the estimated coefficients δ^c and the associated confidence intervals of Equation (3). Most notably, Italian and Portuguese banks inflated their regulatory capital by a considerably

[10] Lubberink and Willett (2021) find that banks' regulatory adjustments are relevant for the market valuation of highly levered banks in times of elevated market uncertainty.

larger magnitude than banks in other European countries, as we discuss below. However, we also find a significant amount of capital inflation for banks in Austria, Germany, France, Norway, and Slovenia, although to a lesser degree.

[Figure 3 about here]

To investigate whether our overall results are exclusively driven by Italian and Portuguese banks, we re-estimate the regression specification from Equation (1) and include two interaction terms for banks headquartered in Italy and Portugal, respectively. Table VII reports the regression results of this analysis. Column 1 shows that the unconditional treatment effect for CE banks not based in Italy or Portugal is still statistically significant, albeit smaller in magnitude. However, including bank-level control variables in Column 2 renders the coefficient insignificant. Columns 3 and 4 investigate whether our results for weakly capitalized banks are also largely driven by Italian and Portuguese banks. In this analysis, all coefficients remain statistically significant, indicating that weakly capitalized banks across Europe inflated their regulatory capital around the capital exercise. Moreover, as in Table IV, the interaction with total assets is again insignificant, indicating that our results are not driven by bank size.

[Table VII about here]

The results in Figure 3 and Table VII strongly suggest that country-specific factors are an important driver regarding the extent to which CE banks engage in regulatory capital inflation. We now explore the economic mechanisms behind this observed heterogeneity across countries. We start by collecting anecdotal evidence of national regulatory interventions around the time of the capital exercise which helped banks to boost their regulatory capital. Table VIII provides an overview of measures implemented by national authorities which increased the capitalization of domestic banks. These policies helped banks to comply with the supranational requirements set by the EBA, consistent with Figure 3 and the results in Table VII.

The first form of regulatory forbearance are ad-hoc recapitalizations via CT1-eligible hybrid securities underwritten by the state. While these instruments are not part of a bank's book equity, they count towards regulatory capital. Both in Italy (Banca Monte dei Paschi di Siena) and Portugal (Banco BPI, Banco Comercial Português, Caixa Geral de Depósitos), the state acted as

an underwriter for hybrid securities issued by CE banks, often explicitly citing the EBA capital exercise as the justification to boost banks' regulatory capital ratios.[11]

Second, besides direct capital support measures, several countries implemented specific regulations which resulted in an increase of banks' regulatory capital. One example is the tax treatment of goodwill. The book values of intangible assets and goodwill are deducted from a bank's book equity to address the high level of uncertainty regarding their positive realizable value in times of stress or insolvency (BCBS, 2009). For many banks, these assets are large in magnitude relative to their regulatory capital (24% for the CE banks in our sample as of 2010). Since the valuation of goodwill and intangible assets is subject to considerable accounting discretion (Beatty and Weber, 2006; Ramanna, 2008; Ramanna and Watts, 2012), they provide banks with substantial leeway to inflate their regulatory capital via an impairment or amortization of these assets, which lowers the amount of deductions from book equity. While such impairments and amortization are initially capital neutral, as they also reduce net income, banks can manage their regulatory capital via the devaluation of goodwill and intangible assets if such impairments are tax deductible.[12] For example, in 2011, the Italian government enacted Law Decree 98/2011, allowing banks to boost their regulatory capital via the tax treatment of goodwill. In its 2011 Pillar 3 report, the Italian Bank Intesa Sanpaolo reported an increase in their regulatory capital ratio "from the realignment of goodwill envisaged by Law Decree no. 98/2011 (+52 basis points on Core Tier 1)" (Intesa Sanpaolo, 2011). There is also anecdotal evidence of this form of regulatory capital inflation for other countries. As reported by the Financial Times, the Spanish bank Banco Bilbao Vizcaya Argentaria (BBVA) wrote down "€1.5 billion on the value of its struggling US business" which "did not affect its cash position" but helped "boost its core capital by €400 million due to the tax treatment of goodwill" (Johnson, 2012).[13]

We next conduct a formal regression analysis regarding the drivers of the observed cross-country heterogeneity in regulatory capital inflation. National authorities might choose to be lenient on

[11] For example, the state aid application of Banco Comercial Português explicitly notes that "on 8 December 2011, the EBA published a Recommendation related to banks' recapitalisation needs" and that therefore "the BCP Group needed to raise substantial additional capital by 30 June 2012" (EC, 2012).

[12] Assume a goodwill impairment of €1000 and a tax rate of 20%. The impairment will reduce capital deductions and therefore increase regulatory capital by €1000, while net income will decrease by only €1000×(1-0.2) = €800. The net effect on regulatory capital is therefore €200 due to the tax deductibility of the impairment charge.

[13] Online Appendix 2 discusses these forbearance measures in more detail and provides additional examples of how national authorities can use tax instruments to help their domestic banks to increase their regulatory capital ratios.

their domestic banks for a variety of reasons: they might be prone to regulatory capture and have a tendency to be too soft on their national champion banks (Goodhart, 2012; Schoenmaker, 2012; Haselmann, Singla, and Vig, 2018; Bruno and Carletti, 2019); they might want to minimize disruptions to the financial system and the real economy caused by bank failures (Brown and Dinç, 2011; Huizinga and Laeven, 2012; Walther and White, 2020); their actions might be constrained by political considerations and the electoral cycle (Brown and Dinç, 2005; Bian, Haselmann, Kick, and Vig, 2017); or government interventions in the banking sector might be infeasible due to fiscal budget constraints (Martynova, Perotti, and Suarez, 2019; Acharya, Borchert, Jager, and Steffen, 2020). In Table IX, we examine these explanations by interacting our CEB treatment dummy with several country-level variables.

We first test for the regulatory capture of supervisors by national champion banks (Haselmann, Singla, and Vig, 2018). Column 1 of Table IX includes the variable *National Champion*, which takes on the value of 1 if bank i is the largest bank in country c as of 2011 total assets, and 0 otherwise. We find a negative, but statistically insignificant relationship, suggesting that collusion between national authorities and the largest domestic banks did not play a role in the context of the capital exercise.

[Table IX about here]

Second, we test whether supervisory power is associated with banks' engagement in capital inflation. We employ the *Official Supervisory Power* index from Barth, Caprio, and Levine (2013), which measures the degree to which a country's supervisory agency has the authority to take specific actions. While more powerful supervisors might be more capable to discipline banks, they might also use their power to forbear weak banks. Indeed, this index has been found in the literature to be associated with adverse outcomes, such as corruption in lending, and with no beneficial effects on financial stability (Beck, Demirgüç-Kunt, and Levine, 2006; Barth, Caprio, and Levine, 2013). Consistently, we find that CE banks in countries where supervisors wield more power were more likely to engage in regulatory capital inflation. This finding suggests that powerful national supervisors used their capacity to exercise leniency towards their national banks and provided them with leeway to exercise discretion in the calculation of regulatory capital.

Third, we investigate the role of national authorities' capacity for public intervention. Both

theory (Martynova, Perotti, and Suarez, 2019) and recent empirical evidence (Acharya, Borchert, Jager, and Steffen, 2020) suggests that fiscally constrained governments might be more prone to engage in regulatory capital forbearance as they do not have the fiscal capacity to intervene in the banking sector. We follow Acharya, Borchert, Jager, and Steffen (2020) and measure the variable *Fiscal Constraints* using a country's current account balance as a percentage of nominal GDP. A higher current account balance indicates more fiscal room for government intervention. As shown in Column 3, we find no evidence for this mechanism in the context of the EBA capital exercise.

Fourth, we study whether fears of a credit crunch induced national authorities to forbear their domestic banks, in an attempt to avoid adverse effects on the real economy. We employ data from the ECB's Bank Lending Survey and construct the variable *Credit Standards*, defined as the share of banks expecting a tightening in credit standards over the next quarter. The interaction term in Column 4 shows that regulatory capital inflation is more pronounced in countries in which banks (and therefore, arguably, regulators and supervisors) expect a near-term contraction of credit supply. This finding is consistent with the notion that national authorities might chose to be lenient on banks in bad times to avoid a financial panic and minimize disruptions to the real economy (Brown and Dinç, 2011; Huizinga and Laeven, 2012; Walther and White, 2020). While we do not analyze whether this regulatory forbearance helped to avert a credit crunch, Acharya, Borchert, Jager, and Steffen (2020) provide evidence that such forbearance causes banks, that remain weakly capitalized, to engage in zombie lending (Acharya, Eisert, Eufinger, and Hirsch, 2019).

Fifth, we test whether regulatory capital inflation might be driven by the election cycle. As governments have an incentive to delay bank failures until after elections (Brown and Dinç, 2005) and to avoid unpopular bail-outs prior to elections (Bian, Haselmann, Kick, and Vig, 2017), we would expect national authorities to be more lenient on banks before upcoming elections. To investigate this, we construct the variable *Before Election*, which takes on the value of 1 if the capital exercise took place 12 months before the next national congressional election, and 0 otherwise. As shown in Column 5, we find no evidence for such political considerations playing a role around the capital exercise.

Finally, we include all country-level variables jointly in a horse race regression in Columns 6 and 7. The results confirm that regulatory capital inflation around the capital exercise was likely driven by powerful supervisors and the attempt to minimize disruptions to the real economy caused

by a credit crunch. In contrast, regulatory capture by national champion banks, fiscal constraints of national authorities, and political considerations driven by the electoral cycle appear to play a minor role. The coefficient on *Fiscal Constraints* is only significant in Column 6 and the coefficient on *National Champion* even suggests that these banks were less engaged in regulatory capital inflation.

IV. Robustness Checks

A. Placebo Treatment Periods

If CE banks would systematically differ from non-CE banks with respect to characteristics relevant for capital deductions, we would expect to see differential changes in the ratio of regulatory capital to book equity between CE banks and non-CE banks also in other periods. To examine this possibility, we conduct two tests with placebo treatment periods before (2008-2010) and after (2012-2014) the 2011 EBA capital exercise. Table X shows the results of this placebo exercise. For convenience of comparison, the first column of Table X replicates our baseline result in the third column of Table and shows the treatment effect of the capital exercise from 2010 to 2012. The second and third column then compare the changes in regulatory deductions between CE banks and non-CE banks for the placebo periods from 2008 to 2010 and from 2012 to 2014, respectively. While there is strong evidence for regulatory capital inflation around the capital exercise, CE banks and non-CE banks exhibit no differential change in the ratio of regulatory capital to book equity during the two placebo periods. This alleviates concerns that CE banks and non-CE banks differ systematically with respect to characteristics relevant for regulatory deductions.

[Table X about here]

B. Matching Results

For our main analysis, we rely on an OLS regression analysis. However, if the covariate distributions differ substantially by treatment status, then conventional regression methods can be sensitive to minor changes in the specification because of their heavy reliance on extrapolation. One approach to address this problem is the use of matching estimators which have favorable robustness

properties with respect to a variety of data configurations (Imbens, 2014). Thus, we estimate the treatment effect of the capital exercise on regulatory capital inflation using the bias-corrected Abadie and Imbens (2011) matching estimator. Specifically, we adopt four different matching strategies based on Gropp, Mosk, Ongena, and Wix (2019). The full sample matching strategy matches four non-CE banks to each CE bank based on the six matching covariates using the full sample of 48 CE banks and 144 non-CE banks. The overlap sample matching strategy matches one non-CE bank to each CE bank based on asset size only in the sample of banks which are larger than the smallest CE bank and smaller than the largest non-CE bank. The within-country matching strategy matches the two smallest CE banks and the two largest non-CE banks around the selection threshold within each country around. Finally, the within-region matching strategy matches CE banks to non-CE banks around the selection threshold within the same region (GIIPS countries and non-GIIPS countries). Online Appendix 3, which replicates Table 5 of Gropp, Mosk, Ongena, and Wix (2019), shows that the different matching strategies reduce differences in bank characteristics between treatment and control group banks. The third row in Table XI provides the results of these matching exercises. Our results are robust and similar in magnitude to our regression results when using the full sample, the within-country, and the within-region matching strategy. While the treatment effect is not significant when employing the overlap sample matching strategy, the coefficient is very similar in magnitude. The associated p-value is 0.11 and the results are therefore borderline statistically significant at the 10% level.

[Table XI about here]

C. Robustness After Excluding Individual Countries and CE Banks

Another concern is that our results are driven by individual countries or banks. Figure 3 shows that regulatory capital inflation of CE banks is more pronounced in Italy and Portugal. However, Columns 3 and 4 of Table VII show that the treatment effect is still positive and significant, even after including CEB $\times$ Italy and CEB $\times$ Portugal interaction terms. In Online Appendix 4, we replicate the results of Columns 3 and 4 in Table IV for different subsamples, by excluding banks from each country and each CE bank individually. Our results are robust to this extensive battery of subsample robustness checks.

D. Regulatory Capital Inflation Versus Risk Weighted Asset Reduction

When faced with higher capital requirements, banks can increase their regulatory capital ratios in two different ways: they can either increase their levels of regulatory capital (the numerator of the capital ratio) or they can shrink their risk-weighted assets (the denominator of the capital ratio). Gropp, Mosk, Ongena, and Wix (2019) show that, in response to the 2011 EBA capital exercise, CE banks reduced their risk-weighted assets by 16 percentage points relative to non-CE banks, while both CE and non-CE banks increased their levels of CT1 capital by the same magnitude. This paper shows that CE achieved this CT1 capital increase largely by inflating their regulatory capital. Regulatory capital inflation and a reduction in risk-weighted assets could serve as either substitutes or complements with regard to raising regulatory capital ratios. Figure 4 plots the change in the ratio of regulatory capital to book equity against the change in the logarithm of risk weighted assets between 2010 and 2012 for CE and non-CE banks.. For CE banks, there is a strong negative correlation between capital inflation and changes in risk weighted asset , suggesting that these banks treated both methods as complements to increase their regulatory capital ratios.

[Figure 4 about here]

V. Conclusion

This paper studies how higher capital requirements introduced at the supranational level affect regulatory capital of banks across countries. Exploiting the sudden increase in capital requirements during the 2011 EBA capital exercise, we find evidence that treated banks exercise discretion in the calculation of regulatory capital, thereby inflating their regulatory capital without a commensurate increase in their book equity. This improvement in bank capitalization "on paper" did not translate into a reduction of non-regulatory market- and accounting-based measures of bank risk. We find that this form of regulatory capital inflation varies considerably across countries, suggesting that the leeway of banks to exercise discretion is provided to them by their own national authorities. Regulatory capital inflation is more pronounced in countries with powerful supervisors and where a tightening of credit supply is expected in the near future. Our results suggest that national authorities forbear their domestic banks in order to minimize disruptions to bank lending and the

real economy.

To conclude, we provide empirical evidence on the interplay between supranational rules and their national implementation. In particular, we find that banks subject to the same supranational intervention display heterogeneous behavior which is primarily driven by national supervisory discretion. The 2014 introduction of the Single Supervisory Mechnism (SSM) and single European rulebook might have alleviated this concern by fostering a more consistent banking supervision across countries in Europe (Bruno and Carletti, 2019). However, concerns remain that "the single European rulebook is not yet single enough" and that there "is still room to arbitrage national rules" (Nouy, 2017).

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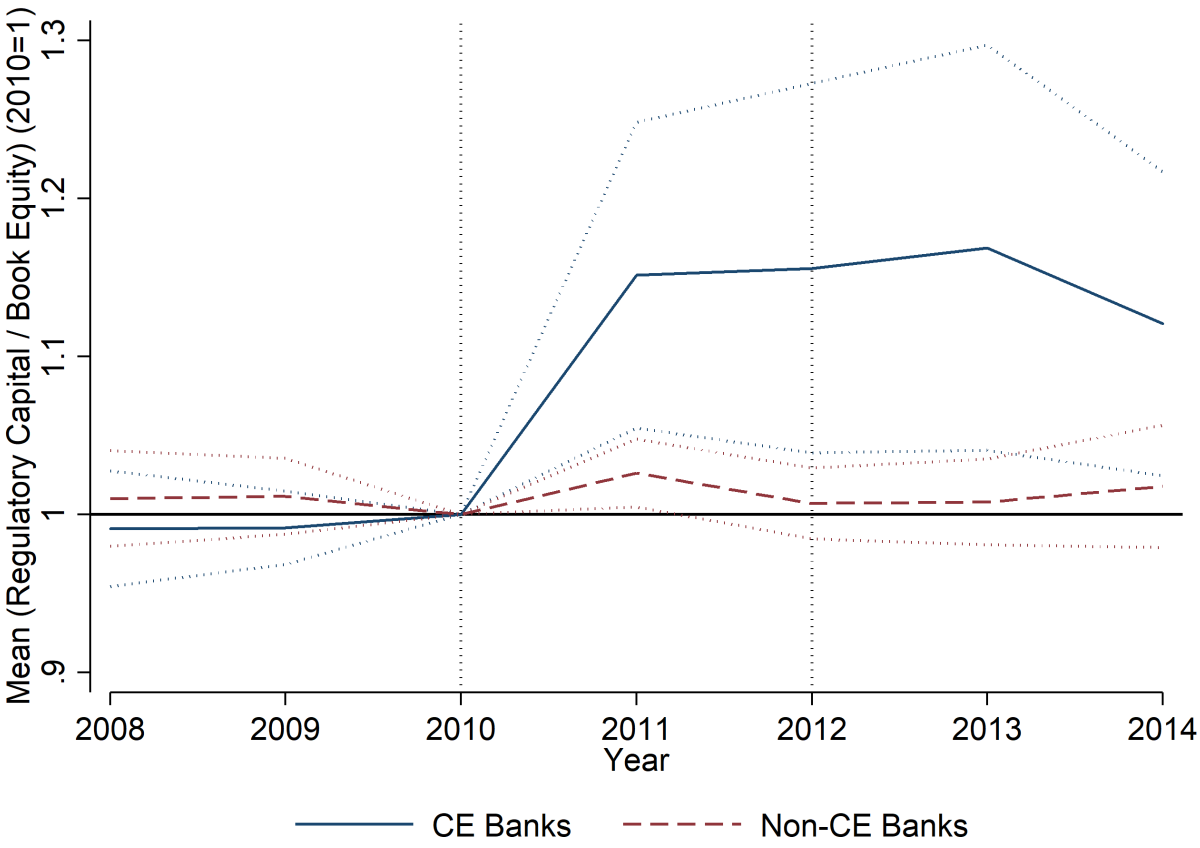

Figure 1. The Ratio of Regulatory Capital to Book Equity Over Time. Figure 1 shows the evolution of the mean ratio of regulatory core tier 1 (CT1) capital to total book equity over time for 48 capital exercise banks (CEB) (solid blue line) and 143 non-capital exercise banks (Non-CEB) (dashed red line), normalized to the value of 1 in 2010. The dotted lines indicate the 95 percent confidence intervals. The horizontal black line marks the value of 1, indicating no change in the ratio. The two dashed vertical lines mark 2010 and 2012, the years immediately before and after the capital exercise.

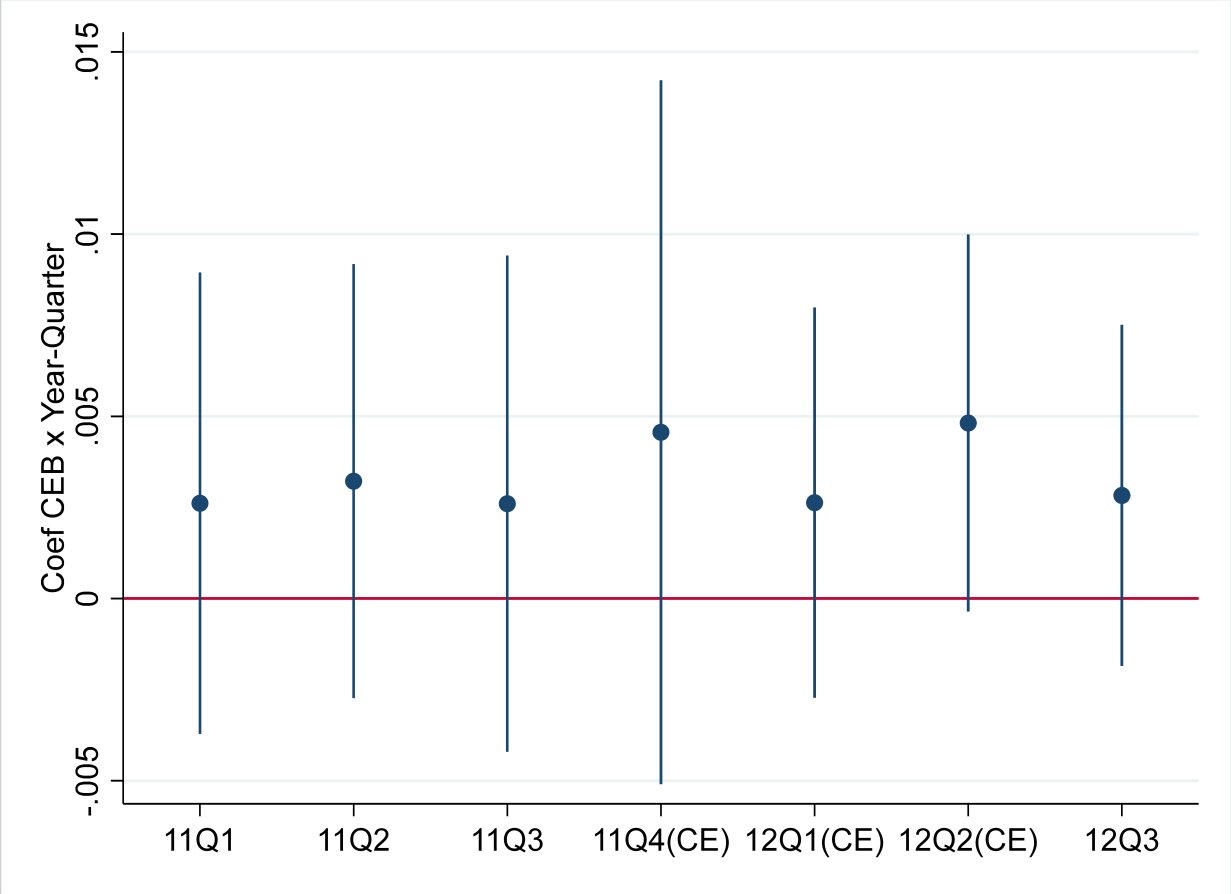

Figure 2. CDS Spreads of CE and Non-CE Banks Over Time. Figure 2 shows the estimated coefficients and confidence intervals of the specification: Senior CDS spread $= \beta_1 \text{CEB} \times Year - Quarter + \text{CY} \times \text{YearQuarter FE} + \text{Bank FE} + \varepsilon$. Standard errors are clustered at the bank level.

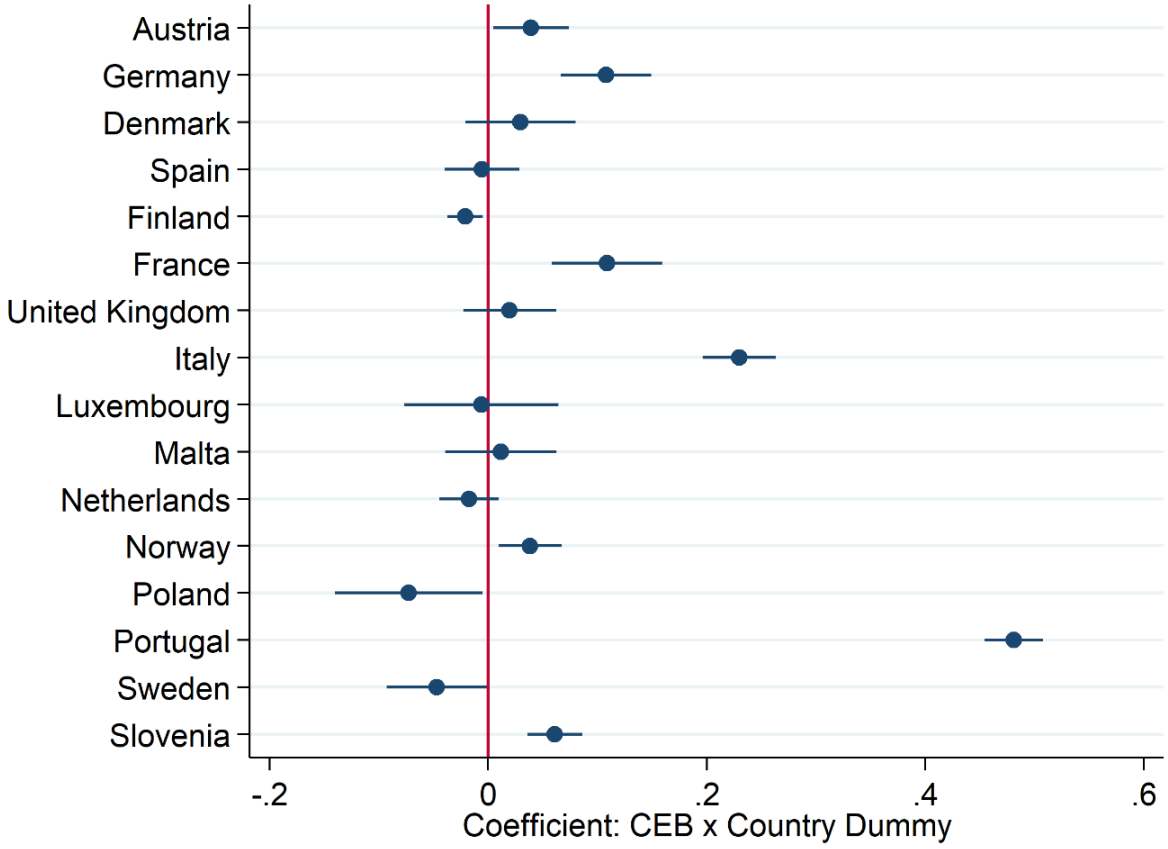

Figure 3. Cross-Country Heterogeneity in Regulatory Capital Inflation. Figure 3 plots the estimated coefficients δ^c and the associated confidence intervals of Equation (3) in Section III.D. The dependent variable is the change in the ratio of regulatory core tier 1 (CT1) capital to total book equity from 2010 to 2012. The variable CEB_i takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise; and CY_c is a battery of country dummy variables, which takes on the value 1 for country c, and 0 otherwise. We control for the following bank characteristics X_i^k as of 2010: log total assets, CT1 ratio, customer loans as a share of total assets, net interest income as a share of total operating revenue, depository funding as a share of total assets, and net income over total assets. Standard errors are clustered at the country level.

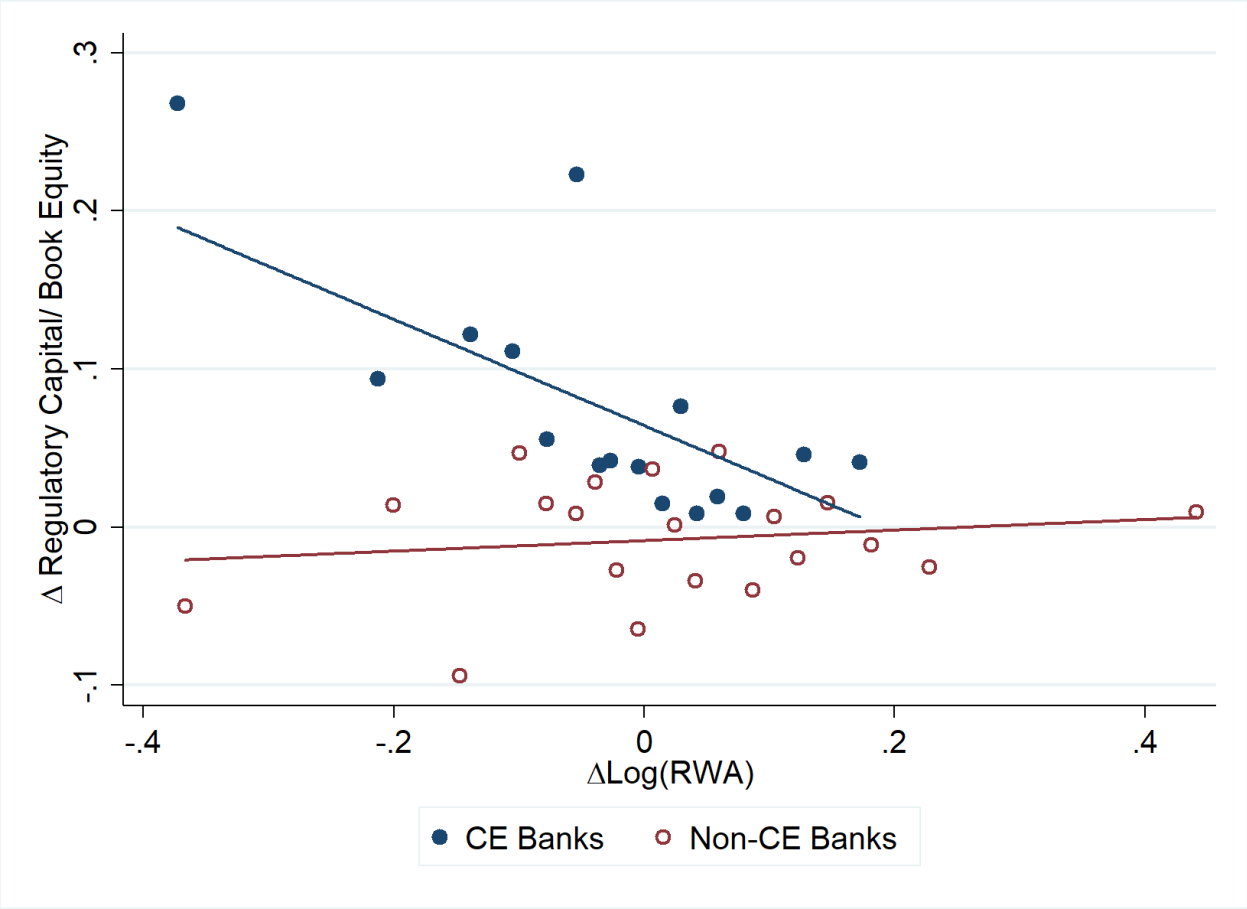

Figure 4. Regulatory Capital Inflation Versus Risk Weighted Asset Reduction. Figure 4 shows a binned scatter plot (with linear fit) of the change in the ratio of regulatory capital to book equity and the change in the logarithm of risk-weighted assets from 2010 to 2012. The plot groups banks based on the change in risk-weighted assets into 20 equal-sized bins and then computes the mean for the two variables within each bin.

Table I
Example of Regulatory Capital Inflation: Intesa Sanpaolo

Table I presents the amounts of total book equity, capital deductions, and regulatory CT1 capital, as well as the ratio of regulatory capital to book equity for the Italian bank Intesa Sanpaolo SpA for the years 2010 and 2012 (Data Source: SNL Financial).

	2010	2012	Δ
Total Book Equity (in €B)	54.6	49.9	−4.7
Capital Deductions (in €B)	28.4	16.4	−12.0
Regulatory CT1 Capital (in €B)	26.2	33.5	7.3
Regulatory Capital / Book Equity (in %)	47.9	67.1	19.2

Table II
Descriptive Statistics

Table II provides summary statistics and mean comparisons for bank characteristics of 48 capital exercise banks (CEB) and 143 non-capital exercise banks (Non-CEB). "Log TA", "CT1 Ratio", "Deposits / TA", "Loans / TA", "NII / Op.Rev.", and "Net Income / TA" denote the logarithm of total assets, the core tier 1 (CT1) capital ratio, total deposits as a share of total assets, customer loans as a share of total assets, net interest income as a share of total operating revenue, and net income over total assets as of 2010, respectively. We test for differences in means using Welch's t-test. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	CEB			Non-CEB			Δ Mean
	Mean	Median	SD	Mean	Median	SD	
Log TA	5.26	5.21	1.46	2.00	2.21	1.58	3.27***
CT1 Ratio (in %)	9.86	9.21	3.12	11.43	10.64	4.99	−1.57***
Deposits / TA (in %)	40.93	40.47	15.59	55.46	56.25	20.49	−14.53***
Loans / TA (in %)	56.73	60.03	15.65	66.53	70.59	17.72	−9.80***
NII / Op. Rev. (in %)	60.42	57.94	14.86	67.65	68.97	22.59	−7.23**
Net Income / TA (in %)	0.39	0.40	0.43	0.41	0.29	0.54	−0.02

Table III
Univariate Results

Table III presents the mean percentage changes of total book equity, capital deductions, regulatory core tier 1 (CT1) capital, and the ratio of regulatory capital to book equity for 48 capital exercise banks (CEB) and 143 non-capital exercise banks (Non-CEB) from 2010 to 2012. All values are winsorized at the 5% level. The last column tests for differences-in-differences using Welch's t-test. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	CEB	Non-CEB	DID
Variable	$\Delta\%$	$\Delta\%$	$\Delta\Delta pp$
Book Equity	6.06^{**}	16.44^{***}	-10.37^{***}
Capital Deductions	-23.10^{***}	12.52^{**}	-35.62^{***}
CT1 Capital	16.21^{***}	16.32^{***}	-0.11
CT1 Capital / Book Equity (in %)	8.65^{***}	-0.65	9.30^{***}

Table IV
Changes in the Ratio of Regulatory Capital to Book Equity

Table IV presents the estimation results of the change in the ratio of regulatory capital to book equity from Equation (1) in Section II.A:

$$Y_i = \alpha + \beta \times \text{CEB}_i + \delta \times (\text{CEB}_i \times \text{CT1 Ratio}_{2010,i}) + \sum_k \theta^k X_i^k + \gamma_c + \epsilon_i$$

where the dependent variable Y_i is the change in the ratio of regulatory core tier 1 (CT1) capital to total book equity from 2010 to 2012, i.e. $\Delta\,(\text{CT1 Capital/Total Book Equity})_{2010-2012,i}$. The variable CEB_i takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. We control for the following bank characteristics X_i^k as of 2010: log total assets, CT1 ratio, customer loans as a share of total assets, net interest income as a share of total operating revenue, depository funding as a share of total assets, and net income over total assets. γ_c denote country fixed effects. Standard errors are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	Δ(Regulatory Capital/Book Equity)$_{2010-2012}$				
CEB	0.093**	0.074*	0.100**	0.394***	0.439**
	(0.034)	(0.041)	(0.045)	(0.101)	(0.156)
CEB × CT1 Ratio 2010				−0.032***	−0.032***
				(0.008)	(0.008)
CEB × Log Total Assets 2010					-0.008
					(0.013)
Log Total Assets 2010		0.002	-0.003	0.001	0.002
		(0.006)	(0.008)	(0.008)	(0.007)
CT1 Ratio 2010		−0.004**	-0.001	-0.000	-0.000
		(0.002)	(0.001)	(0.001)	(0.001)
(Total Deposits/TA) 2010		-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
(Customer Loans/TA) 2010		0.000	0.001	0.001	0.000
		(0.001)	(0.001)	(0.001)	(0.001)
(Net Int. Inc./Op.Rev) 2010		-0.001	-0.000	-0.000	-0.000
		(0.000)	(0.001)	(0.001)	(0.001)
(Net Income/TA) 2010		0.021	0.022	0.028*	0.028∗
		(0.014)	(0.015)	(0.014)	(0.014)
Country FE			Yes	Yes	Yes
N	191	191	191	191	191
R^2	0.129	0.176	0.326	0.401	0.402

Table V
Changes in Capital Ratios and Shadow Capital Ratios

Table V presents the estimation results of the change in capital ratios (CT1 capital over risk-weighted assets) and shadow capital ratios (total book equity over risk-weighted assets) from the following regression specification:

$$Y_i = \alpha + \beta \times \text{CEB}_i + \delta \times (\text{CEB}_i \times \text{CT1 Ratio}_{2010,i}) + \sum_k \theta^k X_i^k + \gamma_c + \epsilon_i$$

where the dependent variable Y_i is either the change in the CT1 capital ratio (Columns 1 and 2) or the change in the shadow capital ratio (Columns 3 and 4) from 2010 to 2012. The variable CEB_i takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. We control for the following bank characteristics X_i^k as of 2010: log total assets, CT1 ratio, customer loans as a share of total assets, net interest income as a share of total operating revenue, depository funding as a share of total assets, and net income over total assets. γ_c denote country fixed effects. Standard errors are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Δ(CT1 Capital/RWA)$_{2010-2012}$		Δ(TE/RWA)$_{2010-2012}$	
CEB	1.003	3.213**	0.300	-0.156
	(0.781)	(1.343)	(0.742)	(1.450)
CEB × CT1 Ratio 2010		−0.238*		0.049
		(0.122)		(0.163)
Bank-Level Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N	191	191	190	190
R^2	0.306	0.322	0.207	0.208

Table VI
The EBA Capital Exercise and Bank Risk

Table 5 presents the estimation results for the following regression specification:

$$Y_i = \alpha + \beta \times \text{CEB}_i + \delta \times (\text{CEB}_i \times \text{CT1 Ratio}_{2010,i}) + \sum_k \theta^k X_i^k + \gamma_c + \epsilon_i$$

where, in Panel A, the dependent variable Y_i is the 3-day cumulative CDS return around the announcement of the capital exercise on October 26 (Columns 1-4) and the change in senior and junior CDS spreads between October 2011 and June 2012 (Columns 5 and 6). In Panel B, the dependent variable is the change in banks' z-Scores between 2010 and 2012. The variable CEB_i takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. We control for the same bank characteristics as in the previous tables. γ_c denote country fixed effects. Standard errors are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. CDS Spreads.

	CDS Returns: October 26, 2011				ΔCDS: Oct11-Jun12	
					ΔCDS^{SEN}	ΔCDS^{SUB}
CEB	−8.44*	6.41	4.90	-19.41	-38.98	62.89
	(3.92)	(6.78)	(6.90)	(41.03)	(130.33)	(240.51)
CEB × CT1 Ratio 2010				2.91	15.96	-2.47
				(4.88)	(17.89)	(24.25)
Bank-Level Controls		YES	YES	YES	YES	YES
Country FE			YES	YES	YES	YES
N	53	53	53	53	51	41
R^2	0.03	0.28	0.44	0.46	0.68	0.68

Panel B. Z-Scores.

	$\Delta\text{Z-Score}_{2010-2012}$			
CEB	-2.04*	-1.85	-1.25	-8.86***
	(1.17)	(1.12)	(2.02)	(2.63)
CEB × CT1 Ratio 2010				0.82***
				(0.22)
Bank-Level Controls		YES	YES	YES
Country FE			YES	YES
N	190	190	190	190
R^2	0.02	0.05	0.20	0.21

Table VII
Regulatory Capital Inflation Across Countries

Table VII presents the estimation results of the following regression specification:

$$\begin{aligned} Y_i = \alpha + \beta \times \text{CEB}_i + \delta \times (\text{CEB}_i \times \text{CT1 Ratio}_{2010,i}) \\ + \gamma^{IT} (\text{CEB}_i \times \text{Italy}) \\ + \gamma^{PT} (\text{CEB}_i \times \text{Portugal}) \\ + \sum_k \theta^k X_i^k + \gamma_c + \epsilon_i \end{aligned}$$

where the dependent variable Y_i is the change in the ratio of regulatory core tier 1 (CT1) capital to total book equity from 2010 to 2012, i.e. $\Delta\,(\text{CT1 Capital/Total Book Equity})_{2010-2012,i}$. The variable CEB_i takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. *Italy* and *Portugal* are dummy variables which take on the value of 1 for Italian and Portuguese banks, respectively, and 0 otherwise. We control for the following bank characteristics X_i^k as of 2010: log total assets, CT1 ratio, customer loans as a share of total assets, net interest income as a share of total operating revenue, depository funding as a share of total assets, and net income over total assets. γ_c denote country fixed effects. Standard errors are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	Δ(Regulatory Capital/Book Equity)$_{2010-2012}$			
CEB	0.050**	0.036	0.218***	0.232***
	(0.021)	(0.025)	(0.065)	(0.071)
CEB × CT1 Ratio 2010			−0.018***	−0.019***
			(0.006)	(0.005)
CEB × Log Total Assets 2010				-0.002
				(0.006)
CEB × Italy	0.187***	0.199***	0.144***	0.145***
	(0.021)	(0.019)	(0.026)	(0.026)
CEB × Portugal	0.450***	0.441***	0.398***	0.396***
	(0.021)	(0.015)	(0.016)	(0.017)
Bank-Level Controls		Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N	191	191	191	191
R^2	0.46	0.47	0.49	0.49

Table VIII
Regulatory Forbearance: Anecdotal Evidence

Table VIII presents anecdotal evidence on measures implemented by national authorities around the EBA capital exercise to increase the capitalization of domestic banks. For each measure, the table lists the country and the date, provides a short description, and, where applicable, refers to the national law or decree in which the measure was introduced. Online Appendix 2 provides a more detailed discussion on some of these policies.

Country	Date	Description	Reference
Italy	Jul 6, 2012	New instruments eligible as CT1 capital	Decree 95
Italy	Jul 6, 2012	Hybrid capital injection Banca MPS	
Italy	Jul 17, 2011	Tax treatment of goodwill	Decree 98/2011
Italy	Dec 22,2011	Conversion of DTAs to tax credits	Decree 201
Portugal	Jan 11, 2012	Amendment recapitalization scheme	Law 4/2012
Portugal	Jun 29, 2012	Hybrid capital injection Banco BPI	
Portugal	Jun 29, 2012	Hybrid capital injection Banco Comercial	
Portugal	Jun 28, 2012	Hybrid capital injection CGD	
Slovenia	May 16, 2012	Hybrid capital injection Nova Ljublj. Banka	
Slovenia	Dec 5, 2012	Hybrid capital injection Nova Kreditna Banka	

Table IX
Cross-Country Determinants of Regulatory Capital Inflation

Table IX presents the estimation results of the following specification:

$$Y_i = \alpha + \beta \times \text{CEB}_i + \delta \times (\text{CEB}_i \times \text{CT1 Ratio}_{2010,i}) + \sum_c \kappa^c \, (\text{CEB}_i \times \text{CY Characteristic}_c) + \sum_k \theta^k X_i^k + \gamma_c + \epsilon_i$$

where the dependent variable Y_i is the change in the ratio of regulatory core tier 1 (CT1) capital to total book equity from 2010 to 2012. The variable CEB_i takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. $CY\ Characteristic_c$ are the following country-specific characteristics: $National\ Champion_i$ takes on the value of 1 if bank i is the largest bank in country c, and 0 otherwise; $Official\ Supervisory\ Power_c$ comes from Barth, Caprio, and Levine (2013) and measures the degree to which national supervisors have the authority to take specific actions; $Fiscal\ Constraints_c$ is the current account balance to GDP ratio; $Credit\ Standards_c$ measures the share of banks expecting to tighten their credit standards in the next quarter; and $Before\ Election_c$ takes the value of 1 if the capital exercise took place 12 months before the next national congressional election, and 0 otherwise. We control for the same bank characteristics as in the previous tables. γ_c denote country fixed effects. Standard errors are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	Δ(Regulatory Capital/Book Equity)$_{2010-2012}$						
CEB	0.111**	0.093**	0.104**	0.014	0.109**	0.051*	0.191**
	(0.050)	(0.039)	(0.040)	(0.027)	(0.051)	(0.027)	(0.078)
CEB × CT1 Ratio 2010							0.015*
							(0.008)
National Champion	-0.058					−0.073**	−0.064**
	(0.037)					(0.030)	(0.028)
CEB × Official Supervisory Power		0.062**				0.040***	0.030**
		(0.024)				(0.009)	(0.011)
CEB × Fiscal Constraints			-0.011			−0.006**	-0.004
			(0.007)			(0.003)	(0.003)
CEB × Credit Standards				0.004***		0.003***	0.003**
				(0.001)		(0.001)	(0.001)
CEB × Before Election					-0.057	-0.050	-0.043
					(0.058)	(0.040)	(0.037)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	191	184	191	181	191	181	181
R^2	0.339	0.376	0.368	0.428	0.330	0.470	0.481

Table X
Placebo Treatment Periods

Table X presents the estimation results of the change in the ratio of regulatory core tier 1 (CT1) capital to total equity around the 2011 EBA capital exercise and around two placebo treatment periods:

$$Y_i = \alpha + \beta \times \text{CEB}_i + \sum_k \theta^k X_i^k + \gamma_c + \epsilon_i$$

where the dependent variable Y_i is the change in the ratio of regulatory core tier 1 (CT1) capital to total book equity from 2010 to 2012 (treatment period), 2008 to 2010, and 2012 to 2014 (placebo periods), respectively. The variable CEB_i takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. We control for the following bank characteristics X_i^k as of 2010: log total assets, CT1 ratio, customer loans as a share of total assets, net interest income as a share of total operating revenue, depository funding as a share of total assets, and net income over total assets. γ_c denote country fixed effects. Standard errors are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	$\Delta_{2010-2012}$ Treatment	$\Delta_{2008-2010}$ Placebo	$\Delta_{2012-2014}$ Placebo
CEB	0.100**	0.003	0.002
	(0.045)	(0.025)	(0.023)
Bank-Level Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	191	178	157
R^2	0.33	0.28	0.25

Table XI
Matching Results

Table XI presents the estimation results of the change in the ratio of regulatory capital to book equity using the matching strategies based on Gropp, Mosk, Ongena, and Wix (2019) described in Section IV. In each column, the first row contains the difference in the outcome variable for capital exercise banks (CEB) between the period before (2010) and the after (2012) the capital exercise; the second row contains the difference in the outcome variable for matched control group (control) banks over the same period. The paper tests for differences-in-means using Welch's two-sample t-test. The third row contains the estimate for the average treatment effect on the treated (ATT) based on the bias-corrected Abadie and Imbens (2011) matching estimator. Column 1 presents the results for the *full sample* matching strategy, Column 2 the results for the *overlap matching* strategy, Column 3 the results for the *within-country* matching strategy, and Column 4 the results for the *within-region* matching strategy. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Δ(Regulatory Capital/Book Equity)$_{2010-2012}$			
	Full	Overlap	Within Country	Within Region
CEB: After - Before	0.09***	0.09***	0.09**	0.08**
Control: After - Before	0.01	0.00	−0.01	−0.02
Bias-Corrected ATT	0.08**	0.09	0.10***	0.09**
Number of Observations	48	48	25	26

Online appendix for:

"Supranational rules, national discretion:

Increasing versus *inflating* regulatory bank capital?"

Online Appendix 1: Book Equity, Capital Deductions, and Regulatory Capital

This table illustrates the calculation of regulatory common equity tier 1 (CET1) capital via the application of capital deductions to book equity (Common Equity Tier 1 capital before regulatory deductions) according to the social Basel disclosure template (BCBS, 2011).

	Item
	Common share capital plus related stock surplus
+	Retained earnings
+	Accumulated other comprehensive income (AOCI)
+	Directly issued capital subject to phase out from CET1
+	Common share capital issued by subsidiaries and held by third parties
=	**Common Equity Tier 1 capital before regulatory deductions (Book Equity)**
-	Prudential valuation deductions
-	Goodwill (net of related tax liability)
-	Intangibles other than mortgage-servicing rights (net of related tax liability)
-	Deferred tax assets
-	Cash-flow hedge reserve
-	Shortfall of provisions to expected losses
-	Securitisation gain on sale
-	Gains and losses due to changes in own credit risk on fair valued liabilities
-	Defined-benefit pension fund net assets
-	Investments in own shares
-	Reciprocal cross-holdings in common equity
-	Investments in the capital of financial institutions [. . .] (above 10% threshold)
-	Significant investments in financial institutions [. . .] (above 10% threshold)
-	Mortgage servicing rights
-	Deferred tax assets arising from temporary differences
-	Amount exceeding the 15% threshold
	of which: Significant investments in the common stock of financials
	of which: mortgage servicing rights
	of which: deferred tax assets arising from temporary differences
-	National specific regulatory deductions
-	Deductions applied to CET1 due to insufficient AT1 and T2
=	**Common Equity Tier 1 capital (CET1) (Regulatory Capital)**

Online Appendix 2: Anecdotic evidence of forbearance by national authorities

We hand collected from annual reports, pillar 3 reports and EC state aid cases anecdotic evidence of forbearance by national authorities. Below we discuss three different methods how national authorities could forbear their banks.

1. Recapitalizations

One group of forbearance measures are ad hoc recapitalizations, such as the issuance of core tier 1 eligible hybrid securities, underwritten by the state. Germany (NORD/LB), Italy (Banca Monte dei Paschi di Siena), Portugal (Banco BPI, Banco Comercial Portugues, Caixa Geral de Depositos) and Slovenia (NLB, Nova Kreditna Banka Maribor) provided these instruments and often explicitly referred to the EBA capital as an important reason to justify the state aid measure. For example, the state aid application of Banco Comercial Português notes *"On 8 December 2011,the EBA published a Recommendation related to banks' recapitalisation needs. ... In the light of the foregoing, the BCP Group needed to raise substantial additional capital by 30 June 2012."*.[1] Capital assistance measures need a legal basis and thus approval from the parliament. The legal basis of the assistance to Banco Comercial Português is Law No 4/2012 which has been enacted on January 11th, 2012.[2] Besides direct capital support measures, several countries implemented around the EBA capital exercise regulation aiming to increase the regulatory capital of banks. We discuss several of these measures below.

2. Conversion of deferred tax assets into tax credits

Deferred tax assets are items on the bank's balance sheet that may be used to reduce taxable income in the future. Capital Requirements Regulation No. 575/2013 requires banks to deduct deferred tax assets from core tier 1 capital, because their dependence on future income, which depresses bank capital. The Italian government, however, enacted decree-law no. 201 on 6 December 2011[3], allowing banks to convert their deferred tax assets into tax credits, which do not have to be deducted because they are guaranteed by the government. Similar regulatory changes have been implemented in the subsequent years by Spain, Portugal and Greece, resulting in a European Commission investigation whether these measures constitute illegal state aid.

[1] State aid case SA.34724. Link: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_34724

[2] https://dre.pt/application/conteudo/477151

[3] https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legge:2011;98

3. Deductions of tax treatment of goodwill impairments

For prudential purposes, the book value of intangible assets and goodwill is deducted from CT1 capital because they may become worthless when banks go bankrupt. However, these assets are typically large in magnitude relative to a bank's regulatory capital (24% for capital exercise banks in our sample as of 2010). Banks could reduce intangible asset deductions by impairing these assets. From an accounting perspective, this results in a decrease of the book value of goodwill (equal to the amount of the impairment charge) but also reduces net income (by that same amount). The impact on CT1 capital is initially capital neutral because, on the one hand, the impairment charge reduces CT1-deductions but, on the other hand, it also reduces profits which is a component of CT1 capital. One way national authorities could support banks is to allow tax-deductible intangible asset impairments, resulting in a net increase in regulatory capital after an impairment.[4] In 2011, the Italian government enacted Law Decree no. 98/2011[5], allowing banks to boost their regulatory capital by impairing intangible assets. For example, the measure resulted in a 40 basis points increase in the regulatory capital of Banca Monte dei Paschi di Siena's.[6]

[4] Assume a bank impairs goodwill for an amount of 1,000 EUR which is tax-deductible. The tax rate is 20%. This will result in a reduction of 1,000 EUR in capital deductions (thus increasing CT1 capital) whereas net income will decrease with 800 EUR (1,000*(1-0,2)) rendering an net positive effect on CT1 capital of 200 EUR due to a permanent difference between book and tax income.

[5] https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legge:2011-07-06;98!vig=

[6] https://www.gruppomps.it/en/media-and-news/press-releases/banca-monte-dei-paschi-siena-tier-1-up-to-8-8-per-cent.html

Online Appendix 3: Pre-Treatment Characteristics of Banks

This table provides pre-treatment summary statistics on Capital Exercise banks, Non-Capital Exercise banks and control group banks (mean comparison). The paper tests for differences in means using the Student's t-test. (*, **, and *** indicate statistical significance at the 10%, 5%, and 1% level respectively). Panel A compares the mean values of the 48 Capital Exercise banks and 145 Non-Capital Exercise banks in the unmatched sample. Panel B compares the 48 Capital Exercise banks to the full sample of matched control group banks based on the Mahalanobis matching estimator. Panels C to E compare Capital Exercise banks to the sample of matched control group banks using the overlap, within country and within region matching strategy respectively. Table I lists the matching covariates for each matching strategy.

	# Banks	Total Assets		Core Tier 1 Ratio		Total Deposits / Total Assets		Customer Loans / Total Assets		Net Interest Income / Operating Revenue		Net Income / Total Assets
Panel A: Unmatched Sample												
Capital Exercise Banks	48	454.31		9.86		40.93		56.73		60.42		0.39
Non-Capital Exercise Banks	144	24.43		11.41		55.54		66.62		67.69		0.41
Δ		429.87	***	-1.55	**	-14.61	***	-9.89	***	-7.27	**	-0.02
Panel B: Full Sample												
Capital Exercise Banks	48	454.31		9.86		40.93		56.73		60.42		0.39
Matched Control Group	48	107.14		10.30		47.89		64.80		64.62		0.41
Δ		347.17	***	-0.44		-6.95	***	-8.07	***	-4.19	***	-0.02
Panel C: Overlap Sample												
Capital Exercise Banks	36	161.32		9.98		41.97		59.78		61.95		0.40
Matched Control Group	36	156.10		10.95		53.80		57.06		71.89		0.38
Δ		5.22		-0.96		-11.83	**	2.72		-9.94		0.02
Panel D: Within Country												
Capital Exercise Banks	25	320.88		9.96		43.51		59.08		58.80		0.40
Matched Control Group	25	80.92		10.80		43.21		61.72		71.22		0.42
Δ		239.96	***	-0.84	*	0.31		-2.64		-12.42	*	-0.02
Panel E: Within Region												
Capital Exercise Banks	26	310.18		10.01		44.85		59.77		58.99		0.45
Matched Control Group	26	108.31		9.73		48.26		65.69		61.31		0.45
Δ		201.87	**	0.28		-3.41		-5.92	***	-2.31		0.00

Online Appendix 4: Robustness of the results after excluding individual countries and banks

Online Appendix 4 replicates the results of Table 3 column (3) and (4) and subsequently estimates equation (1) for subsamples excluding one specific country (Panel A) or CE bank (Panel B).

Panel A: Robustness of the results after excluding individual countries

	CEB	Controls	CY FE	Obs.	R-sq	CEB	CEB x CT1 Ratio $_{2010}$	Controls	CY FE	Obs.	R-sq
All CY's	0.100**	YES	YES	191	0.326	0.394***	-0.032***	YES	YES	191	0.401
Excluding:											
Austria	0.103**	YES	YES	184	0.335	0.401***	-0.032***	YES	YES	184	0.413
Belgium	0.098**	YES	YES	189	0.326	0.393***	-0.032***	YES	YES	189	0.401
Cyprus	0.100**	YES	YES	190	0.316	0.394***	-0.032***	YES	YES	190	0.392
Denmark	0.106**	YES	YES	167	0.339	0.437***	-0.037***	YES	YES	167	0.418
Finland	0.102**	YES	YES	188	0.330	0.394***	-0.032***	YES	YES	188	0.403
France	0.098*	YES	YES	185	0.322	0.396***	-0.032***	YES	YES	185	0.398
Germany	0.098*	YES	YES	151	0.361	0.416***	-0.034***	YES	YES	151	0.436
Greece	0.100**	YES	YES	191	0.326	0.394***	-0.032***	YES	YES	191	0.401
Hungary	0.100**	YES	YES	190	0.326	0.394***	-0.032***	YES	YES	190	0.401
Ireland	0.100**	YES	YES	190	0.324	0.394***	-0.032***	YES	YES	190	0.399
Italy	0.083	YES	YES	162	0.338	0.325**	-0.025**	YES	YES	162	0.388
Luxembourg	0.104**	YES	YES	189	0.328	0.395***	-0.032***	YES	YES	189	0.401
Malta	0.101**	YES	YES	189	0.327	0.394***	-0.032***	YES	YES	189	0.401
Netherlands	0.108**	YES	YES	186	0.336	0.415***	-0.033***	YES	YES	186	0.414
Norway	0.108**	YES	YES	167	0.329	0.402***	-0.032***	YES	YES	167	0.406
Poland	0.106**	YES	YES	188	0.336	0.394***	-0.031***	YES	YES	188	0.408
Portugal	0.064*	YES	YES	185	0.264	0.321***	-0.027***	YES	YES	185	0.344
Slovenia	0.101**	YES	YES	188	0.326	0.415***	-0.034***	YES	YES	188	0.406
Spain	0.112**	YES	YES	181	0.337	0.408***	-0.032***	YES	YES	181	0.412
Sweden	0.103**	YES	YES	184	0.339	0.395***	-0.032***	YES	YES	184	0.403
United Kingdom	0.097*	YES	YES	176	0.327	0.387***	-0.031***	YES	YES	176	0.401

Panel B: Robustness of the results after excluding individual CE banks

	Country	CEB	Controls	CY FE	Obs.	R-sq	CEB	CEB x CT1 Ratio $_{2010}$	Controls	CY FE	Obs.	R-sq
All banks		0.100**	YES	YES	191	0.326	0.394***	-0.032***	YES	YES	191	0.401
Excluding:												
BNP Paribas	France	0.100**	YES	YES	190	0.327	0.395***	-0.032***	YES	YES	190	0.401
Monte dei Paschi di Siena	Italy	0.081*	YES	YES	190	0.325	0.319***	-0.025***	YES	YES	190	0.380
Banco BPI	Portugal	0.086**	YES	YES	190	0.283	0.393***	-0.033***	YES	YES	190	0.380
BBVA	Spain	0.101**	YES	YES	190	0.328	0.395***	-0.032***	YES	YES	190	0.402
Banco Comercial Portugues	Portugal	0.092**	YES	YES	190	0.282	0.344***	-0.027***	YES	YES	190	0.344
Banco Popolare	Italy	0.099**	YES	YES	190	0.320	0.416***	-0.034***	YES	YES	190	0.400
Banco Popular Espanol	Spain	0.107**	YES	YES	190	0.333	0.400***	-0.032***	YES	YES	190	0.407
Banco Santander	Spain	0.100**	YES	YES	190	0.326	0.397***	-0.032***	YES	YES	190	0.402
Bank of Valletta	Malta	0.101**	YES	YES	190	0.327	0.394***	-0.032***	YES	YES	190	0.401
Banque et Caisse d'Epargne	Luxembourg	0.104**	YES	YES	190	0.328	0.395***	-0.032***	YES	YES	190	0.401
Barclays	United Kingdom	0.100**	YES	YES	190	0.327	0.393***	-0.032***	YES	YES	190	0.401
Caixa Geral de Depositos	Portugal	0.100**	YES	YES	190	0.316	0.394***	-0.032***	YES	YES	190	0.392
Credit Agricole Group	France	0.100**	YES	YES	190	0.325	0.395***	-0.032***	YES	YES	190	0.401
DNB Bank	Norway	0.100**	YES	YES	190	0.327	0.396***	-0.032***	YES	YES	190	0.402
Danske Bank	Denmark	0.099**	YES	YES	190	0.326	0.394***	-0.032***	YES	YES	190	0.401
DekaBank	Germany	0.100**	YES	YES	190	0.324	0.397***	-0.032***	YES	YES	190	0.400
Deutsche Bank	Germany	0.100**	YES	YES	190	0.324	0.395***	-0.032***	YES	YES	190	0.399
DZ bank	Germany	0.099**	YES	YES	190	0.322	0.395***	-0.032***	YES	YES	190	0.397
Erste Group Bank	Austria	0.099**	YES	YES	190	0.326	0.394***	-0.032***	YES	YES	190	0.400
Espirito Santo	Portugal	0.104**	YES	YES	190	0.344	0.419***	-0.034***	YES	YES	190	0.428
La Caixa	Spain	0.099**	YES	YES	190	0.325	0.395***	-0.032***	YES	YES	190	0.400
Groupe BPCE	France	0.099**	YES	YES	190	0.324	0.394***	-0.032***	YES	YES	190	0.399

Panel B: Robustness of the results after excluding individual CE banks (Continued)

	Country	CEB	Controls	CY FE	Obs.	R-sq	CEB	CEB x CT1 Ratio $_{2010}$	Controls	CY FE	Obs.	R-sq
HSBC	United Kingdom	0.100**	YES	YES	190	0.327	0.394***	-0.032***	YES	YES	190	0.401
Intesa Sanpaolo	Italy	0.098**	YES	YES	190	0.319	0.393***	-0.032***	YES	YES	190	0.393
Jyske Bank	Denmark	0.101**	YES	YES	190	0.327	0.399***	-0.032***	YES	YES	190	0.402
Landesbank Berlin	Germany	0.099**	YES	YES	190	0.324	0.398***	-0.032***	YES	YES	190	0.399
Landesbank Hessen-Thuringen	Germany	0.103**	YES	YES	190	0.332	0.413***	-0.033***	YES	YES	190	0.413
Lloyds Banking Group	United Kingdom	0.101**	YES	YES	190	0.328	0.394***	-0.032***	YES	YES	190	0.402
NORD/LB	Germany	0.094*	YES	YES	190	0.320	0.382***	-0.031***	YES	YES	190	0.382
Nordea Bank	Sweden	0.099**	YES	YES	190	0.326	0.397***	-0.032***	YES	YES	190	0.402
Nova Kreditna banka Maribor	Slovenia	0.099**	YES	YES	190	0.326	0.394***	-0.032***	YES	YES	190	0.400
Nova Ljubljanska Banka	Slovenia	0.100**	YES	YES	190	0.327	0.407***	-0.033***	YES	YES	190	0.405
Nykredit Realkredit	Denmark	0.101**	YES	YES	190	0.329	0.420***	-0.035***	YES	YES	190	0.405
OP Financial Group	Finland	0.103**	YES	YES	190	0.328	0.393***	-0.032***	YES	YES	190	0.400
OTP Bank Nyrt.	Hungary	0.100**	YES	YES	190	0.326	0.394***	-0.032***	YES	YES	190	0.401
Permanent TSB Group	Ireland	0.100**	YES	YES	190	0.324	0.394***	-0.032***	YES	YES	190	0.399
Powszechna Bank	Poland	0.106**	YES	YES	190	0.333	0.393***	-0.031***	YES	YES	190	0.405
Rabobank Group	Netherlands	0.100**	YES	YES	190	0.327	0.400***	-0.032***	YES	YES	190	0.402
Raiffeisen Bank	Austria	0.102**	YES	YES	190	0.328	0.400***	-0.032***	YES	YES	190	0.404
SNS Bank	Netherlands	0.104**	YES	YES	190	0.329	0.412***	-0.033***	YES	YES	190	0.408
Skandinaviska Enskilda Banken	Sweden	0.100**	YES	YES	190	0.328	0.391***	-0.031***	YES	YES	190	0.401
Societe Generale	France	0.099**	YES	YES	190	0.324	0.394***	-0.032***	YES	YES	190	0.399
Svenska Handelsbanken	Sweden	0.100**	YES	YES	190	0.326	0.403***	-0.033***	YES	YES	190	0.403
Swedbank	Sweden	0.101**	YES	YES	190	0.328	0.396***	-0.032***	YES	YES	190	0.400
Sydbank	Denmark	0.102**	YES	YES	190	0.328	0.397***	-0.032***	YES	YES	190	0.401
UniCredit	Italy	0.099**	YES	YES	190	0.322	0.395***	-0.032***	YES	YES	190	0.397
UBI	Italy	0.097**	YES	YES	190	0.318	0.397***	-0.032***	YES	YES	190	0.393
WGZ bank	Germany	0.101**	YES	YES	190	0.326	0.395***	-0.032***	YES	YES	190	0.400

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