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Türkiye'de İş Çevrimi Değişkenliği

Business Cycle Volatility in Turkey

Pınar Fulya Gebeşoğlu,[*a]

[a] Uzman, Hazine ve Maliye Bakanlığı, Sigortacılık Genel Müdürlüğü, Ankara/Türkiye.
ORCID: 0000-0002-3698-4457

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ÖZ

Bu çalışmada Türkiye'de iş çevrimlerinin değişkenliği ile cari açık dengesi, finansal sermaye akımları, ticaret haddi ve para arzı değişkenliği arasındaki uzun vadeli dinamik ilişkiler incelenmektedir. Belirlenen değişkenlerin değişkenlikleri ARCH ve GARCH tipi süreçler ile elde edilmiştir. 1998Ç1:2018Ç4 dönemini kapsayan ARDL modeli seçilen değişkenler arasında eş bütünleşme ilişkisi tespit edilmiştir. Uzun vadeli dengeden sapmalarda gözlenen dinamik düzeltme hareketini gözlemlemek üzere Vektör Hata Düzeltme Modelinden faydalanılmış ve modelin uzun vadede istikrarlı olduğu gözlenmiştir. Türkiye'de iş çevrimi değişkenliğinin finansal sermaye akımlarındaki hareketlerin yanı sıra dış ticaret hadlerinde ve para arzında gözlenen değişkenlik ile açıklanabileceği sonucuna varılmaktadır.

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ABSTRACT

This study investigates the long-term dynamic relation among the volatility of the business cycles in Turkey and the the current account balance, financial capital flows, terms of trade and money supply volatility. The volatilities of the designated variables are derived by employing ARCH/ GARCH type processes. The ARDL model covering the period 1998Q1:2018Q4 indicates that there is cointegration among the volatilities of the selected variables. The VECM model is formed to investigate dynamic correcting movement in deviations from long-run equilibrium. It is concluded that the volatility of business cycles in Turkey can be explained by the fluctuations in financial capital flows as well as volatilities observed in terms of trade and money supply in the long run.

1. Introduction

Being a multi-dimensional phenomenon of the last few decades the globalization raised much controversion with respect to its macroeconomic effects. The views span a broad spectrum of conflicting views with the advocates praising the benefits of globalization at the one end whereas the opponents proclaim that globalization has produced undeniable negative consequences such as income inequality, macroeconomic volatility, increase in frequency and severity of financial crises on the other end. The effect of increased integration in both goods and capital markets on business cycle volatility is rather an empirical issue and hence the results are often inconclusive varying with respect to the specific country dynamics and time periods analyzed.

* Sorumlu yazar/*Corresponding author*.
e-posta: ozorhanfulya@gmail.com

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Deregulation of financial markets to ease the flow of capital across borders has adverse implications especially for emerging and developing economies with premature capital markets that are mostly dependent on foreign capital inflows for financing growth. Turkey, with historically high current account deficit to GDP ratios has been dependent on a model of borrowing to stimulate growth. Yet the long-term average growth ratio of Turkey since the liberalization of goods and financial markets has been steady whereas the macroeconomic volatility measured in terms of standard deviations of growth of GDP has increased considerably.

Vulnerability to foreign capital inflows and financial speculation exposes emerging and developing countries to increased risk of volatility. Hence identifying the effect of fluctuations in financial capital flows on business cycle volatility is crucial in exploring the effects of globalization on emerging and developing economies.

The gradual liberalization process has begun in 1980s in Turkey. Following the liberalization of foreign trade, capital maket liberalization in 1989 accelerated the integration to the international financial markets. Having attracted remarkably abundant short term portfolio investments at global financial liquidity periods, sudden stops triggered by either a global financial turmoil or adverse developments specific to emerging markets have proved to be a major source of volatility in the Turkish economy since the 1990s. For instance Arshad et. al. (2014) analyze the volatility in Istanbul Stock Exchange between 2000 and 2013 and conclude that the contagion effect intensifies in case of global downturns pointing to the effect of financial integration on volatility in Turkey.

This paper examines the existence of a long-term association among the fluctuations in current account and financial account and business cycle volatility in Turkey between the period 1998Q1:2018Q4. The volatilities of the business cycle, terms of trade and ratio of M2 to GDP are derived by employing ARCH (autoregressive conditional heteroscedasticity) and GARCH (generalized autoregressive conditional heteroskedasticity) type processes proposed by Hamilton et. al. (1994). The ARDL model is established to explore if cointegration exists among the selected variables. Dynamic comovement of deviations from the long run equilibrium is analyzed by making use of the VECM model that is found to be stable in the long run.

Following the introduction a brief literature review is included. Then the data, methodology and the empirical results are displayed and the study is concluded.

2. Literature

Integration induced by globalization has two main economic dimensions such as integration in goods markets and financial markets. The economic theory is rather ambiguous on its predictions of the effects of trade and international financial integration on cyclicality. In theoretical analysis macroeconomic volatility is often segregated as output, consumption and investment volatility and the effects of trade integration on volatility are argued to vary with respect to the types of shocks experienced and the trade specialization properties observed in different countries.

Razin et. al. (1992) test the predictions of economic theory with respect to the effects of integration in goods and capital markets on output volatility by employing a panel data set of 138 countries between 1950-1988 yet their empirical results suggest no correlation between the volatility of investment, consumption or output and the level of capital and goods mobility.

Denizer et al. (2000) detect a counter association among financial sector advancement and magnitude of macroeconomic cycles in the long-run. Buch et. al. (2002) conduct a panel data study and detect no consistent link between output volatility and openness but emphasize that the link between the two may be affected by the observed shock and also explain the missing link by parameter instability over time. Tiryaki (2003) distinguishes between the short and long term and argues that the link indicating lower volatility by financial sector development is rather indefinite in the short term.

Köse et. al. (2003), investigate the association among macroeconomic volatility and integration in international financial markets in a large set of countries and report increased volatility for consumption with increasing financial integration up to a certain threshold. The authors argue that the relationship between macroeconomic volatility and international financial integration is rather a complex one and it cannot be easily inferred that increasing financial integration increases volatility in emerging economies but instead the role of fiscal and monetary policies and the integration level do matter (Kose et. al. 2003).

Kaminsky et. al. (2004) argue that capital flows tend to exacerbate the business cycle especially in emerging and developing economies as they call it ‘‘when-it-rains-it pours syndrome’’. Loayza et. al. (2006) highlight that increased financial openness in countries with comparatively less developed financial markets intensify the impact of financial shocks. Tharavanij (2007) employs panel data estimation techniques for 44 countries between the period 1975-2004 and conclude that more developed capital markets exhibit lower business cycle volatility.

Alper (2000) argues that net short-term capital flows are weakly procyclical and lead the cycle by one quarter in Turkey and gross long-term capital inflows are strongly procyclical and lead the cycle by one quarter. Alp et. al. (2012) indicate that the business cycles in Turkey are highly volatile as expected to be in developing countries but argue that the volatility observed significantly declines post 2001 period owing much to policy reforms. Hence the macroeconomic volatility observed following trade and capital account liberalization in Turkey may not necessarily infer causality but simply indicate inadequate set of policy tools to cope with prematurely accelerated liberalization.

3. Data and Methodology

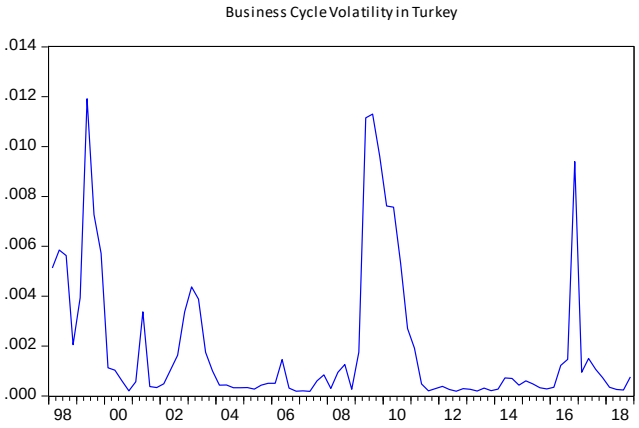
Quarterly data between the period 1998 and 2018 is used. Gross domestic product (Thousand TL)- level GDP by Expenditure Approach-Current Prices (TURKSTAT)(TRY Thousand) is obtained from electronic data delivery system (EVDS) of the Central Bank.

Current account balance, financial account which is the total of direct investments, portfolio investments, other investments and reserve assets all in million USD are taken from the Central Bank. The ratio of current account balance

to GDP denoted as cad and the financial account data denoted as fa is used in levels.

The logarithm of GDP series is taken and then deseasonalized by using Census X-12 Seasonal Adjustment function in E-views. Business cycle component is estimated by using Hodrick- Prescott filter (Hodrick and Prescott, 1997). The volatility of the business cycle denoted as volbc is derived by employing GARCH (1,1) model selected according to model selection criteria and forecast performance (Hamilton et. al. 1994). Graph 1 shows business cycle volatility in the Turkish economy since 1998. The business cycle volatility peaks at times of economic crises often with a quarter lag as expected. A comparably extended period of high volatility is observed during the global financial crises of 2008-2009 which indicates an amplified contagion effect.

Graph 1. Business Cycle Volatility in Turkey



Source: Author's calculation.

Quarterly terms of trade data in USD is obtained from Turkish Statistics Institute Database (https://biruni.tuik.gov.tr/medas/?kn=62&locale=tr). The volatility of terms of trade indicated as voltot is derived by using the ARCH(1,0) model.

Quarterly M2 Money supply data is obtained from EVDS of the Central Bank. The ratio of M2 to GDP is deseasonalized using Census X-12 Seasonal Adjustment function in E-views. The volatility of the ratio of M2 to GDP indicated as volm2gdp is derived by using the ARCH (1,0) model.

The ARDL model is formed for the period 1998Q1:2018Q4. The ARDL bounds test is conducted to check for cointegration.

4. Results

The analysis is based on the general empirical model:

volbc = f (cad, fa, voltot, volm2gdp)

As a first step stationarity properties of the series are checked to ensure that the ARDL model is applicable for the designated variables. Augmented Dickey Fuller (1979) test results are displayed in Table 1.

Table 1. Augmented Dickey Fuller Unit Root Test Results

Series	Level p value		First Difference p value	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
volbc	0.0037*	0.0164	0	0
cad	0.0995	0.264	0.0012*	0.0055*
fa	0.1549	0.5055	0.0000*	0.0000*
voltot	0.0325*	0.1326	0.0000*	0.0000*
volm2gdp	0.5096	0.9321	0.0000*	0.0000*

*indicates significance at %1

Using the ARDL model in the form of (1) co-integration among variables is tested.

$$\Delta \text{volbc}_t = \alpha + \sum_{i=1}^{p} \text{bi}\, \Delta\, \text{volbc}_{t-1} + \sum_{i=0}^{q} \text{bi}\, \Delta \text{volcad}_{t-1} + \sum_{i=0}^{q} \text{bi}\, \Delta\, \text{volfa}_{t-1} + \sum_{i=0}^{q} \text{bi}\, \Delta \text{voltot}_{t-1} + \sum_{i=0}^{q} \text{bi}\, \Delta \text{volm2gdp}_{t-1} + \delta 1\, \text{volbc}_{t-1} + \delta 2\, \text{volcad}_{t-1} + \delta 3\, \text{volfat}_{t-1} + \delta 4\, \text{voltot}_{t-1} + \delta 5\, \text{volm2gdp}_{t-1} \quad (1)$$

The optimal lag structure is chosen based on the Akaike Information Criterion by comparing lag legth criteria. According to the Bounds test result displayed in Table 2 it is concluded that co-integration exists among the indicators analyzed.

Table 2. Bounds Test Result for Cointegration

Dependent Variable (volbc)	F-Statistic	99 % Lower Bound	95% Upper Bound	Outcome
ARDL (1,2,0,0,0)	4. 4491	3.29	4.37	Cointegration

The estimated long term coefficients and error correction coefficients for the ARDL (1,2,0,0,0) model are displayed in Table 3.

Table 3. Estimated Long Term and Error Correction Coefficients

Estimated Long Term Coefficients (Dependent Variable: volbc)

Variables	Coefficient	T Statistics
cad	-0.0359	-1.365974
fa	0.0001	3.626041*
voltot	0.0028	3.782360*
volm2gdp	-0.3183	-3.208452*
c	0. 5496	3.959827*

Error Correction Coefficient (Dependent Variable: volbc)

Variables	Coefficient	T Statistics
Ect	-0.402407	- 5.182036*

Diagnostic Checking

F_{BG}	0.145232 [0.8481]
JB_{NORM}	97.48290 [0.0000]
F_{WHITE}	2.026529 [0.0676]
F_{RAMSEY}	1.375353 [0.2447]

Notes: * indicates %1 significance level.

Ect denotes error correction term.

F_{BG}, JB_{NORM}, F_{WHITE} F_{RAMSEY} indicates autocorrelation, normality, heteroskedasticity and Ramsey reset tests.

The estimated long term coefficients of the ARDL model indicates that the financial capital flows, volatility of terms of trade and volatility of the ratio of M2 money supply to GDP are significant in explaining the business cycle volatility in Turkey in the long term. Since the empirical evidence proved that a significant co-integrating relationship exists between the variables the VECM is established. The error correction term of the VECM is consistent with the error correction term obtained from the ARDL model. The speed of adjustment which is significant at %1 as expected indicates that approximately %40 of the departures from the long run equilibrium is corrected each period.

5. Conclusion

Globalization is often charged with increasing business cycle volatility (Buch et. al. 2002). Especially premature capital account liberalization is expected to increase volatility of business cycles due to unstable foreign capital inflows in emerging and developing economies. Therefore the paper aimed to explore the relation among the business cycle volatility in Turkey and indicators of openness such as the ratio of the current account deficit to GDP and financial capital flows. Volatility of terms of trade and volatility in broad based money supply M2 are included as control variablas in line with the empirical literature (Mendoza 1995, Kose 2002, Kose et. al. 2004, Andrews et. al. 2009). The ARDL model is established to investigate the existence of a long term association among the selected variables and the Bounds test indicated a long term cointegrating relationship. The estimated long term coefficients of the selected ARDL(1,2,0,0,0) model reveal that the capital account flows and fluctuations in terms of trade and the ratio of M2 to GDP are empirically significant in explaining the business cycle volatility in Turkey in the long term. Olani (2018), argues that capital controls targeting short term, volatile and speculative foreign portfolio investments increase output level and decrease output volatility. Precautions to be taken by the policy makers to smoothe the business cycle volatility are beyond the scope of this paper. However prospective research focusing on the relation between imposing controls on short term international capital flows in the form of portfolio transfers and business cycle volatility in emerging and developing economies may contribute to the literature.

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