The growth-stability trade-off

Abstract: Building a panel of 39 large European banks with quarterly data over the period 2005-2018, this paper examines the role played by profitability as driver of simultaneous changes in growth and stability. Our results suggest that there exists a trade-off between growth and stability in banking. We find that a positive shock in stability may cause a stronger negative shock in growth for high profitable banks rather than their less profitable peers. Moreover, a positive shock in growth leads to a stronger negative shock in stability for less profitable banks. We find profitability to drive a different management of both growth and stability changes.

Keywords: Growth, Stability, Trade-off, Profitability.

1 Introduction

Building a panel of 39 large European banks with quarterly data over the period 2005-2018, this paper examines the role played by profitability as driver of simultaneous changes in growth and stability. Regarding growth, EU banks are losing market share to US banks, moreover within our burdens new players (e.g. challenger banks) are expected to steal a substantial part of bank's market share and profit margin because of their innovative and less expensive business models (BCBS, 2018). This scenario calls into question the growth opportunities of the EU banking sector. Regarding stability, EU regulators are focusing on addressing structural challenges and a more competitive market. The upcoming Banking Package will revise the set of rules aimed at reducing risks. However, the impact of new supervisory standards on profitability and capital is expected to be material (MB, 2017). Moreover, despite the bank's profitability recovery, market analysts expect the return on equity to continue to fluctuate below the corresponding cost of equity (FSR, 2018). What follows from this scenario is that profitability represent a serious concern for both growth expectations and stability requirements. To build our framework, we rely on the buffer view theory and the franchise/charter value theory. The former suggest capital buffers as a mean to reduce bank insolvency risk (Blum and Hellwig 1995; Bolton and Freixas 2006; Peura and Keppo 2006), whereas the latter claims that banks with high growth opportunities tend to preserve them pursuing safer policies aimed at lowering the insolvency risk (Jian, 2009). The joint interpretation of these results suggest higher capital buffers as a mean to both enhance stability and safeguarding growth opportunities. Our contribute to literature consist with including profitability within this picture, arguing that capital is just a piece of the puzzle that explains both changes in growth and stability. Our results suggest that there exists a trade-off between growth and stability in banking. We find that a positive shock in stability may cause a stronger negative shock in growth for high profitable banks rather than their less profitable peers. We explain this result by the different strategies employed by banks when managing stability, depending on their level of profitability. In particular, high profitable banks enhance their stability via de-risking selling assets with high-risk from which growth opportunities derive much of their value (Haq and Heaney, 2010). Conversely, less profitable banks engage in different and more sophisticated Liabilities Management Exercises (LMEs) (Lubberink and Renders, 2016) which are less likely to lower the value of growth opportunities. Additionally, a positive shock in growth leads to a stronger negative shock in stability for less profitable banks rather than the more profitable ones. Our explanation borrow from the gambling for resurrection studies (Kirti, 2017). Less profitable banks are characterized by higher capital buffers, which lower the risk of breaching the minimum requirements, but have less value of growth opportunities than their high profitable peers. As a consequence the former are more likely to engage into gambling to increase their value of growth opportunities, jeopardizing their stability. We provide policy implications addressing the implementation of TLAC/MREL requirements under the light of our findings on the relationship between growth and stability changes. The paper is organized as follows: section 2 provides an overview of the existing literature, section 3 describes the empirical framework, section 4 presents the hypothesis and the data used in the study, section 5 shows the methodology employed and the following results, section 6 provides the robustness test, section 7 discusses the results and concludes suggesting further investigations.

2 Literature Review

The idea of the banking sector as a sector entailing a variety of trade-offs is being debated in literature. Although a bench of both theoretical and empirical investigation, existing literature leaves room for further investigation. The debate surrounding trade-offs in banking centers on the role of regulation, bank capital, risk-taking behavior and their relations with profitability and stability. The vast body of literature on minimum capital requirements and their effects on risk-taking behavior and profitability develops under different perspectives and leaves the issue unresolved. The gambling argument has led scholars to underscore the adverse effect of the regulatory capital standards on a bank's risk appetite (Kahane, 1977; Koehn and Santomero, 1980; Kim and Santomero, 1988). An opposite school of taught underpins the key role of minimum capital requirements in constraining bank's risk-taking behaviour instead (John et al., 1991; Keeley and Furlong, 1989; Keeley and Furlong 1990; Rochet, 1992).Morrison and White (2005) bring novel insights into the risk-capital debate in the banking industry by explicitly introducing a new dimension that directly relates to the reputation of regulators. In a nutshell, capital requirement might contribute to alleviate the moral hazard problem by restricting bank size. One of the predictions is that capital requirements can be looser the higher the reputation of regulators and the transparency of accounting standards. An implication is that capital requirements may turn to constrain bank's growth. The observed tendency toward considerably tightening the capital requirements following the great financial crisis requiring banks to build up capital buffers calls for a deeper investigation into risk adjustments. Several studies have shed a light on the fact that banks set their capital ratios way above the minimum capital requirement suggesting that regulatory minima might not be binding (Ayuso, Perez and Saurina, 2004; Lindquist, 2004). Building buffers of capital above the minimum requirement is consistent with the capital buffer theory (Milne and Whalley, 2001; Peura and Keppo, 2006) and the associated costs, both direct and indirect, of breaching the minimum capital requirement. One of the implications is that supervisory capital requirements might not be able to affect bank capital corrections (Berger et al., 2008), which is in line with a body of literature attributing to capital regulation a second order of importance in driving bank's capital structure (see among others, Allen et al., 2011; Flannery and Ragan, 2008). A related implication, therefore, is that firm specific variables should have a prominent role in determining capital structure decisions. In line with corporate finance theory, prominent literature suggests a revenant role for profitability, growth opportunities, size and risk taking (Rajan and Zingales, 1995; Gropp and Heider, 2010). While the implementation of capital regulation might virtually turn out to restraining bank growth in its attempt to strengthen resiliency (Tanna et al., 2017), buffers of excess capital would allow banks flexibility to expand asset riskiness. However, how the relations between capital and risk and adjustments thereon work, still is an open question. Coping with tighter capital requirements obviously casts a relevant question on the options available to banks to manage capital-risk adjustments. In principle, banks can react to stricter regulatory constraints either reducing their risk exposure rather than issuing new equity (Hyun and Rhee, 2011; Cathcart et al., 2015) or increasing capital rather than adjusting risk exposure (Bertrand Rime, 2000). Focusing on excess capital, Jokipii and Milne (2011) provide and excellent insight capital-risk adjustments work. Findings point that banks with small capital buffers adjust the required level faster than banks with higher capital buffers, raising capital and lowering risk. Conversely, banks with higher capital buffers adjust their capital levels slower and increasing both capital and risk. As an implication, well-capitalized banks are flexible enough to expand risks for future growth whenever valuable opportunities materialize. Unraveling the growth-stability trade-off requires, therefore, adding a new dimensions in the analysis i.e., managing capital buffers at light of bank's expectations over opportunities for future growth. Nevertheless, setting targets for the capital ratio casts the issue of effectively meeting those ratios. Addressing such an issue turns to shift the focus from the growth-stability relation to the growth-profitability relation. While dynamics in growth and profitability have been usually tested separately, to the best of our knowledge Goddard et al. (2004) are the first to relate them, accounting for a positive effect of profitability on growth. Should the predictions of the capital buffer theory hold, highly profitable banks can afford operating with lower levels of capital since it would be much more easier for them tapping equity markets whenever they need rising funds. This incentive would be stronger the more opportunities for future growth are recognized in market valuations. Establishing a relation between capital ratios and growth and between profitability and growth calls into question how profitability relates to capital ratios. Such an association meets the Lee and Hsieh (2013) claim to extend the capital-risk relation to efficiency and profitability. Theoretically, while lowering the probability of default and bankruptcy costs, high capital levels would turn out in lower funding costs, hence resulting in higher profitability levels (Berger, 1995). Recent investigations converge toward a positive association of Tier 1 ratio with stock returns (Demirgüç-Kunt et al., 2013) and profits (Iannotta et a., 2007), equity-to-total-asset ratio and bank profits (Demirgüç-Kunt and Huizinga, 2000). Tan (2016) relates the positive association between capital and profits to a higher bank's creditworthiness, a more prudent lending behavior and lower borrowing. However, the causality can also go in the opposite direction, pointing to a significant effect of profitability on bank capital. First, managing dividend pay-out ratios can help raising their capital ratios (Cohen and Scatigna, 2016). Second, profitability is a key factor allowing the reconciliation of the expansion of risky assets with the need of meeting regulatory capital requirements. Teixeira et al., (2014) confute the predictions of the capital buffer theory in several respects accounting for a positive association of growth opportunities, profitability and frequency of dividend payments with capital buffers. Instead, they results confirm the capital buffer theory as regards the impact of bank size (negative) and riskiness (positive) on excess capital. Moreover, profitability, size and risk have a stronger effect on excess Tier 1 capital for high-growth banks. On a managerial point of view, however, how banks manage their capital levels, still remains in the shadow. Assuming a bank operating with a target capital ratio with earnings being the primarily source of capital, the relevant issue is related to the profitability levels the bank needs to achieve in order to meet its targets. A stream of empirical research investigates the impact of loans growth on risk, capital levels and bank's profitability. Foos et al. (2010) provide evidence that loans growth significantly affects overall bank's riskiness, leading to an expansion loan loss provision coupled with declines in the relative interest income and contractions in total capital ratios. In the same vein, Salas and Saurina (2002) find a positive association between loan growth and prospective loan losses in a sample of Spanish saving banks while Hess et al. (2009) account for a direct relation between loan growth and credit losses. Chavan and Gambacorta (2018) investigate NPL's behavior through the cycle. They find a persistence in NPLs and a lagged positive, although asymmetric, impact of bank credit growth in NPLs. Higher capital buffers allow reaching higher risk profiles, according to the predictions of the capital buffer theory, but requiring higher profitability levels to stabilize capital ratios. Too challenging capital ratios (i.e., high capital targets in an environment where required profitability levels far exceed current profits) posit the problem of the required adjustments. Arguably, corrections might arise by reducing capital targets or, otherwise, by increasing risk taking behavior. Prior research on the risk-efficiency or risk-profitability relations provide interesting insights. Sun and Chang (2011) relate bank efficiency to different measures of risk, i.e. credit risk proxied by loan loss reserve ratio, market risk proxied by the exchange rate volatility and operational risk factors measured as the volatility of ROA and ROE. All the risk factors are negatively associated to cost efficiency. Based on both market and accounting risk measures, Eisenbeis (1999) accounts for a positive association between firm specific inefficiencies and bank risk-taking behavior, although with differences across bank sizes. While large banks tend to operate closer to their efficient frontier than smaller banks. Bank size emerges as a relevant attribute in Altunbas et al. (2000) as well. When explicitly factoring risk into the analysis, the optimal bank size emerges as considerably smaller. Gonzalez (2005) relates bank regulation, risk taking behavior and charter value with the interesting result that risk-taking incentives are increasing in the tightness of regulation, resulting in decreasing charter values. Capital-risk and capital-profitability relations leave a managerial issue unsolved, which relates to how bank manage default risk via capital targets as a function of profitability levels.

3 Empirical framework

Modelling the relationship between growth and stability

To investigate the relationship between changes in growth and stability, we assume both variables strictly depending one on each other. Bank's resilience represents the crucial condition of growth since, according to the franchise value theory, the lower the probability of default the safer the growth opportunities' value. On the other hand bank's growth constitutes a prerequisite for bank's stability since, under the assumption of earning being the first source of capital, higher profits generated by growth will build up capital buffers which will lower the probability of breaching the minimum capital requirement, according to the buffer view. As a consequence, we develop a simultaneous equation model. We employ as simultaneously determined variables the observed changes in growth and stability. Moreover, we assume banks to target optimal values of growth and stability. As a result, in line with Jokipii and Milne (2011), we model observed changes of growth and stability as percentage of the optimal change given by the difference between their target and actual values, accounting for exogenous shocks that may hamper adjustments to the optimal targets. The resulting model is as follows:

$$\begin{cases} \Delta Growth_{i,t} = \alpha_{i,t} + \xi_1\left(Growth^*{}_{i,t} - Growth_{i,t-1}\right) + \xi_2 \Delta Stability_{i,t} + \varepsilon_{i,t} \\ \Delta Stability_{i,t} = \mu_{i,t} + \varphi_1(Stability^*{}_{i,t} - Stability_{i,t-1}) + \varphi_2 \Delta Growth_{it} + \kappa_{i,t} \end{cases} \quad (4)$$

$\Delta Growth_{i,t}$ and $\Delta Stability_{i,t}$ are the simultaneous determined variables which refer to observed changes in growth and stability proxy variables respectively; $(Growth^*{}_{i,t} - Growth_{i,t-1})$ and $(Stability^*{}_{i,t} - Stability_{i,t-1})$ denote the optimal changes given by the differences between targets and actual value of growth and stability respectively; the coefficients ξ_1 and φ_1 stand for the percentages of the optimal change. We further assume banks' optimal values of growth and stability to be unobservable. As a result, we employ a set of variables acknowledge by literature as predictors of both growth and stability targets. Hence, the final model is as follows:

$$\begin{cases} \Delta Growth_{i,t} = \alpha_{i,t} - \xi_1 Growth_{i,t-1} + \xi_2 K_{i,t} + \xi_3 \Delta Stability_{i,t} + \varepsilon_{i,t} \\ \Delta Stability_{i,t} = \mu_{i,t} - \varphi_1 Stability_{i,t-1} + \varphi_2 J_{i,t} + \varphi_3 \Delta Growth_{it} + \kappa_{i,t} \end{cases} \quad (5)$$

Where: $\Delta Growth_{i,t}$ and $\Delta Stability_{i,t}$ are the observed changes in growth and stability proxy variables respectively; $K_{i,t}$ and $J_{i,t}$ are vectors capturing variables able to predict both growth and stability targets; $Growth_{i,t-1}$ and $Stability_{i,t-1}$ are the actual levels of growth and stability respectively; the coefficients ξ_1 and φ_1 stand for the speed of adjustment toward the optimal value of growth and stability respectively; $\varepsilon_{i,t}$ and $\kappa_{i,t}$ are the error terms. Given that the coefficients ξ_1 and $\varphi_1$represent the percentage of the optimal change in equation (4), we assume them to predict the speed of adjustment toward the optimal target when related to the lagged dependent variable. If the coefficient is equal to one, it means that the adjustment toward the optimal value is complete. Conversely, if the coefficient is equal to zero, it means that the adjustment didn't take place. If negatives, the coefficients represent the speed at which growth and stability value move from the optimal one. We expect the coefficients to range between the interval [0;1] to provide a reliable proxy of the speed of adjustment.

Profitability as driver of changes in growth and stability

Given the assumption of earnings being the primarily source of capital, profitability plays a crucial role in building capital buffers, able to lower the probability of default and enhancing bank's stability. Simultaneously, from both theorical (Goddard et al., 2004; Yazdanfar and Öhman, 2015) and empirical perspective (Chronopoulos et al., 2015; Garcia and Martins, 2016), profitability provides a source of value for future growth opportunities. To explore the role of profitability in driving changes in both growth and stability, we develop two dummies R_H and R_L, which denote high and low profitable banks respectively. Dummy R_H assumes value 1 if the value of the return on assets exceeds its average calculated over the entire sample, zero otherwise. Dummy R_L assumes value 1 if the value of the return on assets is below its average calculated over the entire sample, zero otherwise. We interact these variables with the lagged dependent variables $Growth_{i,t-1}$ and $Stability_{i,t-1}$ of both growth and stability proxy variables respectively, in order to capture differences in speed of adjustments that may depend on bank's profitability degree. With the same purpose, we interact R_H and R_L with the observed adjustments $\Delta Growth_{i,t}$ and $\Delta Stability_{i,t}$ of both growth and stability proxy variables respectively.

4 Hypothesis and data

The hypothesis

Our null hypothesis is:

$H_0 =$ Changes in stability and growth have no impact one on the other. If the null hypothesis is rejected, we test the following further hypothesis:

$H_1 =$ Changes in stability and growth are positively related. This assumption is in line with joint results of the franchise/charter value theory and the buffer view theory which suggest capital buffers as mean able to both enhancing stability and protecting the value of growth opportunities. We expect profitability to strengthen the relationship. Therefore, the higher the profitability the higher the positive impact that growth and stability changes have on each other.

$H_2 =$ Changes in stability and growth are negatively related. This assumption is in line with theory suggesting risk as negatively related to stability, but positively related to growth. Therefore, enhancing stability by reducing risk might jeopardize the growth opportunities' value. We expect profitability to loosen the relationship. Therefore, the higher the profitability the lower the negative impact that growth and stability changes have on each other.

The sample

To select our sample we start from the universe of listed banks located in Western and Eastern Europe. The research is conducted running the Equity Screening of the Bloomberg Professional Service which allow us to select listed banks following the Industry Classification Benchmark (ICB) criterion within the burdens of Western and Eastern Europe. At this stage the sample consist of 528 banks. In order to rule out less significant banks, we employ six filters and require at least one to be fulfilled. First, we require banks to be directly supervised by the European Central Bank (ECB), or to be part either of the stress test or the transparency test conducted by the European Banking Authority (EBA), then we extend the filters covering all the Global Systemically Important Banks (G-SIBs), Global Systemically Important Institutions (G-SIIs) and Other Systemically Important Institutions (O-SIIs). At this stage the sample consist of 262 banks. We further refine the sample selecting only banks with available quarterly data. The final sample consist of 39 listed banks located in 15 countries belonging to the European Economic Area region. A detailed list is provided in Table 1. The sample period starts in Q1 2005 and ends in Q4 2018 covering the sub-prime crisis and euro sovereign debt crisis. Moreover, the period reflects the European implementation of Basel Accords providing for the evolution of the regulatory framework. Table 2 provides a descriptions of variables involved in this study

Growth and stability proxy variables

Crucial to our analysis is the recognition of the proper proxy variables for stability and growth in banking. Regarding stability, the literature points out the Z-Score as a reliable proxy variable (Groeneveld and de Vries, 2009; Ayadi et al., 2010; Beck et al., 2012; Chiaramonte et al., 2015). It is calculated as: $Z{-}Score$= ROA+CARσ(ROA) where ROA is the return on assets, CAR is the capital-asset ratio and σ(ROA) is the standard deviation of the return on assets. The Z-score assesses the number of standard deviation that the bank's Roa has to fall below the mean in order to make the bank insolvent. A higher Z-score value indicates that the bank has a lower default risk and a greater stability. Additionaly, the

Table 1

List of banks

Bank	Country	Bank	Country
Erste Group Bank AG	Austria	DNB ASA	Norway
Raiffeisen Bank International AG	Austria	Banco Comercial Portugues SA	Portugal
Dexia SA	Belgium	Banco BPI SA	Portugal
KBC Group NV	Belgium	Banco Bilbao Vizcaya Argentaria SA	Spain
Danske Bank A/S	Denmark	Banco de Sabadell SA	Spain
Nordea Bank Abp	Finland	Banco Santander SA	Spain
BNP Paribas SA	France	Bankinter SA	Spain
Credit Agricole SA	France	CaixaBank SA	Spain
Societe Generale SA	France	Nordea Bank Abp	Sweden
Commerzbank AG	Germany	Skandinaviska Enskilda Banken AB	Sweden
Deutsche Bank AG	Germany	Svenska Handelsbanken AB	Sweden
Alpha Bank AE	Greece	Swedbank AB	Sweden
Eurobank Ergasias SA	Greece	Credit Suisse Group AG	Swiss
National Bank of Greece SA	Greece	UBS Group AG	Swiss
Piraeus Bank SA	Greece	ING Groep NV	The Netherlands
Banca Monte dei Paschi di Siena SpA	Italy	HSBC Holdings PLC	UK
Intesa Sanpaolo SpA	Italy	Lloyds Banking Group PLC	UK
Mediobanca Banca di Credito Finanziario	Italy	Royal Bank of Scotland Group PLC	UK
UniCredit SpA	Italy	Barclays PLC	UK
Unione di Banche Italiane SpA	Italy		

This table reports the list of banks coverd in this study.

Table 2

Description of variables and expected signs

Category	Variable	Description	Expected sign	
			Growth equation	Stability equation
Growth Proxy Vaiables	ΔPBV	Changes in price-to-book ratio		
	ΔTQ	Changes in the Tobin's Q		
Stability Proxy Variables	ΔZS	Changes in Z-Score as defined in section		
	ΔCDS	Changes in CDS spreads on 5-year senior debt contracts		
Growth-Stability Pedictors	EX	The difference between total regulatory capital ratio and the minimum capital required	+	+
	RISK	Risk weighted assets to total assets	-	-
	ROA	Net income to total assets	Ambiguous	Ambiguous
	EFF	Efficiency ratio	-	-
	COMP	% Chg market share in terms of total lending (retail + corporates)	+/-	+/-
Dummy variables	RH	Assumes value one if ROA is above the average value, zero otherwise		
	RL	Assumes value one if ROA is below the average value, zero otherwise	Ambiguous	Ambiguous

This table presents the definitions of all variables involved in this study and their expected sign for both growth and stability equations. Source: Bloomberg (2005-2018).

credit default swap (CDS) spreads are also commonly used by literature as proxy variables for bank stability (Chiaramonte and Casu, 2010; Calice et al.,2012; Ballester et al., 2016; Arnold and Soederhuizen, 2018). A CDS rate is the periodic rate a protection buyer pays on a notional amount to a protection seller for transferring the risk of a credit event (Annaert et al., 2013). As a result, CDS rates provide a measure of bank's probability of default. An higher CDS rate is associated with higher bank's default risk and weaker stability. We measure CDS spreads on 5-year senior debt contracts in line with the relevant literature that considers it the most liquid contract in the market (Chiaramonte and Casu, 2010; Annaert et al., 2013; Banerjee et al., 2016). Regarding growth, we employ growth opportunities as reliable proxy variable. The corporate finance literature identifies growth opportunities as the chance to carry out an investment at a future date able to turn out profitable, given an existing strategic management of the resources. However, banking literature addresses the growth opportunities concept by means of the franchise/charter value theories. In line with empirical studies in this field, we employ the price to book ratio (Teixeira et al., 2014) and the Tobin's Q (Keeley, 1990; Gropp and Vesala, 2001) as proxy variables for growth opportunities. The price to book ratio is calculated as ratio between equity price and book value per share. The Tobin's Q is calculated as follows: (Market Cap + Total Liabilities + Preferred equity + Minority Interest / Total Assets). This measure depicts the ratio of the market value of a firm to the replacement cost of the firm's assets.

Predictors of growth and stability targets

Given that the targets are unobservable, we rely on the relevant literature to select the most appropriate variables able to predict growth and stability targets. According to the franchise/charter value theory, growth opportunities tackle the moral hazard problem enticing banks to pursue safer policies (Jian, 2009). Moreover, the capital buffer theory claims banks pile up capital buffers in order to avoid the risk of breaching the minimum capital requirement (Blum and Hellwig 1995; Bolton and Freixas 2006; Peura and Keppo 2006). Fiordelisi and Mare (2013) provides further evidence that capital buffers reduce the probability of default thereby increasing bank stability. It follows that capital buffers play a role in protecting growth opportunities value as well as reducing the probability to breach the minimum capital requirements. Moreover, Hellmann et al. (2000) claim that an higher capital requirement ratio has a double effect on bank risk-taking: a positive one since high risk-taking is associated with high capital requirement ratio, and a negative one given that undercapitalized banks are related to lower franchise value which may entice banks to increase their risk-appetite. Hence, the joint effect of capital endowment and risk-taking must be taken in account to evaluate the dynamics related to both stability and growth opportunities. As a result, we employ capital buffers, measured as the capital exceeding the minimum required, and risk, measured as risk-weighted assets, to predict both growth and stability targets. Demirgüç-Kunt and Huizinga (1999) state that bank stability requires adequate levels of profitability to be sustained. Fiordelisi and Mare (2013) point out higher efficiency level, in terms of cost minimization and profits maximization, is significantly related to lower probability of default. According to Demsetz et al. (1996), bank more efficient, that can provide less expensive services compared to their competitors, are able to exploit profitability as source of franchise value. As a result, we further employ profitability, measured as the ratio of net income to total assets, and the efficiency ratio, measure with the cost income ratio, as predictors of both growth and stability. Martynova et al. (2014) debunk the common view pointed out by literature, according which low competition is related to higher franchise value and lower risk-taking incentives, claiming that high franchise value stemming from low competition is exploited to invest in risky assets thereby jeopardizing bank stability. As a result we employ competition, measured using the percentage change of market share in terms of total lending (retail + corporates) per country, as predictor of both growth and stability.

5 Methodology and results

The equations (5) and (7) set out dynamic models which we estimate using the one-step Blundell-Bond system GMM estimators (Blundell and Bond, 1998). According to Jokipii and Milne (2011), this approach accounts for bank specific effect enabling us to provide unbiased estimates compared to the three stage least squares (3SLS) method which is common in literature (Heid et al., 2004). The methodology employs lagged levels as instruments in the first difference equations and lagged first differences in the levels equations. Table 3 provides correlations of the main variables both in levels and differences.

Table 3
Correlation matrix

	PBV	TQ	CDS	ZS	ROA	ΔPBV	ΔTQ	ΔCDS	ΔZS	ΔROA
PBV	1.0000									
TQ	0.8306	1.0000								
CDS	-0.4026	-0.3848	1.0000							
ZS	0.0766	0.0357	-0.1068	1.0000						
ROA	0.2366	0.1641	-0.3348	0.0847	1.0000					
ΔPBV	0.1200	0.0647	-0.0312	0.0128	-0.0412	1.0000				
ΔTQ	0.0752	0.1921	-0.0364	0.0149	-0.1695	0.4831	1.0000			
ΔCDS	-0.0100	-0.0157	0.2230	-0.0245	0.0303	-0.1564	-0.0964	1.0000		
ΔZS	-0.0173	-0.0200	0.0089	0.5152	0.0010	-0.0412	-0.0353	-0.0043	1.0000	
ΔROA	-0.0127	-0.0042	-0.005	0.0127	0.6640	-0.0512	-0.1238	0.0038	0.0216	1.0000

This Table shows the correlation matrix of main variables involved in this study

The results of this simple correlation analysis show a positive relationship between growth and stability. The CDS level is negatively correlated to both growth proxies levels, this means that the higher the spread between credit default swaps and senior bonds the lower the growth opportunities. It follows that the lower the spread, namely a greater stability, the higher the growth opportunities. The positive correlation between the Z-score level and both growth proxy levels shows that a greater stability, namely an higher number of standard deviations that the Roa has to fall to make the bank insolvent, leads to higher growth opportunities. These results are in line with the predictions of the franchise value theory, which claims that a lower probability of default increases the growth opportunities, and with the assumption of higher profits, stemming from growth, piling up capital buffers able to lower the probability of default according to the capital buffer view. Profits are crucial in this picture since they constitute the main source for growth opportunities and capital buffers. The correlation between Roa and both growth and stability proxy variables provides evidence of the positive relationship between profits and both growth and stability. However, difference variables shows contrasting results regarding changes in Z-score and Roa which are negatively related to growth opportunities. These results suggest a possible trade-off between growth and stability driven by profitability, since Z-score is a measure of bank stability strictly related to profitability by construction. This preliminary study of correlations does not account for simultaneous changes in growth and stability, therefore we need to deepen the investigation.

Growth and stability single equation estimations

We first estimate the system of equations outlined in model (5) as separate equations, the results are presented in Table 4. We create four models (a), (b), (c) and (d) for each combination of growth and stability proxy variables. Each model presents three specifications. Specification I replicate the equations as described in model (5). Specification II allows the speed of adjustments, namely the coefficients of the lagged dependent variable, to interact with the degree of profitability. Specification III further allows observed adjustments in growth and stability to interact with the degree of profitability.

Regarding the growth equation, observed adjustments in stability (Δ Stability) are statistically significant and negatively correlated with changes in growth for all specifications of models (a), (b) and (d). Only model (c), involving the Tobin Q and the Z-score as growth and stability proxy variable respectively, does not show statistically relevant results even though confirms the negative sign of the relationship. Moreover, when observed changes in stability interact with the degree of profitability, the correlation appears stronger for high profitable banks. As above, this result holds for the same 3 out of four models. The coefficients of the lagged dependent variable (Growth t-1) range between 0 and 1, therefore can be considered as speed of adjustments towards the growth target. All the coefficients are negative and statistically significant for each specification of every model. For specification I, the coefficients range between 12% and 16%. This means that banks move from growth target by a percentage that ranges within this interval, on a quarter basis. For specifications II and III, when we interact the lagged dependent variable with the degree of profitability, high profitable banks move slower from the target with percentages that range between 8% and 12% on a quarter basis. Conversely, low profitable banks move faster from the target with percentages ranging from 16% to 25%. Predictors of growth generally match the expected signs. The excess capital shows a positive relationship with growth proxy variables for three out of four models. Additionally, the risk-weighted assets on total assets are negatively associated with growth proxy variables. These two results combined match the predictions of both the franchise/charter value theory and the capital buffer theory. In short, higher capital buffers are able to lower the risk of bank insolvency and protect the value of the growth opportunities. The return on assets shows and ambiguous sign. Its coefficients are positive but statistically insignificant for all specifications of model (b) and (c), but negative and more significant for models (a) and (d). The efficiency ratio shows a positive relationship with growth changes in contrast with the predicted sign. A possible explanation is that this relationship is mainly driven by the decrease of profitability rather than the increase of expenses. The variable expressive of banking competition shows contrasting signs coherently with the different positions held in literature on its impact on growth opportunities.

Regarding the stability equation, the observed changes in growth (Δ Growth) are negatively correlated with changes in stability for every specification of each model. However, specifications I and II of models (a) and (c), using the Z-score as stability proxy variable, do not show statistically relevant results. When observed changes in growth interact with the degree of profitability, low profitable banks show a stronger, negative and statistically significant relationship with changes in stability for each specification III of every model. The coefficients of lagged dependent variable (Stability t-1) show a negative and statistically significant relationship with changes in stability for each specification of every model. The coefficients range between 0 and 1, hence can be consistently considered as speed of adjustments. They significantly vary depending on the stability proxy variable. For specification I, models (a) and (c), which uses the Z-score as proxy of stability, show that banks move from the stability target by a percentage of 71% on a quarter basis. Conversely, models (b) and (d), which uses the CDSs as stability proxy variable, show a deviation around 21% from the stability target. For specifications II and III, when the lagged dependent variable interacts with the degree of profitability, the results are ambiguous. For models (a) and (c), involving the Z-score, high profitable banks are faster in moving from the target, rather for models (b) and (d), involving the CDSs, less profitable banks are the fastest. All control variables present the expected sign. The excess capital shows a positive correlation with observed changes in stability, when it's proxied by

Table 4

Blundell-Bond: Single equation estimations

	(a)			(b)			(c)			(d)		
	ΔPBV-ΔZS			ΔPBV-ΔCDS			ΔTQ-ΔZS			ΔTQ-ΔCDS		
	I	II	III	I	II	III	I	II	III	I	II	III
Growth equation												
Growth t-1	-0.128*** (-12.58)			-0.168*** (-13.97)			-0.126*** (-11.81)			-0.143*** (-11.10)		
RH*Growth t-1		-0.088*** (-7.12)	-0.088*** (-7.12)		-0.093*** (-5.77)	-0.093*** (-5.76)		-0.087*** (-6.77)	-0.087*** (-6.77)		-0.126*** (-7.61)	-0.125*** (-7.54)
RL*Growth t-1		-0.220*** -11.49)	-0.220*** (-11.49)		-0.256*** (-14.66)	-0.257*** (-14.72)		-0.221*** (-11.14)	-0.221*** (-11.12)		-0.167*** (-8.70)	-0.169*** (-8.76)
Δ Stability	-0.018** (-2.25)	-0.018** (-2.26)		-0.083*** (-7.18)	-0.079*** (-6.86)		-0.01 (-1.13)	-0.01 (-1.11)		-0.071*** (-5.18)	-0.071*** (-5.15)	
RH*ΔStability			-0.019* (-1.82)			-0.119*** (-4.40)			-0.007 (-0.64)			-0.148*** (-4.48)
RL*ΔStability			-0.016 (-1.34)			-0.069*** (-5.38)			-0.013 (-0.94)			-0.052*** (-3.39)
EX	0.025** (2.25)	0.021* (1.89)	0.021* (1.89)	0.020** (1.96)	0.014 (1.42)	0.014 (1.36)	0.013 (1.03)	0.004 (0.30)	0.004 (0.30)	-0.016 (-1.28)	-0.019 (-1.49)	-0.021 (-1.59)
RISK	-0.004 (-0.21)	-0.007 (-0.38)	-0.007 (-0.39)	-0.021 (-1.15)	-0.028 (-1.56)	-0.027 (-1.53)	-0.01 (-0.56)	-0.02 (-1.30)	-0.026 (-1.29)	-0.023 (-1.14)	-0.028 (-1.39)	-0.028 (-1.38)
ROA	-0.029** (-2.40)	-0.019 (-1.59)	-0.019 (-1.59)	-0.009 (-1.12)	0.001 (0.14)	0.0006 (0.08)	0.005 (0.35)	0.015 (1.08)	0.015 (1.08)	-0.033** (-3.14)	-0.031*** (-2.89)	-0.032** (-3.01)
EFF	0.004 (0.53)	0.007 (0.94)	0.007 (0.94)	0.015 (2.23)	0.018** (2.66)	0.018** (2.63)	0.013 (1.47)	0.014 (1.59)	0.014 (1.59)	0.022** (2.55)	0.022**(2.59)	0.022** (2.52)
COMP	0.001 (0.26)	-0.0004 (-0.06)	-0.0004 (-0.06)	0.024** (3.01)	0.019** (2.41)	0.018** (2.32)	-0.008 (-0.98)	-0.009 (-1.14)	-0.009 (-1.14)	0.008 (0.87)	0.007 (0.79)	0.006 (0.64)
Obs	1,619	1,619	1,619	1,534	1,534	1,534	1,619	1,619	1,619	1,534	1,534	1,534
Stability equation												
Stability t-1	-0.714*** (-50.03)			-0.213*** (-14.99)			-0.715*** (-50.26)			-0.222*** (-15.54)		
RH*Stability t-1		-0.807*** (-47.46)	-0.809*** (-47.42)		-0.119*** (-3.73)	-0.114*** (-3.56)		-0.808*** (-47.66)	-0.808*** (-47.66)		-0.122*** (-3.80)	-0.109*** (-3.38)
RL*Stability t-1		-0.510*** (-21.93)	-0.509*** (-21.89)		-0.229*** (-15.40)	-0.227*** (-15.27)		-0.510*** (-21.27)	-0.509*** (-21.92)		-0.238*** (-16.01)	-0.237*** (-15.94)
Δ Growth	-0.045 (-0.85)	-0.029 (-0.52)		-0.403*** (-9.36)	-0.396*** (-9.28)		-0.011 (-0.27)	-0.003 (-0.09)		-0.231*** (-6.80)	-0.226*** (-6.75)	
RH*ΔGrowth			0.063 (0.85)			-0.237*** (-3.07)			0.056 (1.07)			-0.090** (-2.12)
RL*ΔGrowth			-0.146* (-1.75)			-0.475*** (-8.91)			-0.140* (-1.77)			-0.448*** (-8.16)
EX	-0.002 (-0.11)	0.015 (0.60)	0.017 (0.70	-0.042** (-2.24)	-0.035* (-1.87)	-0.034* (-1.79)	-0.003 (-0.15)	0.014 (0.58)	0.017 (0.68)	-0.048** (-2.52)	-0.40** (-2.13)	-0.036* (-1.89)
RISK	-0.092** (-2.14)	-0.102** (-2.28)	-0.096** (-2.15)	0.130*** (3.99)	0.136*** (4.21)	0.137*** (4.25)	-0.091** (-2.12)	-0.101** (-2.27)	-0.096** (-2.15)	0.148*** (4.53)	0.154*** (4.76)	0.143*** (4.44)
ROA	0.061** (2.24)	0.03 (1.07)	0.034 (1.21)	-0.073*** (-4.31)	-0.089*** (-5.10)	-0.084*** (-4.74)	0.063** (2.34)	0.032 (1.14)	0.032 (1.15)	-0.073*** (-4.27)	-0.091*** (-5.12)	-0.098*** (-5.51)
EFF	-0.006 (-0.35)	-0.003 (-0.20)	-0.004 (-0.24)	0.048*** (3.82)	0.047*** (3.78)	0.046*** (3.66)	-0.006 (-0.36)	-0.003 (-0.21)	-0.002 (-0.16)	0.049*** (3.82)	0.048*** (3.78)	0.048*** (3.84)
COMP	-0.03** (-2.15)	-0.02 (-1.16)	-0.021 (-1.24)	0.012 (0.83)	0.017 (1.15)	0.017 (1.12)	-0.035** (-2.13)	-0.019 (-1.15)	-0.022 (-1.29)	0.004 (0.29)	0.009 (0.63)	0.007 (0.52)
Obs	1,612	1,612	1,612	1,513	1,513	1,513	1,612	1,612	1,612	1,513	1,513	1,513

This Table provide the results of the single estimations of both growth and stability equations using the Blundell-Bond approach. Z-statistics are shown in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

the Z-score, and a negative correlation with the observed changes in CDSs, since an higher excess capital reduces the spread between CDSs and senior bonds resulting in an higher stability. The ratio between risk-weighted assets and total assets shows a negative correlation with observed changes in stability, when it's proxied by the Z-score, whereas shows a positive one with CDSs spreads because higher riskiness widen this spread resulting in lower stability. Regarding the return on assets, its correlation with stability appears positive and statistically significant. Its coefficients are positive when related to the Z-score and negative when related to the CDS spreads, since a lower profitability widen the spread causing instability. The efficiency ratio suggest a negative relationship with stability in line with the predicted sign. Finally bank competition shows contrasting results coherently with the different positions held in literature on its impact on bank stability.

6 Robustness test

To test the reliability of our results, we further employ the three stage least squares (3SLS) methodology on our sample. It is an instrumental variable approach, widely used in this literature (Heid et al., 2004) to tackle endogeneity concerns stemming from simultaneous equation models, which uses a linear combination of all exogenous variables as instruments for the endogenous regressors. Combining all exogenous variables, the 3SLS uses all the information available to generate instruments therefore providing consistent and efficient estimates. The equations, consisting in four models each of them presenting the same specifications of the baseline study, are estimated separately. The results of the robustness check are presented in Table 5. Regarding the growth equation, observed changes in stability (Δ Stability) overall confirm the negative and statistically significant correlation with observed changes in growth. Moreover, specification III confirms the stronger relationship for high profitable banks. As per the baseline model, model (c), involving the Tobin Q and the Z-score as growth and stability proxy variable respectively, does not show statistically relevant results. The coefficients of the lagged dependent variable (Growth t-1) are negative and statistically significant. However, they show a slower move from the growth target compared to those of the baseline model. For specification I, the coefficients range between 8% and 12% on a quarter basis. When we interact the lagged dependent variable with the degree of profitability, the coefficients confirm the higher speed of low profitable banks in moving from the growth target. However, model (d), involving the Tobin Q and the CDSs as growth and stability proxy variables, shows a contrasting result. For specifications II and III, the coefficients range from 2% to 12% for high profitable banks and from 11% to 14% for low profitable banks. The control variables show quite the same results of the baseline model. Regarding the stability equation, observed changes in growth are negatively correlated with changes in stability. Moreover, the interaction with the degree of profitability confirms that this relationship is stronger for low profitable peers. However, the results are statistically significant only for two ((b) and (d)) out of four models. The lagged dependent variable (Stability t-1) shows statistically significant and negative coefficients which, as per the baseline model, differ in magnitude depending on the stability proxy variable. For specification I, models (a) and (c), which use the Z-score, indicate that banks move from the stability target of a 56% on a quarter basis. Models (b) and (d), employing the CDS spreads, show a lower speed of 14% on a quarter basis. For specifications II and III, after having interacted the lagged dependent variable with the degree of profitability, the results remain ambiguous with high profitable banks moving faster from the target in models (a) and (c) that use the Z-score as stability proxy variable, whereas, in models (b) and (d) involving the CDS spreads, low profitable banks are the fastest. Control variables show same results of principal model. Overall, the robustness test provides support to results of the baseline model.

Table 5
3SLS: Single equation estimations

	(a)			(b)			(c)			(d)		
	ΔPBV-ΔZS			ΔPBV-ΔCDS			ΔTQ-ΔZS			ΔTQ-ΔCDS		
	I	II	III	I	II	III	I	II	III	I	II	III
Growth equation												
Growth t-1	-0.081*** (-9.48)			-0.078*** (-8.35)			-0.112*** (-10.82)			-0.122*** (-9.93)		
RH*Growth t-1		-0.064*** (-5.91)	-0.065*** (-5.93)		-0.028** (-2.13)	-0.027** (-2.08)		-0.098*** (-7.58)	-0.098*** (-7.58)		-0.126*** (-7.37)	-0.125*** (-7.29)
RL*Growth t-1		-0.113*** (-7.10)	-0.113*** (-7.10)		-0.138*** (-9.43)	-0.139*** (-9.45)		.0.140*** (-7.32)	.0.140*** (-7.32)		-0.117*** (-6.24)	-0.117*** (-6.27)
Δ Stability	-0.019** (-2.59)	-0.019** (-2.52)		-0.088*** (-6.78)	-0.085*** (-6.58)		-0.015* (-1.73)	-0.015* (-1.67)		-0.076*** (-4.46)	-0.076*** (-4.46)	
RH*ΔStability			-0.022* (-2.43)			-0.112*** (-3.81)			-0.16 (1.51)			-0.123** (-3.17)
RL*ΔStability			-0.012 (-0.94)			-0.078*** (-5.46)			-0.11 (-0.75)			-0.064** (-3.42)
EX	0.026** (3.03)	0.025** (2.99)	0.025** (2.99)	0.026*** (3.40)	0.025*** (3.27)	0.025*** (3.24)	0.014 (1.35)	0.012 (1.18)	0.012 (1.18)	0.013 (1.32)	0.014 (1.35)	0.013 (1.31)
RISK	-0.011 (-1.35)	-0.011 (-1.44)	-0.011 (-1.46)	-0.0005 (-0.07)	-0.001 (-0.18)	-0.001 (-0.21)	-0.027** (-2.83)	-0.031** (-3.14)	-0.031** (-3.14)	-0.026** (-2.59)	-0.026** (-2.49)	-0.026** (-2.53)
ROA	-0.023* (-1.87)	-0.017 (-1.39)	-0.017 (-1.39)	-0.014* (-1.67)	-0.004 (-0.48)	-0.004 (-0.50)	0.004 (0.28)	0.009 (0.60)	0.009 (0.60)	-0.042*** (-3.61)	-0.042*** (-3.61)	-0.043*** (-3.65)
EFF	0.002 (0.29)	0.003 (0.45)	0.003 (0.45)	0.007 (1.05)	0.009 (1.37)	0.009 (1.36)	0.007 (0.78)	0.008 (0.83)	0.008 (0.83)	0.011 (1.26)	0.011 (1.24)	1.011 (1.23)
COMP	0.009 (1.25)	0.007 (1.01)	0.007 (1.01)	0.028*** (3.57)	0.022** (2.82)	0.022** (2.77)	0.007 (0.84)	0.006 (0.73)	0.006 (0.73)	0.025** (2.39)	0.025**(2.41)	0.024** (2.35)
Obs.	1,636	1,636	1,636	1,547	1,547	1,547	1,636	1,636	1,636	1,547	1,547	1,547
Stability equation												
Stability t-1	-0.562*** (-33.55)			-0.140*** (-10.42)			-0.562*** (-33.62)			-0.145*** (-10.75)		
RH*Stability t-1		-0.640*** (-31.88)	-0.641*** (-31.87)		0.01 (0.35)	0.011 (0.39)		-0.641*** (-31.93)	-0.641*** (-31.95)		0.009 (0.30)	0.013 (0.44)
RL*Stability t-1		-0.394*** (-13.37)	-0.394*** (-13.37)		0.177*** (-11.92)	0.176*** (-11.85)		-0.394*** (-13.39)	-0.394*** (-13.36)		-0.183*** (-12.27)	-0.183*** (-12.28)
Δ Growth	-0.036 (-0.60)	-0.038 (-0.65)		-0.305*** (-6.74)	-0.289*** (-6.43)		-0.01 (-0.22)	-0.015 (-0.32)		-0.171*** (-4.91)	-0.159*** (-4.61)	
RH*ΔGrowth			0.001 (0.02)			-0.241*** (-3.18)			0.014 (0.25)			-0.086** (-2.02)
RL*ΔGrowth			-0.085 (-0.99)			-0.316*** (-5.67)			-0.079 (-0.93)			-0.290*** (-5.08)
EX	0.040* (1.87)	0.053** (2.50)	0.054** (2.53)	-0.021 (-1.47)	-0.009 (-0.65)	-0.009 (-0.64)	0.039* (1.84)	0.052** (2.47)	0.053** (2.50)	-0.025* (-1.70)	-0.012 (-0.86)	-0.01 (-0.73)
RISK	-0.055** (-2.69)	-0.059** (-2.93)	-0.058** (-2.89)	0.045** (2.94)	0.052*** (3.42)	0.052*** (3.43)	-0.054** (-2.68)	-0.058** (-2.92)	-0.058** (-2.90)	0.045** (2.97)	0.052*** (3.45)	0.053*** (3.50)
ROA	0.089** (2.91)	0.056** (1.86)	0.058* (1.91)	-0.047** (-2.77)	-0.073*** (-4.16)	-0.072*** (-4.07)	0.091** (2.99)	0.058* (1.93)	0.059* (1.95)	-0.051** (-2.96)	-0.077*** (-4.35)	-0.080*** (-4.52)
EFF	-0.025 (-1.27)	-0.023 (-1.19)	-0.024 (-1.21)	0.018 (1.40)	0.016 (1.24)	0.016 (1.23)	-0.025 (-1.27)	-0.023 (-1.19)	-0.023 (-1.18)	0.018 (1.39)	0.016 (1.23)	0.015 (1.16)
COMP	-0.030* (-1.68)	-0.023 (-1.33)	-0.024 (-1.35)	0.018 (1.28)	0.028 (1.94)	0.028* (1.92)	-0.030* (-1.67)	-0.023 (-1.33)	-0.024 (-1.37)	0.014 (1.00)	0.024* (1.69)	0.023 (1.57)
Obs.	1,636	1,636	1,636	1,546	1,546	1,546	1,636	1,636	1,636	1,546	1,546	1,546

This Table provide the results of the single estimations of both growth and stability equations using the 3SLS approach. Z-statistics are shown in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

7 Discussion

Employing a panel of 39 large EU banks with quarterly data during the period 2005-2018, we investigate the role played by profitability in driving both growth and stability changes. As a first step, our results suggest a trade-off between growth and stability, in contrast with the joint interpretation of the franchise/charter value theory and capital buffer theory which suggest capital buffers as a mean for enhancing stability and safeguarding growth. In short, an higher capital buffer is able to both decreasing the risk of breaching the minimum requirement and preserving the value of growth opportunities. We argue that the method through which this result can be achieved may explain the reason why trying to seek stability trough an higher capital endowment could instead lead to a decrease in growth opportunities. Indeed, our findings suggest that a positive shock in stability may cause a stronger negative shock in growth for high profitable banks rather than their less profitable peers. According to the buffer view, banks with high market-to-book ratios, profits and dividends are more levered (Hoque and Pour, 2018) since they face lower costs of issuing equity at short notice (Gropp and Heider, 2010). However, following the tenets of the pecking order theory, equity financing is seen as a "last resort" operation, then those banks can improve the capital endowment through the following two ways: retaining profits or de-risking. Dividend-paying banks generally avoid retained earnings since cutting dividends could provide a bad signal to investors (Lintner, 1956). As a consequence, these banks are more likely to increase their capital endowment, namely the capital buffer that both avoid breaching the minimum requirement, via de-risking. According to the hypothesis of positive relation between bank risk and growth opportunities (Saunders and Wilson, 2001), de-risking means selling assets with a high risk-weight from which growth opportunities might derive a substantial amount of their value (Haq and Heaney, 2010). Hence, enhancing stability via de-risking might jeopardize the value of growth opportunities. On the other hand, the reduction of growth has a minor magnitude for less profitable banks since they have higher capital buffers protecting growth opportunities value, according to the buffer view, and are more likely to manage stability by engaging in Liability Management Exercises (LMEs), since the occurrence of such practices is negatively correlated with profitability (Lubberink and Renders, 2016). Moreover, our results suggest that a positive shock in growth leads to a stronger negative shock in stability for less profitable banks. The relationship between risk and growth opportunities helps shedding some light on this result. An higher value of growth opportunities, which is proper of high profitable banks, deters them from taking more risk, lowering their moral hazard (Jian, 2009). Even if these banks are less levered and their capital buffers are prone to breach the minimum capital requirement, the higher growth opportunities value represent too much value at stake for banks to be enticed into gambling. In short, growth opportunities are able to make gambling too risky to be employed (Kirti, 2017). Conversely, less profitable banks, characterized by higher capital buffers and low growth opportunities, could be enticed into gambling compared to their more profitable peers, investing in more risky tough positive net present value (NPV) assets to increase their growth opportunities. Our estimations regarding the speed of adjustment of growth and stability describe a general movement from the optimal values over the entire sample period. These results are consistent with the struggle faced by the EU banking system in addressing both growth expectations, with aggregate price-to-book values still below one, and stability requirements, which achievement is hampered by structural challenges like Non Performing Loans (NPLs) and operating inefficiencies (EBA, 2017). We find the speed of adjustment to depend on the profitability degree only for growth changes, with less profitable banks moving faster from the growth target than their more profitable peers. The explanation stems from market power as driver of performance persistence (Berger et al., 2000). Hence, high profitable banks, characterized by higher growth opportunities, are more likely to continue generating profits, boosting growth opportunities as present value of profits a bank is expected to earn on a going concern (Demsetz et al, 1996). With lower expectations about their profits, less profitable banks are more likely to be hampered in fulfilling their growth goals, resulting in an higher speed from the optimal value. Regarding stability, evidence suggests that banks which have been faster in complying with regulatory requirements have been able to increase more their lending volumes, market shares and attract cheaper funding compared to slower ones (EBA, 2015). This is in line with results of Jokipii and Milne (2011) that demonstrate that banks with low capital buffers, which are those with higher growth opportunities, profits and dividends according to the buffer view theory (Gropp and Heider, 2010), are faster in adjusting both capital and risk. However, we haven't been able to find profitability as driver of movement from the stability target. The relationship we outlined between changes in growth and stability has a topical policy implication. The directive "Art. 108 BRRD Directive" (EC, 2016) amending the Bank Recovery and Resolution Directive (BRRD) introduces a new asset class called non-preferred senior debt which is aimed at complying with the subordination requirement of Total Loss Absorbing Capacity (TLAC) and Minimum Requirement for own funds and Eligible Liabilities (MREL) standards and further reducing the legal risks stemming from the breach of the non-creditor-worse-off (NCWO) principle. The amendment provides a preferred way to address TLAC/MREL stability requirements. These requirements might have a material impact on profitability since, given the profitability struggle of EU banks, it could increase the costs of funding. As an instance, in November 2018 Unicredit has issued a 5-year Senior Non-Preferred Notes for a total amount of UDS 3.0 billion which costed a spread of 420 bps over the EUR 5-year Swap Rate. Moreover, given that these instruments are not eligible to own-funds, TLAC/MREL requirements could also have an indirect impact on Common Equity Tier 1 (CET1) capital. The following case provides an example on how such relationship might take place. TLAC/MREL requirements have an higher priority compared to macroprudential buffers, which means that the available CET1 is first employed for TLAC/MREL requirements than macroprudential buffers. If TLAC/MREL endowment reduces due to eligible debt expiry, the bank could wind up with a deficit of CET1, resulting not compliant with macroprudential buffers, and more generally with Pilar 2 requirements. Such case is addressed by the Banking Package which grants a grace period if the capital shortfall is due to senior non preferred market rigidities. However, if the cause of the shortfall is found to be the solvency deterioration, the grace period would not be allowed causing supervisory interventions. The material impact of senior non-preferred bonds on profitability and the existing chance of a capital shortfall following the implementation of TLAC/MREL requirements should catch the attention of regulators on the insights provided by this study on the relationship between stability and growth changes depending on the degree of banks' profitability. The banks whose access to the TLAC/MREL market is limited or costly are more likely to experience a capital shortfall (ECB, 2017). In this case, according to our results, those banks will lower their growth opportunities in their attempt to cope with capital requirements, with the magnitude of the reduction depending on profitability.

Further investigations

The evidence suggests banks with proper and credible capital buffers to be the ones which experienced the most growth in lending, even during the crisis (EBA, 2015). According to the buffer view theory, the banks which hold high levels of capital buffer are the less profitable and those which exhibit the lower value of growth opportunities. Moreover, we find low profitable banks to distance the most from the optimal growth target. Apparently, these results seem contradictory, since experiencing an higher growth in lending should not match with lower growth opportunities. However, we suggest future research to focus on the materialization of growth opportunities as phenomenon able to shed a light on these results.

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