

# Online Appendix

“Supranational Rules, National Discretion: *Increasing* versus *Inflating* Regulatory Bank  
Capital?”

October 2022

## A1. Accounting of Regulatory Adjustments

This appendix provides further details on (a) the calculation of regulatory common equity tier 1 (CET1) capital via the application of regulatory adjustments to book equity, and (b) the differences between the CET1 capital and core tier 1 (CT1) capital. Table A1 details the calculation of regulatory CET1 capital according to the official Basel disclosure template (BCBS, 2011).

We next discuss the differences between CT1 capital and CET1 capital. While we use the two terms interchangeably, “the two concepts are somewhat different in the detail, although not that far removed conceptually” (EBA, 2011c). CT1 capital was a transitional capital definition used by the EBA in the 2011 capital exercise and was based on the concept of “total original own funds for general solvency purposes” in the revised framework on Common Reporting (COREP). CET1 capital is the capital definition introduced by the Basel III framework in 2013. For the purpose of the 2011 capital exercise, the EBA “did not choose to anticipate the definition agreed by the Basel Committee of Banking Supervisors under the recently revised framework, commonly known as Basel 3” (EBA, 2011c). Although there are differences between CT1 and CET1 capital with regard to regulatory adjustments, important elements “of the two definitions converge (this is the case for example for the deduction of goodwill).” (EBA, 2011c). Since deductions of goodwill and intangible assets are “the most significant deduction in terms of its effect on solvency” (Lubberink, 2014) and since the valuation of goodwill and intangible assets is subject to considerable accounting discretion (Beatty and Weber, 2006; Ramanna, 2008; Ramanna and Watts, 2012), banks still have substantial leeway under the CET1 capital definition to inflate their regulatory capital via an impairment of goodwill, as discussed in Section VI.A. Moreover, the CET1 capital definition contains additional regulatory adjustments (and therefore additional room for banks to exert discretion) not included in the CT1 definition. One example are deferred tax assets which are not addressed in the CT1 capital definition (EBA, 2011d), but which

**Table A1**  
**Regulatory Capital, Book Equity, and Regulatory Adjustments**

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

	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 adjustments (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)

“are to be deducted in the calculation of Common Equity Tier 1” (BCBS, 2010).<sup>25</sup> Overall,

<sup>25</sup>Note, however, that the capital exercise allowed for the conversion of deferred tax assets into deferred tax credits (EBA, 2011b) as discussed in Section VI.A.

“there is no single answer” regarding the question whether “core Tier 1 [is] more or less severe than the Basel 3 definition of common equity Tier 1” (EBA, 2011c). National authorities still use reductions in regulatory adjustments (i.e. capital deductions) as a policy tool to provide capital relief to banks, such as during the COVID-19 crisis (IMF, 2020).

## A2. Regulatory Capital Inflation: Numerical Example

Table A2

### Example of Regulatory Capital Inflation: Intesa Sanpaolo

This table presents the amounts of total book equity, regulatory adjustments, 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.

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	2010	2012	$\Delta$
Total Book Equity (in €B)	54.6	49.9	-4.7
Regulatory Adjustments (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

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### A3. Decomposing the Change in Regulatory Capital Ratios

A bank's regulatory core tier 1 (CT1) capital ratio is defined as:

$$(A1) \quad \text{CT1 Capital Ratio} = \frac{\text{CT1 Capital}}{\text{RWA}} = \frac{\text{Book Equity} - \text{Regulatory Adjustments}}{\text{RWA}}$$

We decompose the change in capital ratios from 2010 to 2012 into contributions  $\omega$  stemming from changes in book equity (BE), risk-weighted assets (RWA), and regulatory adjustments (RA). To this end, we first multiply the 2010 to 2012 change in each component with the first order derivative of the capital ratio with respect to that component:

$$(A2) \quad \Phi^{\text{BE}} = \Delta \text{BE}_{2010-12} \times \frac{1}{\text{RWA}_{2010}}$$

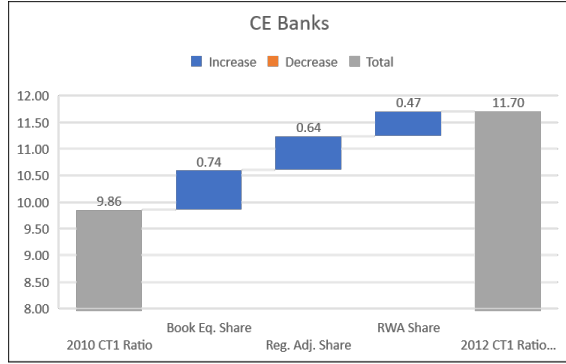
$$(A3) \quad \Phi^{\text{RA}} = -\Delta \text{RA}_{2010-12} \times \frac{1}{\text{RWA}_{2010}}$$

$$(A4) \quad \Phi^{\text{RWA}} = -\Delta \text{RWA}_{2010-12} \times \frac{\text{BE}_{2010} - \text{RA}_{2010}}{\text{RWA}_{2010}^2}$$

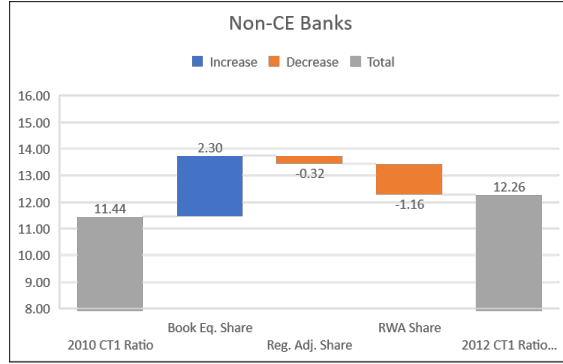
The figure below illustrates this decomposition for CE banks and non-CE banks. As can be seen, the contributions in Equations (A2)-(A4) are a close approximation, but do not exactly add up to the empirical 2012 CT1 capital ratio shown in Figure 1. For CE banks, the contributions add up to 11.70 (instead of 11.88) and for non-CE banks to 12.26 (instead of 12.37).

To reconcile the contributions with the actual empirical 2012 CT1 capital ratio, we therefore

(A) CE Banks



(B) Non-CE Banks



calculate the share  $\Psi$  of each contribution with respect to the overall share

$$(A5) \quad \Psi^{BE} = \frac{\Phi^{BE}}{\Phi^{BE} + \Phi^{RA} + \Phi^{RWA}}$$

$$(A6) \quad \Psi^{RA} = \frac{\Phi^{RA}}{\Phi^{BE} + \Phi^{RA} + \Phi^{RWA}}$$

$$(A7) \quad \Psi^{RWA} = \frac{\Phi^{RWA}}{\Phi^{BE} + \Phi^{RA} + \Phi^{RWA}}$$

and then multiply this share with the empirical 2010 to 2012 change in CT1 capital ratios:

$$(A8) \quad \omega^{BE} = \Psi^{BE} \times \Delta \text{CT1 Capital Ratio}_{2010-12}$$

$$(A9) \quad \omega^{RA} = \Psi^{RA} \times \Delta \text{CT1 Capital Ratio}_{2010-12}$$

$$(A10) \quad \omega^{RWA} = \Psi^{RWA} \times \Delta \text{CT1 Capital Ratio}_{2010-12}$$

As can be seen in Figure 1, these shares are constructed such that:

$$(A11) \quad \text{CT1 Capital Ratio}_{2012} = \text{CT1 Capital Ratio}_{2010} + \omega^{BE} + \omega^{RA} + \omega^{RWA}$$

The contributions  $\omega$  in Equations (A8)-(A10) and  $\Phi$  in Equations (A2)-(A4) are similar in magnitude.

## A4. Panel Difference-in-Differences Methodology

Table A3  
Panel DID: Regulatory Capital Inflation

This table presents a robustness check for the estimation results in Table 2. We estimate the following panel difference-in-differences regression model:

$$\left( \frac{\text{Reg. Adj}}{\text{Book Equity}} \right)_{i,t} = \alpha + \delta \times (\text{CEB}_i \times \text{After}_t) + \sum_k \theta^k (X_{i,2008}^k \times \text{After}_t) + \gamma_i + \gamma_{c,t} + \epsilon_{i,t}$$

where the dependent variable are the regulatory adjustments of bank  $i$  in year  $t$  scaled by total book equity. The variable  $\text{CEB}_i$  takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. The variable  $\text{After}$  takes on the value of 1 for the years 2011 and 2012 and the value of 0 for the years 2009 and 2010. We control for the following bank characteristics  $X_i^k$  as of 2008: 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.  $\gamma_i$  and  $\gamma_{c,t}$  denote bank and country×year fixed effects, respectively. Standard errors are clustered at the country level. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	Regulatory Adjustments/Book Equity				
	[1]	[2]	[3]	[4]	[5]
CEB × After	-6.97*** (2.32)	-4.93* (2.62)	-6.06** (2.73)	-27.72*** (8.87)	-32.65** (12.63)
CEB × After × CT1 Ratio <sub>2008</sub>				2.88** (1.02)	3.06** (1.12)
CEB × After × Log Total Assets <sub>2008</sub>					0.76 0.81
Bank-Level Controls		Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes			
Country-Year FE			Yes	Yes	Yes
Adjusted $R^2$	0.78	0.79	0.79	0.81	0.81
N	756	717	701	701	701



Table A4

## Panel DID: Regulatory Capital Ratios versus Shadow Capital Ratios

This table presents a robustness check for the estimation results in Table 3. We estimate the following panel difference-in-differences regression model:

$$Y_{i,t} = \alpha + \delta \times (\text{CEB}_i \times \text{After}_t) + \sum_k \theta^k (X_{i,2008}^k \times \text{After}_t) + \gamma_i + \gamma_{c,t} + \epsilon_{i,t}$$

where the dependent variable  $Y_i$  is either the CT1 capital ratio (Columns 1 to 3) or the shadow capital ratio (Columns 4 to 6) of bank  $i$  in year  $t$ . The variable  $\text{CEB}_i$  takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. The variable  $\text{After}$  takes on the value of 1 for the years 2011 and 2012 and the value of 0 for the years 2009 and 2010. We control for the following bank characteristics  $X_i^k$  as of 2008: 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.  $\gamma_i$  and  $\gamma_{c,t}$  denote bank and country $\times$ year fixed effects, respectively. Standard errors are clustered at the country level. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	CT1 Capital/RWA			Book Equity/RWA		
	[1]	[2]	[3]	[4]	[5]	[6]
CEB $\times$ After	0.90*** (0.24)	0.55 (0.65)	1.92* (0.96)	0.12 (0.38)	-0.20 (0.46)	-2.16* (1.03)
CEB $\times$ After $\times$ CT1 Ratio <sub>2008</sub>			-0.18* (0.09)			0.26 (0.16)
Bank-Level Controls		Yes	Yes		Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes			Yes		
Country-Year FE		Yes	Yes		Yes	Yes
Adjusted $R^2$	0.88	0.89	0.89	0.86	0.88	0.88
N	756	702	702	755	701	701

**Table A5**  
**Panel DID: Regulatory Capital Inflation Across Countries**

This table presents a robustness check for the estimation results in Table 5. We estimate the following panel difference-in-differences regression model:

$$\begin{aligned} \left( \frac{\text{Reg.Adj}}{\text{Book Equity}} \right)_{i,t} &= \alpha + \delta \times (\text{CEB}_i \times \text{After}_t) \\ &+ \gamma^{IT} (\text{CEB}_i \times \text{Italy} \times \text{After}_t) + \gamma^{PT} (\text{CEB}_i \times \text{Portugal} \times \text{After}_t) \\ &+ \sum_k \theta^k (X_{i,2008}^k \times \text{After}_t) + \gamma_i + \gamma_{c,t} + \epsilon_{i,t} \end{aligned}$$

where the dependent variable are the regulatory adjustments of bank  $i$  in year  $t$  scaled by total book equity. The variable  $\text{CEB}_i$  takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. The variable  $\text{After}$  takes on the value of 1 for the years 2011 and 2012 and the value of 0 for the years 2009 and 2010.  $\text{Italy}$  and  $\text{Portugal}$  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 2008: 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.  $\gamma_i$  and  $\gamma_{c,t}$  denote bank and country×year fixed effects, respectively. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	Regulatory Adjustments/Book Equity			
CEB × After	−3.55 (2.19)	−1.79 (2.55)	−17.22** (7.69)	−18.98 (11.18)
CEB × After × CT1 Ratio <sub>2008</sub>			1.94** (0.86)	2.00* (0.97)
CEB × After × Log Total Assets <sub>2008</sub>				0.26 (0.81)
CEB × After × Italy	−17.34*** (2.19)	−17.17*** (2.03)	−12.80*** (3.35)	−12.78*** (3.37)
CEB × After × Portugal	−19.20*** (2.19)	−20.30*** (2.58)	−17.88*** (2.68)	−17.59*** (3.04)
Bank-Level Controls		Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes
Adjusted $R^2$	0.81	0.81	0.82	0.82
N	743	701	701	701

Table A6

### Panel DID: Cross-Country Determinants of Regulatory Capital Inflation

This table presents a robustness check for the estimation results in Table 8. We estimate the following panel difference-in-differences regression model:

$$\left(\frac{\text{Reg. Adj}}{\text{Book Equity}}\right)_{i,t} = \alpha + \delta \times (\text{CEB}_i \times \text{After}_t) + \sum_c \kappa^c (\text{CEB}_i \times \text{CY Characteristic}_c \times \text{After}_t) + \sum_k \theta^k (X_{i,2008}^k \times \text{After}_t) + \gamma_i + \gamma_{c,t} + \epsilon_{i,t}$$

where the dependent variable are the regulatory adjustments of bank  $i$  in year  $t$  scaled by total book equity. The variable  $\text{CEB}_i$  takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. The variable  $\text{After}$  takes on the value of 1 for the years 2011 and 2012 and the value of 0 for the years 2009 and 2010.  $\text{CY Characteristic}_c$  are the same country-specific characteristics as Table 8. We control for the same bank characteristics as in the previous tables in the appendix.  $\gamma_i$  and  $\gamma_{c,t}$  denote bank and country $\times$ year fixed effects, respectively. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	$\Delta\text{Regulatory Adjustments}_{2010-2012}/\text{Book Equity}_{2010}$						
CEB $\times$ After	-6.78** (2.92)	-5.76** (2.25)	-6.30** (2.57)	-2.04 (2.85)	-7.08** (2.87)	-5.06 (2.88)	-22.79*** (5.71)
CEB $\times$ After $\times$ CT1 Ratio <sub>2008</sub>							2.31*** (0.64)
National Champion $\times$ After	4.09 (2.48)					4.78** (1.78)	3.97** (1.52)
CEB $\times$ Official Supervisory Power $\times$ After		-4.50** (1.73)				-3.97*** (1.12)	-4.78*** (1.08)
CEB $\times$ Fiscal Constraints $\times$ After			0.60 (0.46)			0.37 (0.27)	0.29 (0.22)
CEB $\times$ Credit Standards $\times$ After				-0.20** (0.09)		-0.11 (0.08)	-0.04 (0.09)
CEB $\times$ Before Election $\times$ After					7.46 (6.17)	6.85 (5.63)	3.30 (4.09)
Bank-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted $R^2$	0.80	0.80	0.80	0.80	0.80	0.81	0.82
N	701	673	701	661	701	661	661

## A5. Robustness Check: Lagged Control Variables

Table A7  
Lagged Controls: Regulatory Capital Inflation

This table presents a robustness check for the estimation results in Table 2. We now use the following bank characteristics  $X_i^k$  as of 2009 (instead 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. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	$\Delta\text{Regulatory Adjustments}_{2010-2012}/\text{Book Equity}_{2010}$				
	[1]	[2]	[3]	[4]	[5]
CEB	-10.19** (3.95)	-8.74* (4.48)	-10.47* (5.06)	-49.18*** (13.47)	-60.18** (21.52)
CEB $\times$ CT1 Ratio <sub>2009</sub>				4.34*** (1.18)	4.64*** (1.34)
CEB $\times$ Log Total Assets <sub>2009</sub>					1.75 (1.61)
Log Total Assets <sub>2009</sub>		-0.18 (0.62)	0.05 (0.71)	-0.22 (0.65)	-0.52 (0.60)
CT1 Ratio <sub>2009</sub>		0.35* (0.18)	0.02 (0.16)	-0.04 (0.12)	-0.05 (0.12)
(Total Deposits/TA) <sub>2009</sub>		0.05 (0.03)	0.07 (0.04)	0.04 (0.03)	0.04 (0.03)
(Customer Loans/TA) <sub>2009</sub>		-0.11 (0.10)	-0.18* (0.10)	-0.19* (0.09)	-0.18* (0.09)
(Net Int. Inc./Op.Rev) <sub>2009</sub>		0.09* (0.04)	0.10* (0.05)	0.07 (0.05)	0.07 (0.05)
(Net Income/TA) <sub>2009</sub>		1.00 (1.44)	0.68 (1.62)	-0.56 (1.27)	-0.57 (1.31)
Country FE			Yes	Yes	Yes
Adjusted $R^2$	0.12	0.14	0.22	0.31	0.31
N	191	183	179	179	179

**Table A8**

**Lagged Controls: Regulatory CT1 Ratios versus Shadow CT1 Ratios**

This table presents a robustness check for the estimation results in Table 3. We now use the following bank characteristics  $X_i^k$  as of 2009 (instead 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. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	$\Delta(\text{CT1 Capital/RWA})_{2010-2012}$			$\Delta(\text{Book Equity/RWA})_{2010-2012}$		
	[1]	[2]	[3]	[4]	[5]	[6]
CEB	1.12*** (0.31)	0.85 (0.72)	2.82** (1.25)	0.61 (0.36)	0.27 (0.65)	-0.74 (1.27)
CEB $\times$ CT1 Ratio <sub>2009</sub>			-0.22* (0.10)			0.11 (0.14)
Log Total Assets <sub>2009</sub>		0.02 (0.17)	0.04 (0.17)		-0.01 (0.23)	-0.02 (0.23)
CT1 Ratio <sub>2009</sub>		-0.08 (0.06)	-0.08 (0.06)		-0.09 (0.06)	-0.09 (0.06)
(Total Deposits/TA) <sub>2009</sub>		0.00 (0.01)	0.00 (0.01)		0.01 (0.01)	0.01 (0.01)
(Customer Loans/TA) <sub>2009</sub>		-0.01 (0.01)	0.00 (0.01)		-0.02* (0.01)	-0.02 (0.01)
(Net Int. Inc./Op.Rev) <sub>2009</sub>		-0.01 (0.01)	-0.01 (0.01)		0.01 (0.01)	0.01 (0.01)
(Net Income/TA) <sub>2009</sub>		0.15 (0.27)	0.22 (0.27)		0.03 (0.26)	0.00 (0.24)
Country FE		Yes	Yes		Yes	Yes
Adjusted $R^2$	0.07	0.16	0.17	0.01	0.07	0.07
N	191	179	179	190	178	178

**Table A9**

**Lagged Controls: Regulatory Capital Inflation Across Countries**

This table presents a robustness check for the estimation results in Table 5. We now use the following bank characteristics  $X_i^k$  as of 2009 (instead 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. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

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Dependent Variable	$\Delta\text{Regulatory Adjustments}_{2010-2012}/\text{Book Equity}_{2010}$			
CEB	-4.85*	-3.04	-26.99***	-31.77***
	(2.39)	(2.94)	(7.04)	(9.46)
CEB $\times$ CT1 Ratio <sub>2009</sub>			2.53***	2.67***
			(0.65)	(0.68)
CEB $\times$ Log Total Assets <sub>2009</sub>				0.74
				(0.93)
CEB x Italy	-25.08***	-25.28***	-18.79***	-18.81***
	(2.39)	(2.44)	(3.16)	(3.13)
CEB x Portugal	-48.30***	-47.08***	-42.47***	-41.67***
	(2.39)	(2.51)	(2.04)	(2.11)
Bank-Level Controls		Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Adjusted $R^2$	0.37	0.39	0.41	0.41
N	188	179	179	179

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Table A10

**Lagged Controls: Cross-Country Determinants of Regulatory Capital Inflation**

This table presents a robustness check for the estimation results in Table 8. We now use the following bank characteristics  $X_i^k$  as of 2009 (instead 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. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	$\Delta\text{Regulatory Adjustments}_{2010-2012}/\text{Book Equity}_{2010}$						
CEB	-12.04*	-9.74**	-10.92**	-0.09	-11.36*	-4.72	-24.19***
	(5.67)	(4.26)	(4.10)	(3.26)	(5.81)	(3.47)	(6.43)
CEB $\times$ CT1 Ratio <sub>2009</sub>							2.15***
							(0.60)
National Champion	7.23					9.54**	8.06**
	(4.33)					(3.44)	(3.37)
CEB $\times$ Official Supervisory Power		-6.49**				-4.26***	-3.91***
		(2.96)				(1.11)	(1.27)
CEB $\times$ Fiscal Constraints			1.46*			0.85***	0.75**
			(0.72)			(0.28)	(0.26)
CEB $\times$ Credit Standards				-0.50***		-0.37***	-0.32***
				(0.11)		(0.09)	(0.10)
CEB $\times$ Before Election					5.27	4.10	2.72
					(7.31)	(5.08)	(4.02)
Bank-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted $R^2$	0.23	0.27	0.28	0.34	0.22	0.38	0.40
N	179	172	179	169	179	169	169

## A6. CT1 Capital Ratios: Placebo Treatment Periods

Table A11  
CT1 Capital Ratios: Placebo Treatment Periods

This table presents the estimation results of the change in core tier 1 (CT1) capital ratios from column 3 of Table 3 around the 2011 EBA capital exercise and for two placebo treatment periods:

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

where the dependent variable is the change in the CT1 capital ratio from 2010 to 2012 (treatment period), 2008 to 2010, and 2012 to 2014 (placebo periods), respectively. The variable  $\text{CEB}_i$  takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. We control for the following bank characteristics  $X_i^k$ : 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. Control variables are defined as of 2010 (column 1), 2008 (column 2), and 2012 (column 3), respectively.  $\gamma_c$  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	$\Delta(\text{CT1 Capital/RWA})_{2010-2012}$		
	$\Delta_{2010-2012}$ Treatment	$\Delta_{2008-2010}$ Placebo	$\Delta_{2012-2014}$ Placebo
CEB	3.21** (1.28)	1.16 (1.11)	0.78 (2.06)
CEB $\times$ CT1 Ratio <sub>2010</sub>	-0.24* (0.12)	-0.17 (0.16)	-0.01 (0.17)
Bank-Level Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Adjusted $R^2$	0.18	0.25	0.47
N	188	174	158



## A7. Further Heterogeneity

Table A12

### Regulatory Capital Inflation: Further Heterogeneity

This table presents a robustness check for the estimation results in Table 2. We estimate the following panel difference-in-differences regression model:

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

where the dependent variable is the change in regulatory adjustments from 2010 to 2012 scaled by the 2010 level of book equity. The variable  $CEB_i$  takes on the value of 1 for banks selected into the capital exercise, and 0 otherwise. We interact the variable  $CEB_i$  with 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. Columns 6 and 7 additionally include the pre-treatment ratio of regulatory adjustments to book equity as a measure of how much “room for reduction” banks have to reduce their regulatory adjustments.  $\gamma_c$  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	$\Delta \text{Regulatory Adjustments}_{2010-2012} / \text{Book Equity}_{2010}$						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
CEB	-49.70*** (16.93)	-47.86*** (9.77)	-41.06*** (8.67)	-51.56*** (13.65)	-45.91*** (11.35)	-42.93* (20.40)	-58.30*** (14.55)
CEB × (CT1 Ratio 2010)	3.82*** (1.02)	3.80*** (0.96)	3.78*** (0.93)	3.66*** (0.94)	3.98*** (1.05)	3.46** (1.18)	3.69*** (0.93)
CEB × (Log TA 2010)	0.65 (1.39)						1.25 (1.20)
CEB × (Deposits / TA 2010)		0.03 (0.13)					0.14 (0.11)
CEB × (Loans / TA 2010)			-0.09 (0.13)				-0.16 (0.07)
CEB × (NII / Op.Rev. 2010)				0.10 (0.10)			0.20 (0.08)
CEB × (Net Income / TA 2010)					-5.28 (5.74)		-6.41 (5.73)
CEB × (RA/BE 2010)						8.80 (28.25)	11.05 (28.29)
RA/BE 2010						-30.40*** (6.04)	-31.87*** (6.37)
Bank-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted $R^2$	0.29	0.29	0.29	0.29	0.29	0.37	0.37
N	188	188	188	188	188	188	188

## A8. Robustness Check: Excluding Individual Countries

This table replicates the results of columns (3) and (4) in Table 2 and subsequently estimates Equation (2) in Section IV using subsamples which exclude individual countries.

	Column 3					Column 4					
	CEB	Controls	CY FE	Obs.	Adj. $R^2$	CEB	CEB $\times$ (CT1 Ratio 2010)	Controls	CY FE	Obs.	Adj. $R^2$
All	-11.13**	YES	YES	188	0.20	-46.17***	3.78***	YES	YES	188	0.29
Austria	-11.45**	YES	YES	181	0.21	-46.80***	3.80***	YES	YES	181	0.31
Belgium	-10.98**	YES	YES	186	0.20	-46.05***	3.78***	YES	YES	186	0.30
Denmark	-12.16**	YES	YES	164	0.22	-49.70***	4.18***	YES	YES	164	0.30
Finland	-11.25**	YES	YES	185	0.20	-46.43***	3.83***	YES	YES	185	0.30
France	-10.73*	YES	YES	182	0.19	-46.16***	3.81***	YES	YES	182	0.29
Germany	-11.23*	YES	YES	148	0.22	-50.94***	4.21***	YES	YES	148	0.33
Italy	-8.55	YES	YES	159	0.18	-35.42**	2.76**	YES	YES	159	0.24
Luxembourg	-12.50**	YES	YES	186	0.22	-45.34***	3.61***	YES	YES	186	0.30
Malta	-11.41**	YES	YES	186	0.21	-46.14***	3.76***	YES	YES	186	0.30
Netherlands	-12.12**	YES	YES	183	0.21	-48.43***	3.90***	YES	YES	183	0.31
Norway	-11.59**	YES	YES	164	0.18	-47.07***	3.86***	YES	YES	164	0.28
Poland	-11.56**	YES	YES	185	0.21	-46.17***	3.75***	YES	YES	185	0.29
Portugal	-7.35*	YES	YES	182	0.13	-38.72***	3.33***	YES	YES	182	0.23
Slovenia	-11.32**	YES	YES	185	0.20	-49.39***	4.05***	YES	YES	185	0.31
Spain	-12.32**	YES	YES	178	0.22	-47.36***	3.76***	YES	YES	178	0.31
Sweden	-11.51**	YES	YES	181	0.21	-47.04***	3.90***	YES	YES	181	0.29
United Kingdom	-11.23**	YES	YES	173	0.20	-45.81***	3.76***	YES	YES	173	0.29

## A9. Anecdotal Evidence of Regulatory Forbearance

This appendix discusses in more detail three different methods of regulatory forbearance used by national authorities during the 2011 EBA capital exercise.

### A. Recapitalizations Via CT1-Eligible Hybrid Securities

One form of regulatory forbearance are ad-hoc recapitalizations via CT1-eligible hybrid securities underwritten by the state. In Germany (NORD/LB), Italy (Banca Monte dei Paschi di Siena), Portugal (Banco BPI, Banco Comercial Português, Caixa Geral de Depositos), and Slovenia (NLB, Nova Kreditna Banka Maribor), 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. For example, the state aid application of Banco Comercial Português notes that *“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”*. And further: *“To cover its capital shortfall while constituting an appropriate level of capital buffer, on 29 June 2012 BCP issued EUR 3 billion of hybrid capital instruments convertible into shares (“CoCos”), which are eligible for treatment as CT1, subscribed by the Portuguese State (under the Recapitalisation Scheme)”*<sup>26</sup> Similarly, Caixa Geral de Depositos stated in its 2012 annual report: *“On 8 December 2011, CGD identified and informed the market, of additional capital requirements of EUR 1,834 million, of which amount EUR 1,073 million correspond the public debt buffer calculated based on the exposures as of September 2011 and in the scope of EBA's stress test. In June 2012, the additional capital requirements of CGD were recalculated reaching an amount of EUR 1 650 million. The initial amount of EUR 1,073 million corresponding to the public debt buffer was maintained in accordance with EBA's recommendation and the additional capital necessary to meet the more demanding requirements of Core Tier 1 was set in EUR 577 million. The capital requirements of EUR 1,650*

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<sup>26</sup>State aid case SA.34724. Link: [https://ec.europa.eu/competition/elojade/isef/case\\_details.cfm?proc\\_code=3\\_SA\\_34724](https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_34724)

*million were covered by the sole shareholder through a capital increase of EUR 750 million and the issuance of hybrid instruments (CoCos) eligible for Core Tier 1 in the amount of EUR 900 million, under the terms of Bank of Portugal's Notice 4/2012.*" Thus, the issuance of CT1-eligible hybrid securities helped banks in some jurisdictions to pass the EBA capital exercise without issuing common equity or retaining earnings. While some studies report a positive effect of hybrid capital securities on banks' resilience (Vallée, 2019), other recent literature finds more ambiguous effects (Avdjiev, Bogdanova, Bolton, Jiang, and Kartasheva, 2020; Goncharenko, Ongena, and Rauf, 2020), with potentially perverse incentives for equity investors (Berg and Kaserer, 2015; Goncharenko, 2020).

### *B. Deductions of Tax Treatment of Goodwill Impairments*

In this section, we further discuss how banks can manage their regulatory capital via the devaluation of goodwill and intangible assets. The book values of intangible assets and goodwill are deducted from book equity to address the high level of uncertainty regarding their positive realizable value in times of stress or insolvency (BCBS, 2009). However, for many banks, intangible assets (including goodwill) are typically large in magnitude relative to their regulatory capital. For the CE banks in our sample, the mean (median) value of intangible assets relative to regulatory CT1 capital is 24 (15) percent. Thus, they provide a considerable margin of discretion along which banks can potentially manage their regulatory capital. In its final report on the capital exercise, the EBA noted 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 capital raised by EBA banks with a shortfall.

From an accounting perspective, goodwill impairments result in a decrease of the book value of goodwill (equal to the amount of the impairment charge) but also reduce net income by the same amount. Thus, a devaluation of intangible assets and goodwill is initially capital

neutral with regard to a bank’s regulatory capital. However, if the impairment charges are tax deductible, then banks can increase their regulatory capital via a devaluation of goodwill. Consider the following stylized and simplified example: Assume that a bank reports a goodwill impairment of 1 billion euro (similar to the Spanish bank BBVA in 2012) and further assume that the relevant tax rate is 20%. This will result in a 1 billion euro reduction in regulatory adjustments (thereby increasing regulatory capital) and a decrease in net income of  $1 \text{ billion} \times (1-0.2) = 800 \text{ million euro}$ . Thus, the net effect is positive and regulatory capital increases by 200 million euro.

There is anecdotal evidence that European banks depreciated the value of goodwill to boost their regulatory capital in response to comply with the sudden increase in requirements during the capital exercise. In 2011, the Italian government enacted Law Decree no. 98/2011, 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.<sup>27</sup> Similarly, 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). Moreover, recent studies confirm this relation between the tax deductibility of impairment charges and firms’ financial reporting decisions. Khalil, Romney, and Utke (2019) find that multinational companies with subsidiaries in Luxembourg (i.e. a country where impairment charges are tax deductible) are more likely to write down goodwill compared to multinationals without subsidiaries in Luxembourg.

### *C. Conversion of Deferred Tax Assets into Tax Credits*

Deferred tax assets (DTAs) 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

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<sup>27</sup><https://www.gruppomps.it/en/media-and-news/press-releases/banca-monte-dei-paschi-siena-tier-1-up-to-8-8-per-cent.html>

banks to deduct DTAs from regulatory capital, because their dependence on future income, which depresses bank capital. The Italian government, however, enacted decree-law no. 201 on 6 December 2011, 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.

## A10. Matching Estimation: Sample Balance

Table A13  
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). Panel A compares the mean values of the 48 Capital Exercise banks and 144 Non-Capital Exercise banks in the unmatched sample. Panels B to E compare Capital Exercise banks to the sample of matched control group banks using the *full sample matching*, *overlap matching*, *within country matching* and *within region matching* strategies respectively. The paper tests for differences in means using Welch's t-test. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% level respectively.

	# Banks	Total Assets	CT1 Ratio	Deposits / TA	Loans / TA	NII / Op. Rev.	Net Inc./ TA
<i>Panel A: Unmatched Sample</i>							
EBA Banks	48	454.31	9.86	40.93	56.73	60.42	0.39
Non-EBA Banks	144	24.43	11.41	55.54	66.62	67.69	0.41
$\Delta$		429.87***	-1.55**	-14.61***	-9.89***	-7.27**	-0.02
<i>Panel B: Full Sample Matching</i>							
EBA Banks	48	454.31	9.86	40.93	56.73	60.42	0.39
Matched Group Group	76	107.14	10.30	47.89	64.80	64.62	0.41
$\Delta$		347.17***	-0.44	-6.95***	-8.07***	-4.19***	-0.02
<i>Panel C: Overlap Matching</i>							
EBA Banks	36	161.32	9.98	41.97	59.78	61.95	0.40
Matched Group Group	16	156.10	10.95	53.80	57.06	71.89	0.38
$\Delta$		5.22	-0.96	-11.83**	2.72	-9.94	0.02
<i>Panel D: Within Country Matching</i>							
EBA Banks	25	320.88	9.96	43.51	59.08	58.80	0.40
Matched Group Group	25	80.92	10.80	43.21	61.72	71.22	0.42
$\Delta$		239.96***	-0.84*	0.31	-2.64	-12.42*	-0.02
<i>Panel E: Within Region Matching</i>							
EBA Banks	26	310.18	10.01	44.85	59.77	58.99	0.45
Matched Group Group	26	180.49	9.95	47.63	64.12	59.39	0.50
$\Delta$		229.69*	0.07	-2.77	-4.35*	-0.40	-0.04