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Review of Radical Political Economics 2014 46: 509 originally published online 1 July 2014

DOI: 10.1177/0486613414537993

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Review of Radical Political Economics
2014, Vol. 46(4) 509–516
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Political Economics
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DOI: 10.1177/0486613414537993
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Özgür Orhangazi¹

Abstract

Literature on capital flows identifies various channels through which capital inflows could create financial fragility and economic instability in “developing and emerging economies.” Domestic credit expansion is one such channel. Capital inflows can lead to rapid expansion of domestic credit, even create credit bubbles, and thus result in an increased fragility of the economy. I analyze the link between private capital inflows and bank credit to the private sector in the case of Turkey between 2003 and 2013 and ask whether surges in private capital inflows accelerate growth of credit. I employ a logit model to investigate the link between capital inflows and periods of rapid credit expansion. The findings suggest that net private capital inflows, after controlling for other determinants of credit, are positively correlated with periods of rapid credit expansion.

JEL classifications: E32, E44, E51, F3, G21

Keywords

capital flows, credit booms, credit expansions, Turkey

I. Introduction

Capital account liberalization in “developing and emerging economies” (DEEs) was followed by waves of private capital inflows. Mainstream theory suggested that capital inflows would be beneficial for DEEs, as they would contribute new sources to capital accumulation and stimulate economic growth. Furthermore, by contributing to the integration of domestic financial systems with the international financial markets, it would increase the efficiency of domestic financial systems. However, sudden stops, in many cases, ended episodes of capital inflows with balance of payments, currency and/or banking crises, and heterodox economists of various strands highlighted the destabilizing effects of capital flows to DEEs. In the literature on capital flows, three channels through which surges in capital inflows create conditions for potential instability can be identified: (i) capital inflows can lead to unsustainable current account deficits and overvalued exchange rates; (ii) they can create currency maturity mismatches in balance sheets due to dollarization of liabilities; (iii) they can lead to bubbles in credit and asset markets, and when there is a sudden stop or a reversal in these flows, sharp declines in the value of the domestic currency, defaults and/or debt-servicing difficulties, asset deflations, and credit crunches can arise.

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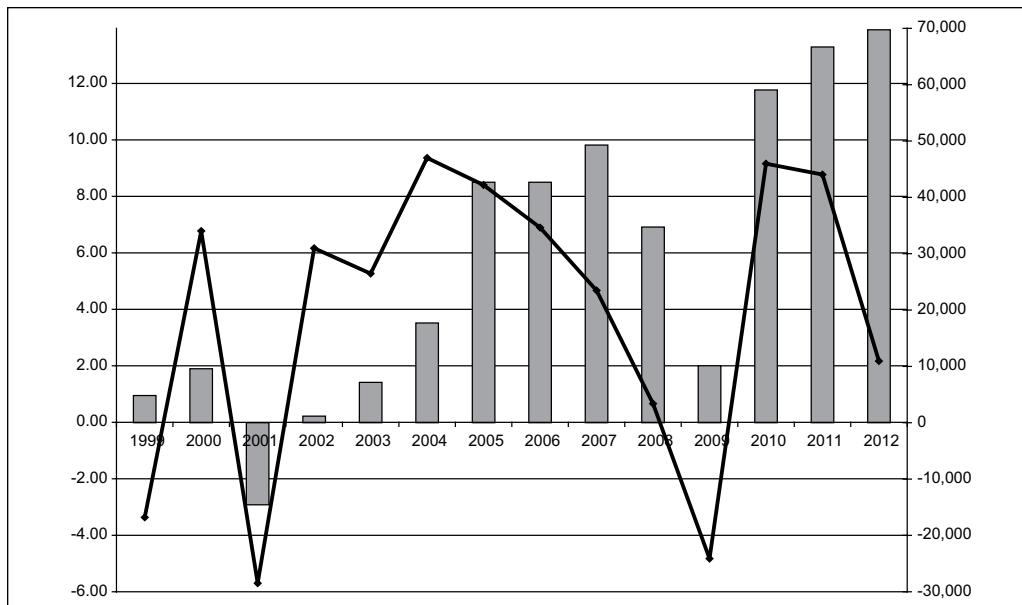


Figure 1. GDP growth rate (left axis) and net private capital inflows (right axis, million USD).
Source: Central Bank of Republic of Turkey Data Delivery System.

The objective of this paper is to analyze the credit channel in the case of Turkey. Turkey has been subject to large capital inflows since the capital account liberalization of 1989 and the crises of 1994, 1998, and 2001 are associated with reversals in capital inflows. Starting in the early 2000s, the volume of capital inflows has increased and by 2012 reached record levels, after a brief slowdown following the 2008 U.S. financial crisis. Total net capital inflows between 2003 and 2012 amounted to \$400 billion, compared with a total of \$35 billion between 1980 and 2002. Large capital inflows are considered to be closely related to the growth performance of the economy, which averaged around 4.6 percent between 2003 and 2012. The close relationship between private capital inflows and the growth performance of the economy can be observed in Figure 1. In the same period, bank credit to the private sector as a percentage of GDP steadily increased, as depicted in Figure 2.

The rest of the paper is organized as follows. In the next section, I present a brief overview of the literature on the link between capital flows and bank credit. The third section lays out the details of the empirical analysis and presents findings of this analysis. In the last section, I conclude by discussing the relevance of these findings and potential further research areas.

2. Related Literature

Critical economists highlighted the destabilizing effects of capital flows to DEEs. For example, Grabel (1995) argued that surges in capital inflows lead to “speculation-led economic development” characterized by “a preponderance of risky investment practices and shaky financial structures.” Crotty and Epstein (1996) stressed the destabilizing aspects of speculative capital flows and argued for capital controls as an essential component of any progressive reform package. Vernengo (2006), in a review essay, pointed out that financial dependency has been emphasized by neo-Marxist analyses as perpetuating the cycle of dependency. Akyüz (2012) noted that surges in capital flows to DEEs can lead to credit and asset bubbles. Capital inflows can lead to expansions in bank credit to the private sector through two channels: first, capital inflows lead to an appreciation of asset values, which increases the net worth in the economy that could be used as

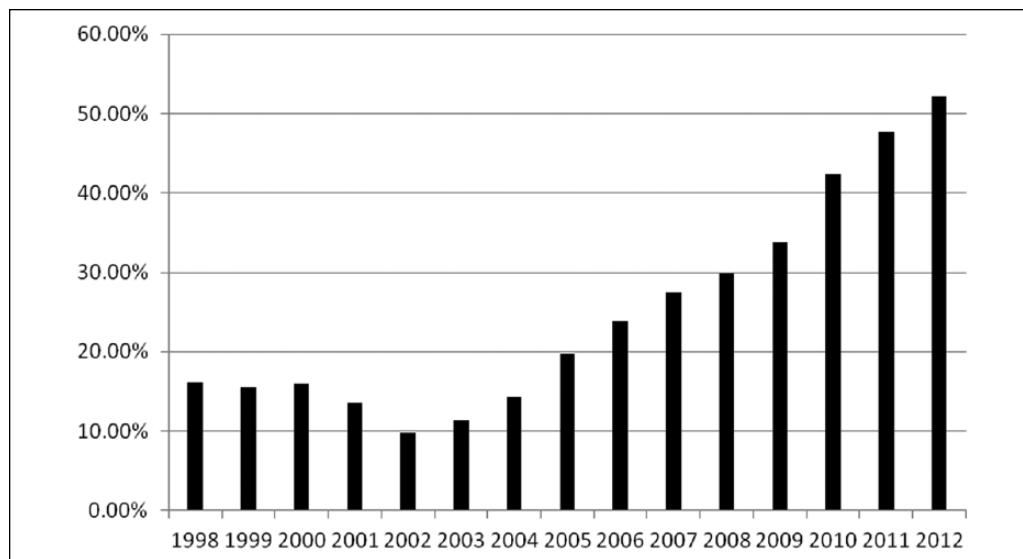


Figure 2. Total bank credit to private sector as a percentage of GDP.
Source: Central Bank of Republic of Turkey Data Delivery System.

collateral and hence results in increased borrowing. For example, an increase in asset prices could make firms' assets more valuable and allow them to borrow more. Second, a portion of capital inflows could directly go into the banking system and then get converted into credit. Credit expansion can occur when domestic banks borrow from abroad and use these funds for domestic lending. In this case, full sterilization of currency market interventions may not be possible and capital inflows lower long-term interest rates (Akyüz 2012: 113). Declining domestic interest rates further accelerate credit expansion. While Akyüz (2012) stressed the possibility of a link between capital movements and asset markets, when credit expansion is also involved, a reversal of capital flows has the potential to create a credit crunch as well as an asset deflation, which might have destructive macroeconomic consequences (113-4).

The empirical link between capital inflows and episodes of rapid credit expansion, on the other hand, is a relatively little studied issue in the literature. Some empirical studies found a positive relationship between capital inflows and credit expansions (e.g. Gourinchas *et al.* 2001; Duenwald *et al.* 2005; Bakker and Gulde 2010; IMF 2004, 2011). Recently, the International Monetary Fund (IMF) noted that capital inflows could be good predictors of credit booms, defined as "extreme episodes during which the cyclical component of credit is larger than 1.75 times its standard deviation" (IMF 2011). Credit booms can be triggered by various factors including past capital inflows, past financial reform, and past productivity gains; and past capital inflows have a larger explanatory power, particularly in DEEs (48). Accordingly, during a credit boom economic activity expands, asset prices and leverage increase, the real exchange rate appreciates, and current account deficits widen. However, when the credit boom comes to an end, economic activity may contract sharply as asset prices decline, deleveraging begins, the real exchange rate depreciates, and the current account deficit contracts. Large swings in these variables could lead to increased financial vulnerabilities (47). The IMF (2011) concludes that "given the high cost of credit boom-bust cycles, policymakers should closely monitor the joint behavior of capital inflows and domestic lending" and they can use "a combination of macroeconomic, exchange rate, prudential policy, and capital control measures to mitigate the adverse effects of large capital inflows" (50).

Table I. Summary statistics.

	Number of observations	Mean	Std. dev.	Min	Max
Net private capital inflows as a percentage of GDP	114	0.006	0.005	-0.005	0.021
Bank credit to private sector as a percentage of GDP	114	0.303	0.125	0.105	0.563
Domestic interest rate (real)	114	0.072	0.052	-0.012	0.181
FED discount rate (real)	114	-0.007	0.019	-0.038	0.040
Consumer confidence index	114	89.258	10.956	68.880	111.900

Goldfajn and Valdes (1997) argue that banks amplify the effects of capital inflows, while Hernandez and Landerretche (2002) contend that the probability that a surge in capital inflows will create a credit boom in DEEs is higher than the probability that they will not. Mendoza and Terrones (2012), in a more recent study, found that “credit booms tend to be synchronized internationally and centered on ‘big events’ like the 1980s debt crisis, the 1992 ERM crisis, the 1990s Sudden Stops, and the 2008 Global Financial Crisis” (2). In the case of Turkey, a recent study done at the Central Bank found that one of the main factors correlated with the probability of credit booms is capital inflows after controlling for the slope of the yield curve, real exchange rate, U.S. interest rate, and net capital inflows (Binici and Köksal 2012).

3. Empirical Analysis

In this section, I present results of preliminary empirical analysis on the link between capital inflows and credit growth in Turkey. The analysis is carried out using monthly data for the period of January 2003-June 2013. Series for net private capital inflows and bank credit to the private sector are obtained from the Central Bank of the Republic of Turkey (CBRT) Data Delivery System. Three control variables are used: domestic interest rate, obtained from the same data source; consumer confidence index, obtained from the Turkish Statistics Institute; and Federal Reserve discount rate, obtained from the U.S. Federal Reserve System. Bank credit to the private sector is taken as a percentage of gross domestic product (GDP). Quarterly GDP series reported by the CBRT is converted into monthly series using Fernandez's (1981) method. Net private capital inflows are also taken as a percentage of GDP, after being converted from U.S. dollars into Turkish liras using the end-of-month Central Bank exchange rates. Using these series as percentages of GDP allows us to control for the expansion of GDP and business cycle actors. Table 1 presents summary statistics for these variables.

Next, I present a logit model that tests the relationship between net private capital inflows and episodes of rapid credit expansion. Rapid credit expansion periods are defined as periods where the growth rate of bank credit to the private sector as a percentage of GDP deviates from its trend by 1.75 times the standard deviation of all the deviations from the trend.¹ The trend is defined as the moving average of the previous 12 months. Let us define k_t as the deviation from the trend of month t 's growth rate of bank credit to the private sector as a percentage of GDP and e_t as a binary variable that takes the value of 1 when there is rapid credit expansion and 0 otherwise. In algebraic terms:

¹Some studies in the literature use 1.96 instead of 1.75. In this case, using 1.75 or 1.96 gives the same results.

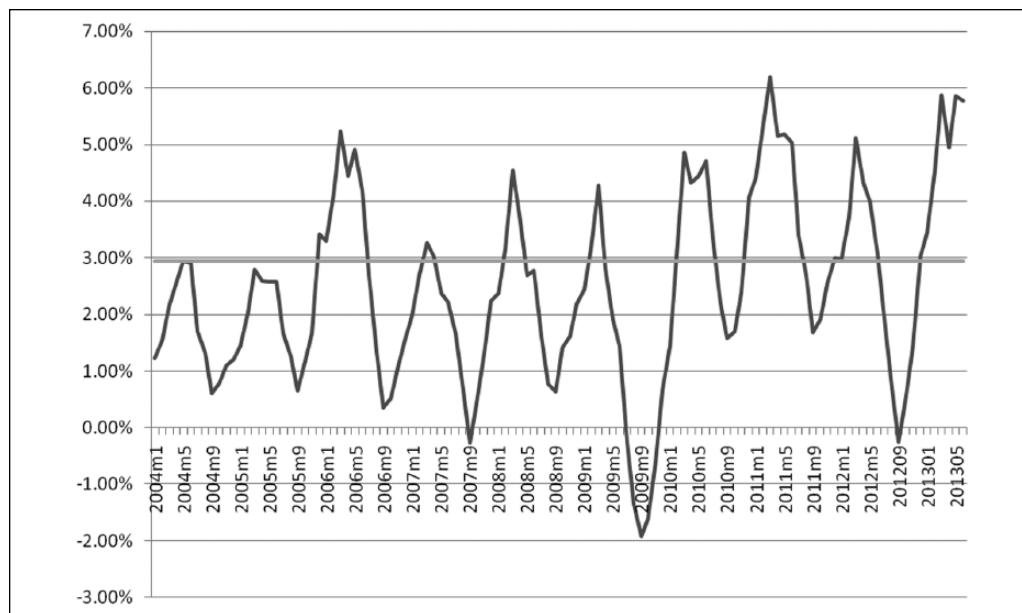


Figure 3. Total bank credit to private sector deviations from the long-term trend.

Note: The straight line represents the standard deviation of the deviations from the trend multiplied by 1.75.

$$\text{If } k_t > \alpha * \sigma(k_t), \text{ where } \alpha = 1.75, \text{ then } e_t = 1; \text{ otherwise } e_t = 0 \quad (1)$$

This methodology is similar to the previous logit model studies of credit expansions such as Gourinchas *et al.* (2001) and Barajas (2011). While there are others, such as Mendoza and Terrones (2008), who use real credit per person, I opt to use bank credit to the private sector as a percentage of GDP, since this indicator also shows economic units' indebtedness changes with respect to their incomes.² Figure 3 depicts k_t and $\alpha * \sigma(k_t)$ between January 2003 and June 2013. Seven episodes of rapid credit expansion are observed in this period.

Next, I estimate a logit model with e_t as the dependent variable and three measures of net private capital inflows (current net private capital inflows as a percentage of GDP, 6-month moving average of private capital inflows as a percentage of GDP, and 12-month moving average of private capital inflows as a percentage of GDP) plus a number of control variables as independent variables. Domestic interest rate is used to control for domestic credit supply conditions, while the Federal Reserve discount rate is used to proxy for global credit supply conditions. Consumer confidence index is used as a proxy for domestic credit demand conditions.

Table 2 presents estimation results for the 12 logit models estimated.³ In the first three models, the dependent variable is e_t , and the independent variables are the three different measures of net private capital inflows, respectively. The following models introduce control variables one by one and then two by two, and the last model uses all control variables together. Coefficients of all three net private capital flow variables have a positive sign and give statistically significant results. When other control variables are added to the first three specifications, the size and the statistical significance of the private capital flows variables remain the same. Of the control

²Sa 2006 summarizes different measures used in the literature.

³All estimations in this section were done using Stata/SE 12.1. The dataset and log files are available from the author upon request.

Table 2. Logit analysis.

Explanatory Variables	1	2	3	4	5	6	7	8	9	10	11	12
Net private capital inflows	0.117*** (0.045)	0.251*** (0.080)		0.108*** (0.049)	0.227*** (0.080)		0.108*** (0.049)	0.228*** (0.080)		0.095* (0.051)		
Net private capital inflows (6-month moving average)			0.320*** (0.098)			0.339*** (0.103)			0.340*** (0.103)			0.212*** (0.082)
Net private capital inflows (12-month moving average)				-19.798*** (4.773)	-19.794*** (4.812)	-21.695*** (4.990)	-19.018*** (5.454)	-20.166*** (5.747)	-22.098*** (6.143)	-22.426*** (6.784)	-22.867*** (6.756)	0.326*** (0.103)
Domestic interest rate						-3.973 (13.896)	1.754 (14.604)	1.683 (14.769)	-3.430 (14.188)	-3.430 (14.881)	-3.430 (15.251)	1.167 (0.025)
US interest rate												1.167 (0.023)
Consumer confidence index												
Number of observations	114	114	114	114	114	114	114	114	114	114	114	114
Area under ROC curve	0.626	0.684	0.702	0.777	0.797	0.811	0.775	0.798	0.810	0.779	0.790	0.809

Note: Models include a constant term not reported here. Standard errors in parentheses. *** indicates statistical significance at 1%, ** at 5%, and * at 10%. Net private capital inflows multiplied by 1000.

variables, domestic interest rate has the expected negative sign and a high degree of statistical significance, while U.S. interest rate and consumer confidence index change signs and are not statistically significant.

In order to assess the predictive power of the models, I use the measure of the receiver operating characteristic (ROC) curve. If our model has no predictive power, then the ROC curve would be a 45-degree line. A model with better predictive power would have a concave shape that lies above this 45-degree line. Hence, measuring the area between the ROC curve and the 45-degree line would produce a statistic between 0.5 and 1.0. The last line in Table 2 indicates that all model specifications have some predictive power and the predictive power increases when we employ 6-month and 12-month moving averages of net private capital flows as the explanatory variable.

4. Concluding Remarks

I presented preliminary analysis of monthly time-series data for the Turkish economy that assesses whether foreign capital inflows have an impact on the expansion of bank credit to the private sector. The results of logit analysis show that there is a positive correlation between capital inflows and the occurrence of periods of rapid credit expansion. Given that the Turkish economy is completely open to capital flows, these findings suggest that this could be a source of potential instability. Surges in capital flows lead to expansions in credit, which can potentially lead to financial fragility as the economy becomes more vulnerable to negative shocks to credit availability and interest rates.

However, this analysis is limited to examining the role of capital flows in periods of rapid credit expansion defined as large deviations from the trend growth rate of credit. Further research should look at the long term relationship between the growth rate of credit and capital inflows using times series analysis. Furthermore, extending this study to other countries using cross-country analysis would unravel whether the Turkish case is representative for other DEEs.

Acknowledgments

The author would like to thank Serkan Demirkılıç and Onur Özdemir for research assistance.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Research funding was provided by a Marie Curie European Reintegration Grant within the 7th European Community Framework Programme (grant no. FP7-PEOPLE-2011-CIG: 303981) and by Kadir Has University's Scientific Research Commission (grant no. 2012-BAP-01).

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