An Estimation of Financial Cycle to Determine Counter Cyclical Capital Buffer[1]

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Abstract

The Basel III Countercyclical Capital Buffer framework has been designed to increase the resilience of the banking sector in periods of upturns in the financial cycle. The main idea is to control banking systems procycical properties which reiterates amplifies risk perception during both in times of distress and buoyant economic activity. Moreover, create a buffer to serve as a shock absorber during downturns. Basel Committee on Banking Supervision's this regulatory standard built itself on five principles where two of them is related to the estimation of financial cycle. In addition, according to this estimated cycle, a regulatory rule is to be introduced. This study describes the estimation of financial cycle to determine counter cyclical capital buffer for Turkey and tries to build on this methodology by proposing an alternative financial condition index.

JEL Classification: E30, E44, G10

Key Words: Financial cycle, Business Cycle, Financial Condition Index

1. Introduction

During the 2008 Global Financial Crisis (GFC), systemic risks were observed that led to broad economic distress, failure of financial institutions, and collapse of several financial systems and loss of financial stability in general. In response to these developments, a significant paradigm shift in international regulation and risk management is observed.

Thus with the recent Basel-III regulations, a structural micro prudential policy measure called counter cyclical capital buffer was developed. The counter cyclicality meant a counter movement along the economic cycle. This regulation is projected to be in full implementation by 2019, phasing in starting from 2016. The main goal is to mitigate systemic risk accumulation along the time domain by supporting or supplementing other prudential and economic policies via estimating the financial cycle. As this is a rather aggregated, blunt measure, countercyclical capital buffer could be quite useful in times where the source of systemic risk accumulation is vague. There is an abundance of evidence on excessive credit growth as a source of systemic risk accumulation. Therefore, credit cycles, which differentiate from economic fundamentals, lay the foundations for the countercyclical capital buffer.

The ultimate goal for the countercyclical capital buffer is to protect the banking system against an excessive credit growth and systemic risk accumulation stemming from this phenomenon. With this property, this initiative is supplementary to the conservation buffer. When the credit growth is modest or at acceptable levels, the countercyclical buffer is to set at zero. In addition, according to the degree of overshooting the preset thresholds of credit growth, an additional capital buffer up to a maximum of 2.5% of risk-weighted assets is applied.

Nevertheless, this macro prudential tool or policy option also comes with a cost. The counter cyclical capital buffer poses a considerable cost on bank capital. Thus, it has to be implemented when the systemic risk accumulation over the time domain can be significantly and positively identified, and relaxed during times of diminished risks, converging to an optimal usage of bank capital, while considering other prudential measures. Given this reality, it is critical for regulatory authorities to estimate the financial cycle and cyclicality correctly and augment (supplement) this with other relevant quantitative and qualitative data/indicators.

In this study, a framework to estimate the financial cycle for countercyclical capital buffer regulation for the Turkish banking system is explained.

2. Methodology
a. Indicators to Monitor Cyclicality

With the GFC, the notion of systemic risk has fully developed, and indicators to monitor the financial cycle gained importance.

The Basel Committee places the credit variable at the center of its proposed fundamental framework of countercyclical capital buffer. The Basel Committee takes the credit-to-GDP definition as a common reference (see BIS, 2010). Moreover, in the literature and the international application it's seen that other supplementary indicators are frequently used. Looking at these set of indicators, asset price indicators, household income and debt indicators are most widely recognized (IMF, 2006). Additionally, indicators of overall economic activity, banking sector performance and indicators of funding cost, and financial stress indexes are found to be utilized by regulatory authorities (Drehmann et.al, 2010; Sandhal et. al, 2011).

Hence, during the decision process of turning the countercyclical capital buffer on or off, the consistency (or robustness) of other supplementary indicators need to be considered alongside the common reference of credit-to-GDP. For this purpose, indicators such as asset prices, funding spreads / CDs spreads, real GDP growth, household balance sheet indicators, and non-financial corporate sectors debt service capacity need to be regarded carefully. Ultimately, the authority needs to cover all economic units' balance sheet structure to infer the position of the banking system within the financial cycle.

Regarding the Turkish experience on the estimation of the financial cycle, Yayla, Sakarya ve Savran (2014) have concluded that the financial cycle highly imitates the economic cycle in Turkey. Thus, business cycle analysis in Turkey is a strong substitute in this regard. In that study, many indicators and variables are tested for cycle estimation, and it's inferred that the common reference variable (credit-to-GDP) also provides a rather good estimation for business cyles in Turkey. Sector specific data such as household disposable income and debt, could not reflect the characteristics of the financial cycle. Moreover, asset price indicators such as real estate prices could not also provide satisfactory results mainly due to lack of historical data and due to constantly improving data coverage and quality.

In this study however, the common reference indicator which is credit-to-GDP, is augmented with other indicators--namely asset prices, overall economic activity and banking sector performance indicators--to provide a broader assessment of the financial cycle to help define countercyclical capital buffer thresholds for regulatory purposes.

b. Credit Gap

The common reference definition of credit-to-GDP is used in estimating the credit gap as proposed by BIS (2010). The notion of credit gap indicates deviations from the long run trend of the credit-to-GDP ratio. The term "credit" is critical. How this variable is defined may actually affect the credit gap. Also, this definition should reflect the lending activity which is most closely linked to financial market conditions and market induced financial intermediation. Thus, the definition of credit or the credit volume should be an extensive definition encompassing all lending activity, which is utilized by non-financial sector, excluding the public (state) loans.

Figure 1: Financial Depth and Intermediation
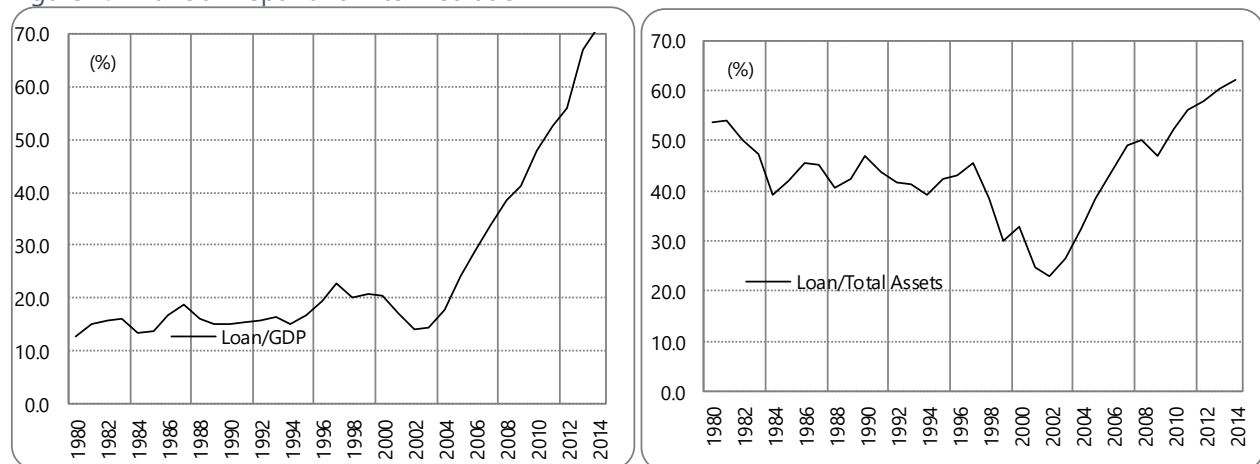
Source: BRSA, TBA, TSI, 2017.

Looking over a longer time horizon might make it quite difficult to identify a long-term trend for loans in Turkey. Especially considering the structural transformation of the Turkish economy and the banking system in particular, as well as the domestic and global crises experiences along this period, makes is rather difficult to estimate a long-term trend and hence deviations from it.

The Basel Committee suggests the use of the Hodrick-Prescott (HP) filter in identifying and decomposing the trend and the cyclical components from the common reference indicator. The HP-Filter is suggested as it is easy, quick to implement, and has become like a "standard" tool for this type of analysis.

While using the HP-filter, the choice of lambda (λ) is important. The Basel Committee proposes setting the lambda to 400,000, rather than 1,600 as originally suggested by Hodrick and Prescott (1980, 1997). The related literature clearly and commonly uses 1,600 as lambda for quarterly data. However, for financial cycle which is assumed (and for advanced economies observed) to have a longer cycle duration from peak to peak (or trough to trough), Drehmann et.al (2010), Drehmann & Juselius (2012) and Borio (2012) suggest the use of 400,000 due to the long-term trends in private borrowing. Hence, the Basel Committee suggests the use of 400,000 for member regulatory authorities.

One other important issue to consider is the Turkish Banking Sectors structural transformation and reform following the domestic financial crises of November 2000 and February 2001. Thus, while identifying long term trends, different samples and coverage for credit definitions are utilized. The results show robust structure. For credit series, as the Basel Committee requires, the most extensive definition, which best reflects the risk accumulation, is used in credit definition and in calculations. The series include banks, Islamic banks (participation banks), non-bank financial institutions and non-financial private sectors foreign borrowing. For GDP, a quarterly annualized series is used (BRSA; 2017, CBRT, 2017).[4]

The long-term trends for credit in the Turkish financial system does not display much sensitivity to the choice of the lambda. Moreover, given the structure of the Turkish financial system, the extent of the credit definition is also not very sensitive. As the Turkish financial system is dominated by banks (almost 85% of the financial system is comprised of banks), the bank loan portfolio to GDP reflects the credit-to-GDP and credit gap variables (as of current economic and financial structure). The credit-to-GDP and credit gap calculated by broad credit definition are shown in Figure 2.
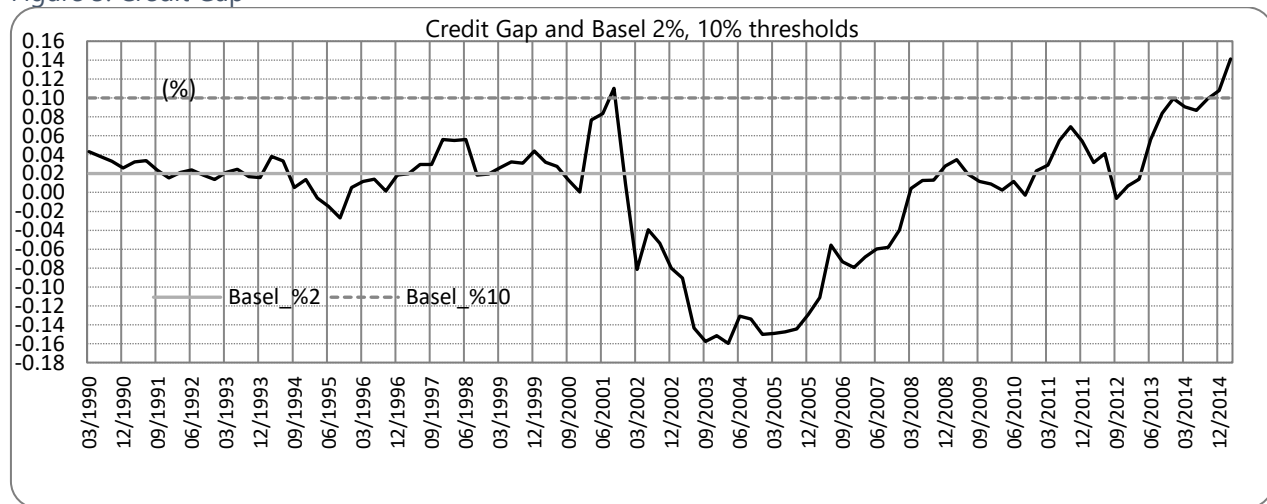
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[4] Data from BRSA and CBRT

Figure 2: Credit to GDP and Credit Gap
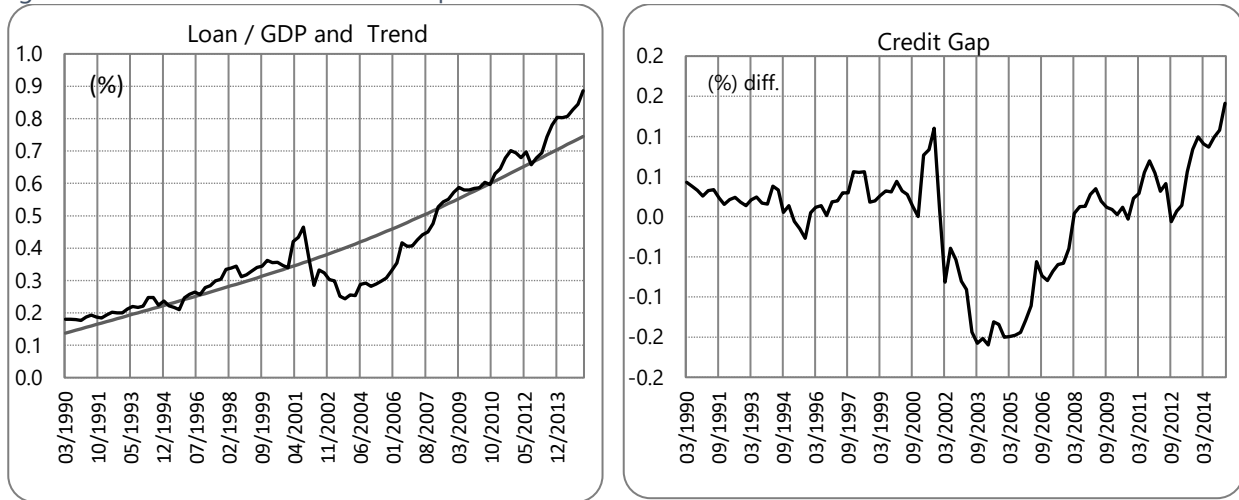
Source: Own calculations.

Figure 3: Credit Gap

Source: Own calculations.

c. Supplementary Variables

BIS(2010) clearly supports the use of supplementary indicators and variables in the estimation of the financial

cycle to minimize the detection problems by using the credit gap definition. As stated earlier both financial

soundness literature and systemic risk literature point out asset prices, funding spreads, lending conditions and surveys, indicators of economic activity and banking sector performance (and profitability which would support bank capital) are considered as the main supporting set of variables (see BIS, 2010 and Gerdrup et. al, 2013).

International experience mainly focused on real estate and housing market price developments regarding the asset price movements. Another field is the household indebtedness. The global financial crisis stemming from the housing market due to mismanagement and pricing of risks, , led the advanced economies to focus more on the housing market developments. . Thus, promoting these indicators in macroprudential supervisory activities is crucial. However, Turkey, an emerging (or developing) economy, faces data availability and quality issues concerning these fields. So, it is assessed that the house price indices are not yet adequate to include in financial cycle estimation (Yayla, Sakarya ve Savran, 2014). As an alternative, the BIST 100 Index stands out as a broader asset price indicator for the Turkish economy. In addition to that, GDP growth and banking sector return on equity are chosen as supporting (supplementary) indicators.

i. Cyclical Analysis of Stock Prices

Asset prices are profoundly affected by economic policy decisions and expectations. In this regard, the Turkish stock market is highly responsive to international capital flows, global and domestic liquidity conditions, credit policies and overall market sentiment, and expectations. The BIST100 Index starting from the first quarter of 1988, and real BIST100 Index (BIST100Index deflated by CPI) are HP-filtered as credit to GDP series.

Filtered Real BIST100Index results display strong coincidence with past financial crises (which is a main property for financial cycles, according to Borio (2012), and Drehmann & Juselius (2012). Moreover, the overall fluctuations are consistent with general economic intuition and sentiment.

Table 4: Reel BIST100 Series, Cyclical Component and Frequency Distribution
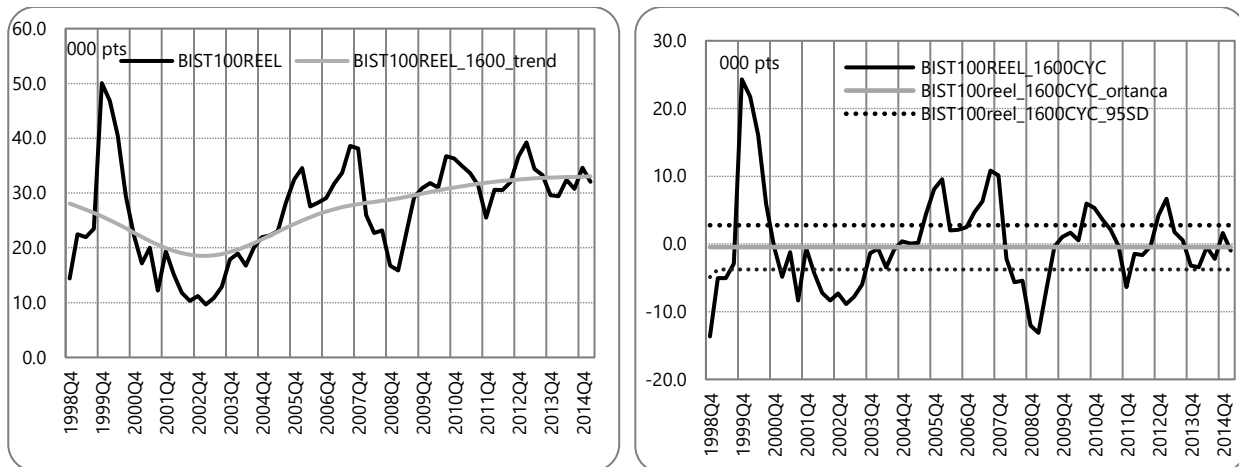
Source: Bloomberg (2015) and own calculations.

ii. GDP Growth

The GDP cycle is estimated using the BBQ algorithm of Bry-Boschan (1971) as cited in the "Estimating Optimal Hodrick-Prescott Filter Smoothing Parameter for Turkey" (2011)study. This algorithm identifies peak and trough points, and estimates an average cycle duration (or length). According to this methodology, the average cycle in Turkey is about 10 quarters from peak to peak and 11 quarters from trough to trough. This average duration of 11 quarters for a cycle is around 2.5-3 years. Thus, the moving average length is set accordingly.

To test whether the GDP cycle and the credit gap cycle coincides, a threshold is set for GDP cycle. This is set as the median GDP growth, rather than the average. If GDP growth falls under the median growth rate, the economic activity does not support the possible credit growth. Given that this median growth rate is 5%, current GDP growth rate falls under the threshold. For example, credit cycle's assessment with the GDP cycle provide a different result for 2015. If it was just a single indicator of the credit gap, the result would introduce an additional capital cost for the banking system, while the lackluster growth performance indicates otherwise. Hence, according to BBQ methodology, following a minor trough, economy does not peak but lingers around that course, which would eventually be reflected in credit growth as well (as it actually did in 2016).

Figure 5: GDP Growth's 11 Quarter Moving Average
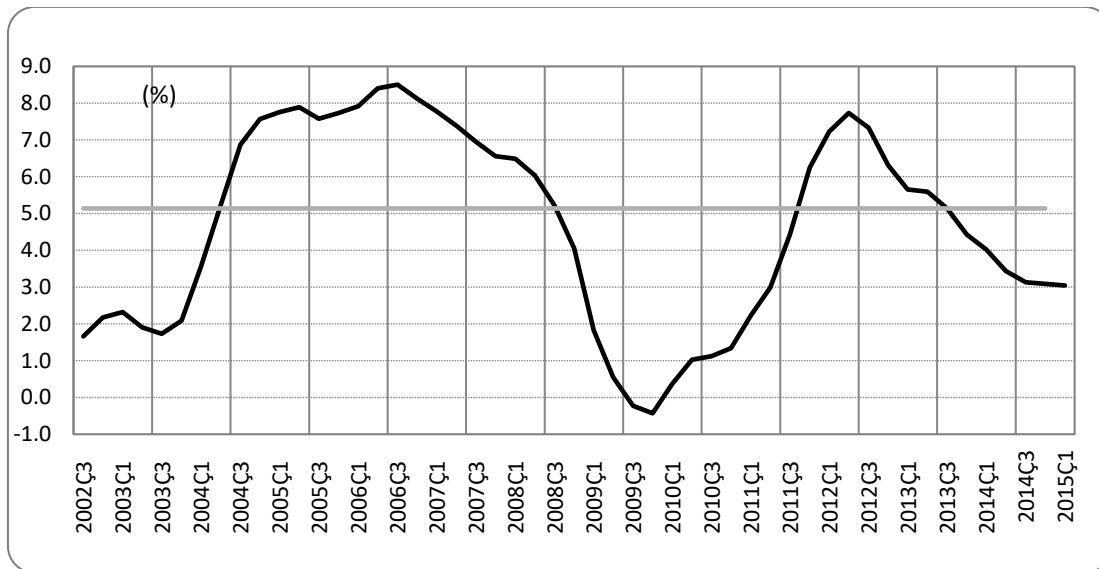
Source: TSI and own calculations.

iii. Banking Sector Performance

Another aspect of the financial cycle is the banking sector performance that works pro cyclically with the credit cycle. There is a strong positive correlation with the profitability of the sector and the lending behavior. Setting aside a capital buffer when banking sector profitability is high, and exhausting the buffer during the less profitable (or loss generating) period would positively contribute to the banking systems soundness. Hence, a fundamental banking performance ratio, return on equity is chosen as a supplementary indicator to the common reference indicator.

Quarterly annualized return on equity ratios compiled from BRSA data (which is also compatible with the IMF Financial Indicators Compilation Guide (2006)), does not have any trend component. And since it's derived from income statements on annualized data, seasonality issues are also not present. Thus, it is possible to use raw ratio. One important issue regarding the profitability ratios is the data provide a more comparable sample only after the 2001 domestic banking crisis and the restructuring of 2002. Thus, data starting from year end 2002 is used. Banking sectors profitability ratios and ROE in particular exhibited underperformance since 2011 and more so since 2014. This also supports the inference from the economic activity indicator. The ROE is close to its lowest 5% percentile in its historical frequency distribution.

Figure 6: Banking Sector Return on Equity and Frequency Distribution
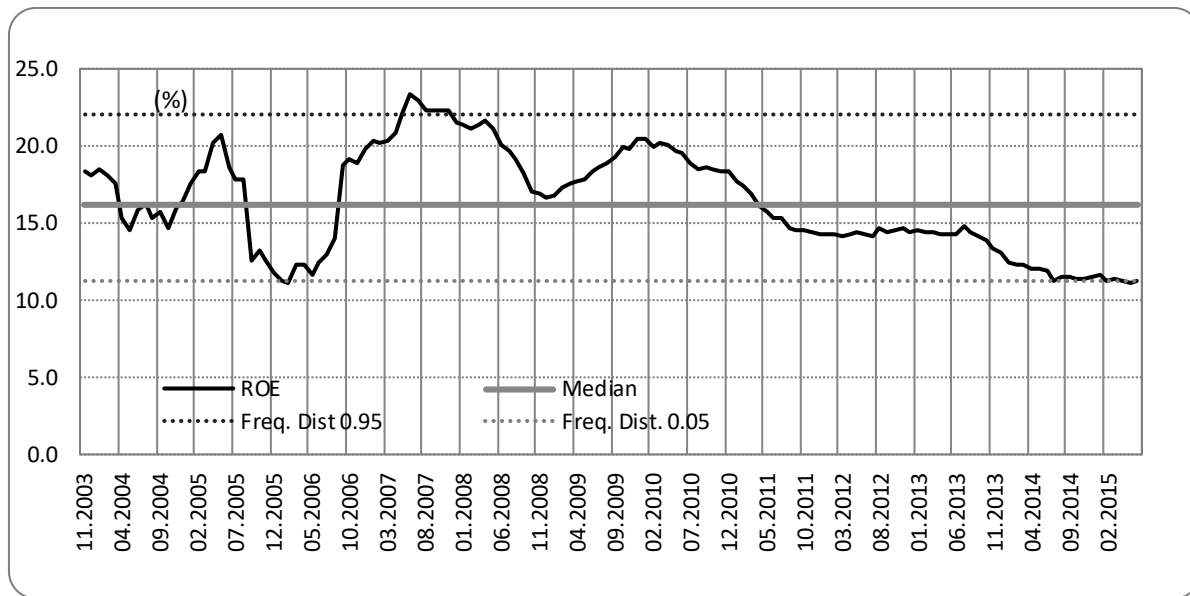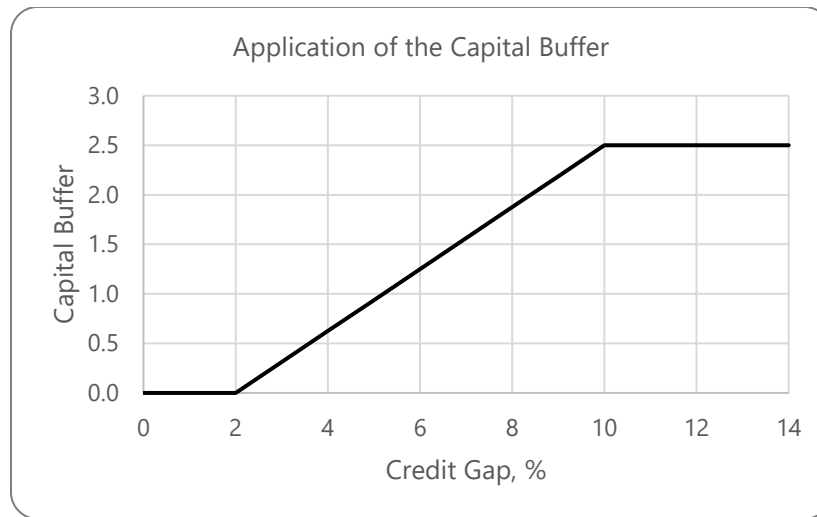
Source: BRSA and own calculations.

d. A Proposed Rule for Setting Counter Cyclical Buffer

As a reference, the Basel Committee credit-to-GDP gap (credit gap) should exceed 2% and 10% thresholds to introduce Basel III capital buffer. According to this, banks will not set aside additional capital buffer, if the credit gap is under 2%. When the credit gap exceeds the 2% threshold, the capital buffer will be enforced, up to the second threshold level of 10%. If that level is also breeched, the capital buffer will be 2.5%.

In accordance with the Basel guide, it's also suggested for Turkey to initially asses the common reference indicator, followed by the supplementary indicators and providing supporting evidence/inference, the below calculation is proposed for the sub-regulation.

$$Capital\ Buffer = Min(2.5\% \ x \ \frac{Max(CreditGap - 2.0\%)}{10.0\% - 2.0\%2}, 2.5\%) \tag{1}$$

Figure 7: Credit Gap – Capital Buffer Relation

Source: BRSA and own calculations.

When the historical capital buffer is calculated according to the proposed formula, a rise in systemic risk accumulation is observed in 2001, 2011 mid-year and 2013 year-end. Thus, importance of supporting indicators is once again evident for this methodology.

Figure 8: Historical Calculated Capital Buffer Need
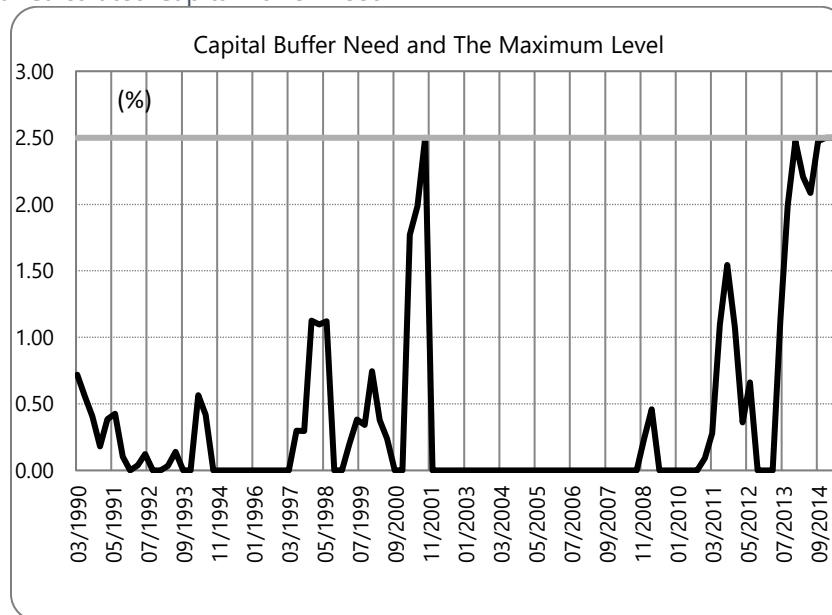
Source: BRSA and own calculations.

However, it is also critical to set clear working rules for these supporting indicators. This is benefical for both the regulatory authority and for the market participants. A rule based system would definetly add to market transparency. Moreover, for the Turkish financial cycle, economic activity weigh quite heavily,so it needs to be prioritized. Considering at least three quarters of the 11 quarter moving average growth trend would provide a relatively robust assesment in acquiring supporting evidence of excessive credit growth.

From other supporting indicators, banking profitablity is prosed to be on the supporting side of rapid credit growth if it reaches above its lower 25% percentile. For example, in the Turkish banking case, recent banking profitability ratios do not indicate implemantation of a counter cyclical capital buffer.

Asset price indicator proxy Real BIST100Index provides mixed results following the 2013 period. While in 2015, this variable indicates implementation of a capital buffer, and in 2016 the finding changes direction.

3. Banking Sector Performance Index and Financial Stress Index

Drehmann & Juselius (2012) and Borio (2012) point out that financial crisis are all markers for financial cycles. Thus, crisis indicate the troughs. However, while identifying financial crisis once they have occurred is easy, it is quite difficult to coin every fluctuation as a crisis, or it would be redundant to wait for the moment when all participants declare a presence of a financial crisis. For these purposes, we have calculated two commonly used composite indicators. First, one is a CAMEL based banking sector performance index with sub blocks of capital, asset quality, funding, and earnings. Each block has financial indicators and each has equal weight. Below, Figure 9 displays the calculated composite index starting from year-end 2002 for the Turkish banking sector.

Figure 9: Banking Sector Composite Performance Index
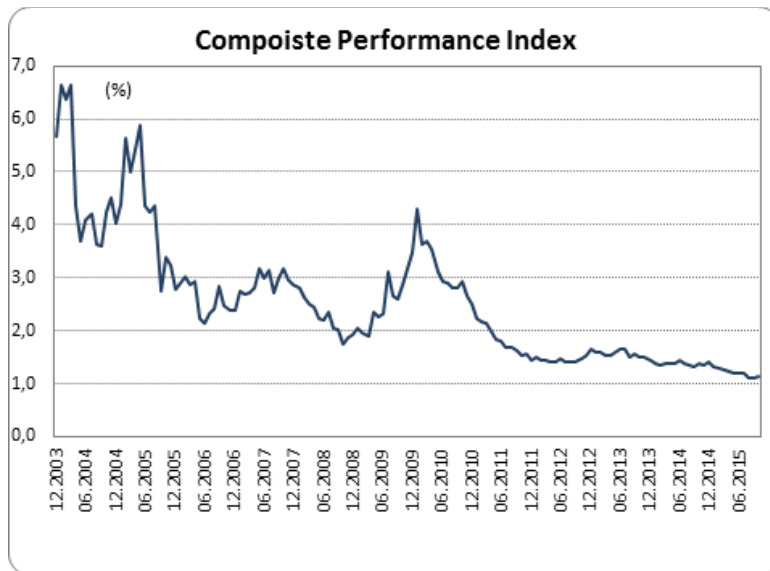
Source: BRSA and own calculations.

This Figure also indicates an increase in banking activity by 2010, losing momentum since 2011, but does not register a hike in 2013.

Another frequently used tool is the financial stress index that combines the exchange rate market, equity market, and funding and credit market into a single stress indicator again with equal weights. This index shows mixed results regarding the credit cycle. However, since 2011 this index shows an increase in the second half of 2013, which is consistent with the common reference indicator.

Figure 10: Financial Stress Index
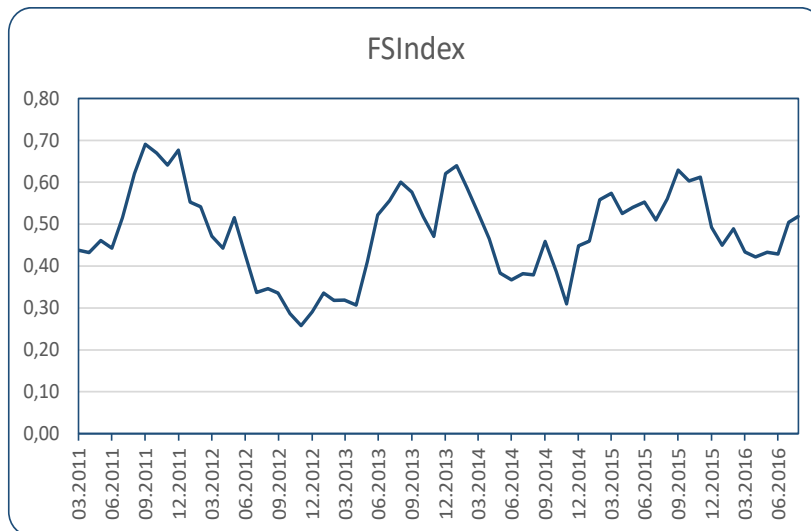
Source: BRSA, CBRT and own calculations.

4. Concluding Remarks

When implementing the counter cyclical capital buffer its is benefical to follow a clear and simple methodology. The Basel Committee common reference proposal does that. However, it is also evident that we need to address financial cycle issues specific to domestic economic and financial properties. Moreover, it needs to be augmented with other indicators.

Additionally, it is also critical to include qualitative information gained from supervisory and enforcement experiences to this process. It is apparent from the GFC that this would contribute to the financial soundness considerably.

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