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Turkish and Argentine Financial Crises: A Univariate Event Study Analysis

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Abstract: This study analyzes the financial crises in Argentina and Turkey in order to find out whether a set of six major macroeconomic indicators account for these crises or not. Evidence suggests that in Turkey, an increase in domestic credit is associated with the 1992, 1994 and 2001 financial crises, whereas an increase in CPI is associated with all crisis episodes. Similarly, a decrease in exchange rate is associated with all crises. A fall in the market index is associated with financial crises in 1991, 1992 and 1994. An increase in M1 is associated only with the crisis in 1992 and a fall in the volume of exports relative to volume of imports is associated with the crisis in 1994. In Argentina, an increase in neither CPI nor domestic credit is associated with any of the financial crises. A decrease in exchange rate is associated with all crises, whereas a fall in the market index is associated with financial crises in 1991 and 2000. An increase in M1, on the other hand, is associated with the crises in 1993, 2000 and 2001.

Key words: Financial crises, event study analysis, graphical analysis

INTRODUCTION

Turkey and Argentina experienced several financial crises in the last few decades with devastating economic, social and political consequences. In today's increasingly interdependent world, finding ways to reduce the risk of future crises has become an international policy challenge of enormous importance. In this respect, determining the individual leading indicators is essential in explaining financial crises so that policy makers can take preventative measures to mitigate or even prevent future financial crises. This article analyses the financial crises in two emerging markets, Argentina and Turkey, based in individual graphs that are each event studies of the sort used in finance, and aims at finding out whether a set of six indicators account for the financial crises or not. It is not an attempt to formulate or test specific theories of what causes these crashes.

MATERIALS AND METHODS

Crisis definition: The objective of a crisis definition is to describe large, extraordinary changes in macroeconomic fundamentals such as exchange rates, interest rates, or foreign exchange reserves. As pointed out earlier, classifying each sample period as being in crisis or not depends on whether or not an index of vulnerability exceeds an arbitrarily chosen threshold. In this study, a

crisis episode is considered to occur in a particular month if the month-over-month percentage change in the bilateral exchange rate is at least 10%. In order to augment the statistical properties of the models, a three-month window is used. In other words, we consider that each crisis episode spans a time period of three months following the month in which the crisis emerged. This practice, from the statistical point of view, strongly increases the number of ones in the sample thereby improving the statistical properties of the probit regressions. In addition, because a large movement in an exchange rate is often followed closely by another or several large movements, some of which may still be part of the crisis associated with the first instance of depreciation^[1], only a depreciation episode that takes place 6 months or more after the previous one is considered a separate crisis. Using this definition and a 10% month-to-month exchange rate threshold, four separate crises in both Turkey and Argentina are identified during the time period between February 1991 and February 2000. In Argentina, crises took place in May 1991, July 1993, January 2000 and October 2002. In Turkey, they emerged in April 1991, February 1992, March 1994 and March 2001.

Explanatory variables: The present study employs monthly (end-of-month) six macroeconomic indicators from Argentina and Turkey spanning the time period

between February 1991 and February 2001. All data are obtained from DataStream and are transformed into natural logarithms to achieve mean-reverting relationships and to make statistical testing procedures valid. We follow a methodology where we use first three crisis episodes in Argentina and Turkey to build probit models that predict future crises while we use the last crises in two countries to test our models out-of-sample.

Variables employed in the present study are shown in Table 1. Bilateral exchange rate between the domestic currency and US Dollar is used as an indicator of competitiveness loss or gain for the countries prior to crisis episodes. A monetary policy indicator that is used in this study is domestic credit, whose excessive growth may serve as an indicator of the fragility of the banking system. Domestic credit rises in the early phase of the banking crisis. As the crisis unfolds, the central bank injects money to banks in order to improve their financial position. Hence, this variable is used as an indicator of the banking sector as well as a monetary policy indicator. As Kaminsky and Reinhart^[2] points out, very high growth rates of domestic credit may serve as a simple indicator of the fragility of the banking system and higher the domestic credit, the more dependent the real economic activity on the health of the banking system and the worse the effects of a crisis on the economy. A pair of explanatory variables used quite frequently in the EWS literature is the level of exports and imports. These variables are used as an indicator of the current account

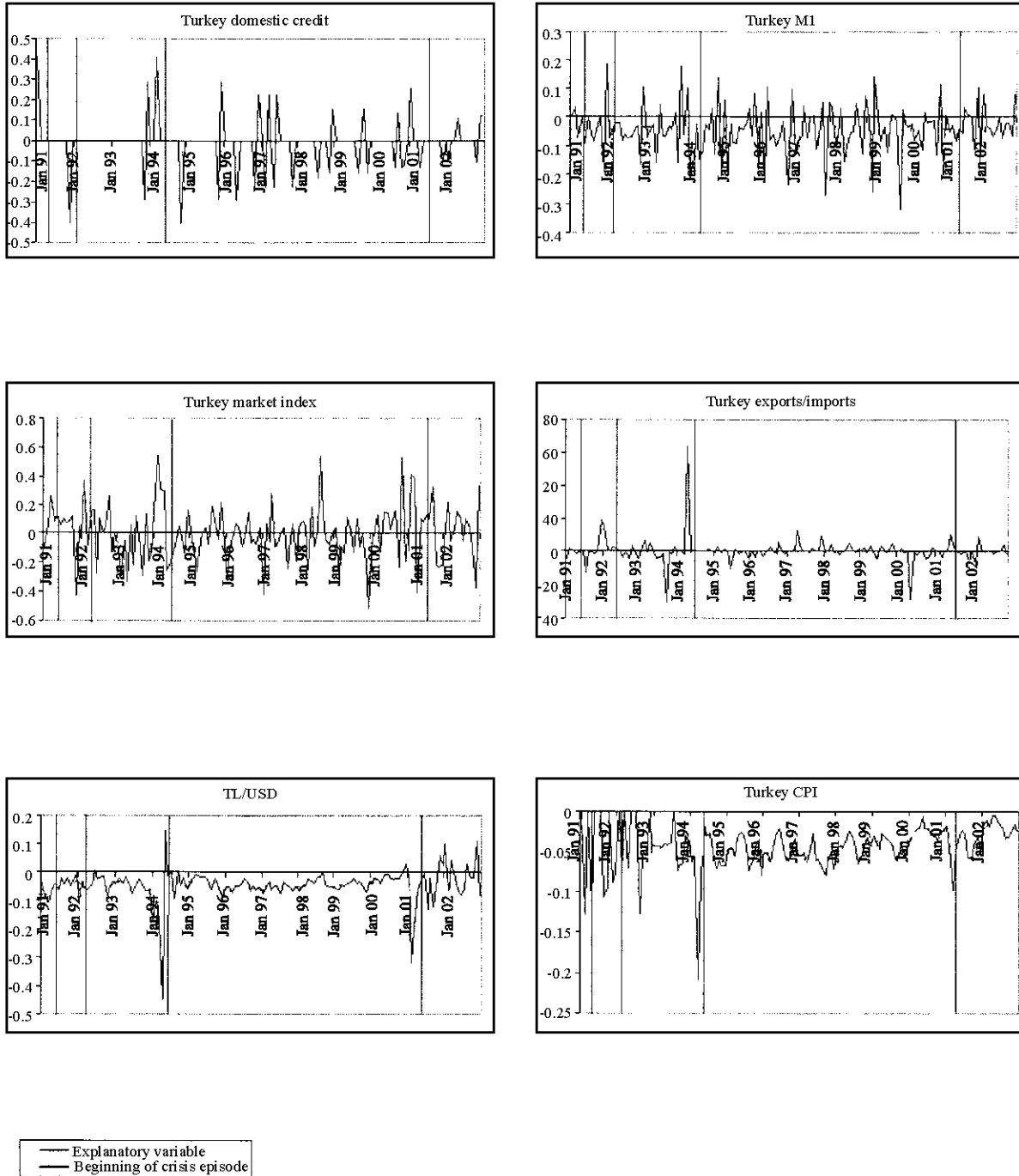
of the countries. Jotzo^[3] points out that declining volume of exports can be considered as an indication of competitiveness loss of a country, possibly caused by an overvalued domestic currency. Excessive import growth, on the other hand, could lead to worsening in the current account and have often been related with currency crises. The present study uses the ratio of export values to the import values in order to keep the number of explanatory variables in the probit models at a minimum thereby diminishing the risk of multicollinearity. Another important indicator used in this study is the money supply M1. As Eichengreen *et al.*^[4] point out, M1 is a measure of liquidity and its growth indicates excess liquidity, which may invoke speculative attacks on the currency thus leading to a currency crisis. This suggestion is also supported by Dowling and Zhuang^[1] who affirm that rapid growth in credit induced by excessive monetary expansion have historically been associated with currency and banking crises in many countries. Literature on EWS also uses market index frequently as an indicator of the market sentiment prior to crises. According to Berg and Patillo^[5], burst of asset price bubbles often precede financial crises. Following this reasoning, we include Turkish and Argentine stock market indices in our model. The last indicator that we employ is the consumer price index, which is a common inflation measure. The inflation rate is likely to be associated with high nominal interest rates and may proxy macroeconomic mismanagement that adversely affects the economy and the banking system^[6].

Table 1: Explanatory variables and definitions

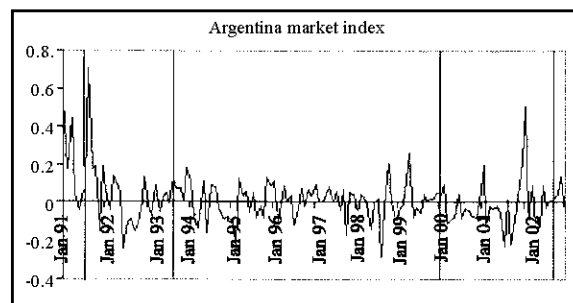
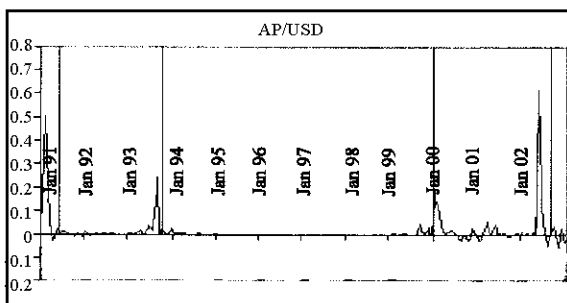
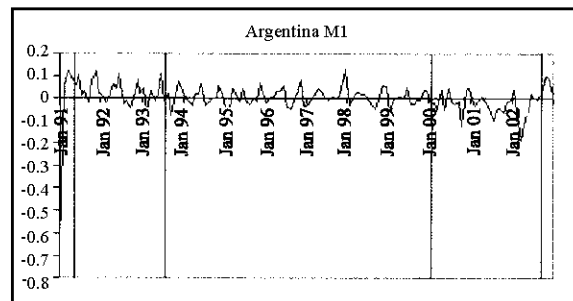
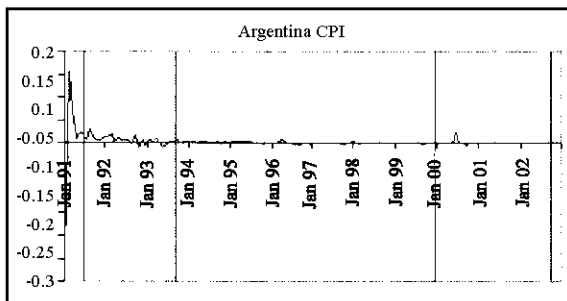
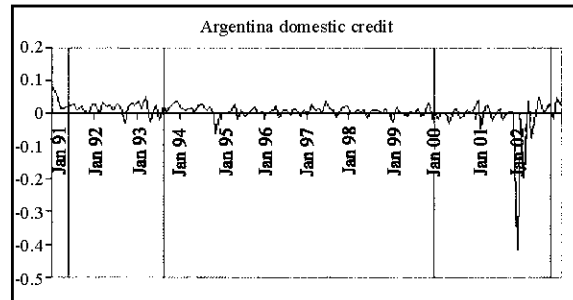
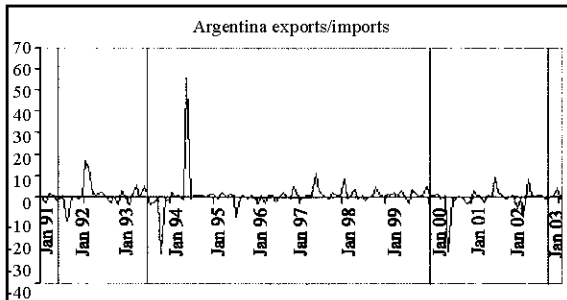
Variables	Symbol	Explanation
Stock market index	M	Log returns of Argentine and Turkish monthly stock market indices. Used as a real sector indicator showing the reaction of the market prior to crises.
Exchange rate	X	Log returns of bilateral monthly US dollar exchange rates for the Turkish Lira and the Argentine Peso. (TL/USD and AP/USD, so that an increase denotes depreciation of the domestic currency) Used as an indicator of competitiveness loss or gain of the countries prior to crises.
Exports/Imports	EXIM	Log returns of monthly export values divided by the log returns of monthly import values for each country. Used as an indicator of the current account of the countries.
Money supply	M1	Log returns of Argentine and Turkish monthly money supply M1. Used as an indicator of monetary policy and liquidity.
Domestic credit	DC	Log returns of monthly Argentine and Turkish domestic credit as a percentage of their GDPs. Used as an indicator of the banking sector as well as a monetary policy indicator.
Consumer price index	CPI	Log returns of monthly Argentine and Turkish consumer price indices. Used as an indicator of inflation.

Table 2: Expected signs of the coefficients

Variables	Sign	Explanation
CPI	+	The inflation rate is likely to be associated with high nominal interest rates and may proxy macroeconomic mismanagement that adversely affects the economy and the banking system ^[2] .
X	-	Berg and Patillo ^[5] point out that currency overvaluation could lead to deteriorations in the current account and have historically been associated with currency crises.
EXIM	-	According to Dowling and Zhuang ^[1] , weak exports and excessive imports usually lead to deteriorations in the current account and have often been associated with currency crises.
M1	+	According to Eichengreen <i>et al.</i> ^[4] growth of M1 indicates excess liquidity, which may invoke speculative attacks on the currency thus leading to a currency crisis. Besides, Dowling and Zhuang ^[1] point out that crises historically have been linked to rapid growth in credit induced by excessive monetary expansion in many countries.
DC	+	Kaminsky and Reinhart ^[2] point out that high levels of domestic credit indicate the fragility of a banking system, thus leading to banking and financial crises.
M	-	According to Kaminsky and Reinhart ^[2] recessions and a bust in asset price bubbles often precede banking and currency crises



Appendix 1: Turkey graphical analysis



— Explanatory variable
— Beginning of crisis episode

Appendix 2: Argentina graphical analysis

For individual variables, a positive coefficient means that an increase in this explanatory variable will cause an increase in dependent variable, that is, dummy dependent variable close to 1. A negative coefficient, on the other hand, would mean that a decrease in this variable would cause a decrease in the likelihood of a crisis with the dummy dependent variable close to 0. Table 2 summarizes the expected signs of the variables as well as the economic rationales behind these expectations.

Graphical event study analysis: The graphical analysis conducted in this study is, in essence, event study of the sort used in finance. Graphics portray the monthly movements in each variable of interest based on one-month lags. Financial crises are marked by vertical lines. An advantage of this methodology is that the behavior of each variable can be examined individually. Yet, we need to use graphs cautiously. In econometrics, marginal contribution of each variable is examined conditional on other variables whereas the graphical method imposes no parametric structure on the data and impose few of the assumptions that are sometimes necessary for statistical inference or estimation but frequently untenable. This is particularly appropriate in a non-structural exploration of the data. They are often more accessible and informative than tables of coefficient estimate.

RESULTS

Next, we examine the data sets using one month lags based on graphical analysis in light of our expectations explained in Table 2. As evident from the graphs presented in Appendix 1, an increase in domestic credit is associated with the 1992, 1994 and 2001 financial crises, whereas an increase in CPI is associated with all crisis episodes. Similarly, a decrease in exchange rate is associated with all crises. A fall in the market index is

associated with financial crises in 1991, 1992 and 1994. An increase in M1 is associated only with the crisis in 1992. A fall in the volume of exports relative to volume of imports is associated with the crisis in 1994.

When we look into the graphical analysis of Argentine financial crises as portrayed in Appendix 2, we see that an increase in neither CPI nor domestic credit is associated with any of the financial crises. A decrease in exchange rate is associated with all crises, whereas a fall in the market index is associated with financial crises in 1991 and 2000. An increase in M1, on the other hand, is associated with the crises in 1993, 2000 and 2001.

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