International macroeconomics

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18 January 2023, 16.00

Surname: _____

First name: _____

ID or passport number: _____

Question	Points	Obtained
1	8	
2	8	
3	8	
4	8	
5	8	
Total	40	

Instructions

The exam consists of **five questions.**

In total, it is possible to obtain up to **40 points**.

Duration of exam: **1 hour and 20 minutes** (= 2 minutes per point or 16 minutes per question).

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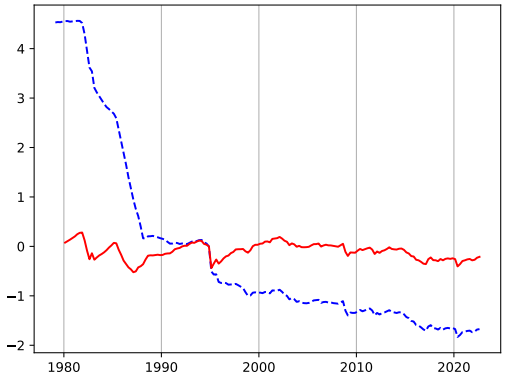
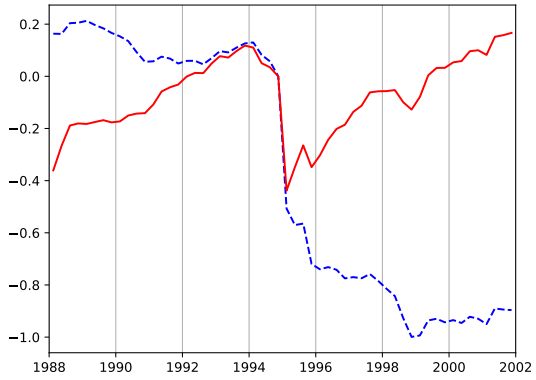
1.



(a) Nominal and real exchange rates, 1979–2022



(b) Nominal and real exchange rates, 1988–2001

Figure 1: Nominal effective exchange rate, s_t (dashed line), and real effective exchange rate, q_t (solid line) of Mexico. Quarterly data in natural logarithms. Both variables are expressed as differences from their 1994Q4 values. The ticks on the horizontal axis correspond to the start of the corresponding years. Source: International Financial Statistics (IMF).

	$\Delta_4 s_t$	$\Delta_4 s_t - \Delta_4 s_{t-4}$
1982 Q1	-0.261030	-0.258542
1982 Q2	-0.608670	-0.612310
1982 Q3	-0.942005	-0.957708
1982 Q4	-0.975766	-0.942318
1983 Q1	-1.086221	-0.825192
1983 Q2	-0.838394	-0.229724
1983 Q3	-0.579918	0.362087
1983 Q4	-0.583199	0.392567
1984 Q1	-0.322012	0.764209
1984 Q2	-0.296639	0.541755
1984 Q3	-0.260758	0.319160
1985 Q3	-0.418346	-0.157588
1985 Q4	-0.594528	-0.367391
1986 Q1	-0.799651	-0.597763
1986 Q2	-0.935590	-0.709801
1986 Q3	-0.962683	-0.544337
1986 Q4	-0.970261	-0.375734
1987 Q1	-0.936438	-0.136788
1987 Q2	-0.899020	0.036570
1987 Q3	-0.783690	0.178993
1987 Q4	-0.762402	0.207860
1988 Q1	-0.783652	0.152786
1988 Q2	-0.594983	0.304038
1988 Q3	-0.409062	0.374628
1995 Q1	-0.637258	-0.670682
1995 Q2	-0.652516	-0.643023
1995 Q3	-0.622118	-0.569455
1995 Q4	-0.719635	-0.593518
2009 Q1	-0.238660	-0.214994
2009 Q3	-0.237922	-0.277199

Table 1: The 30 months with the largest year-on-year nominal depreciations of the Mexican peso since the 1970s, in chronological order. Source: International Financial Statistics (IMF).

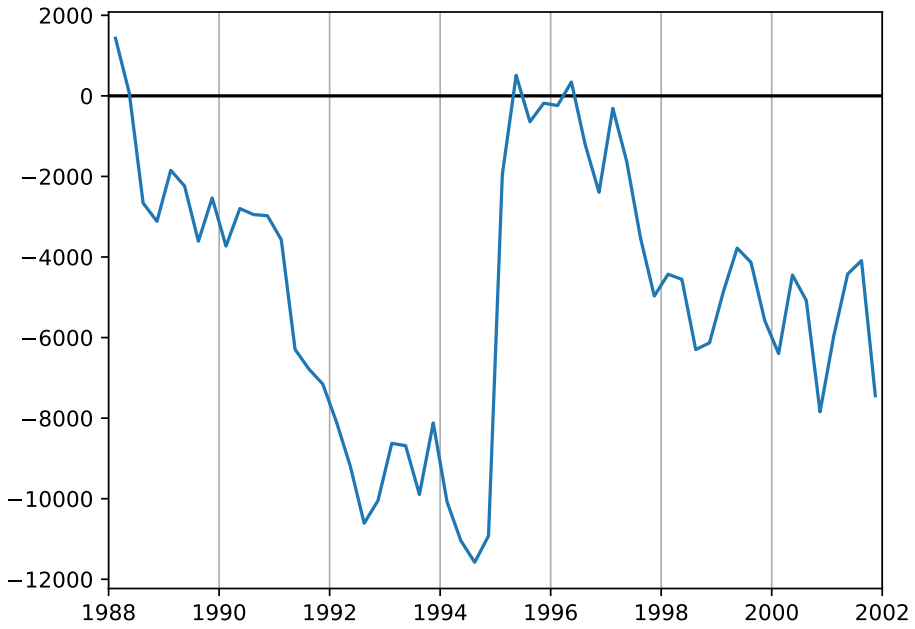


Figure 2: Current account, CA_t, of Mexico. Quarterly data in billions of 2010 US dollars (USD). The ticks on the horizontal axis correspond to the start of the corresponding years. Source: International Financial Statistics (IMF).

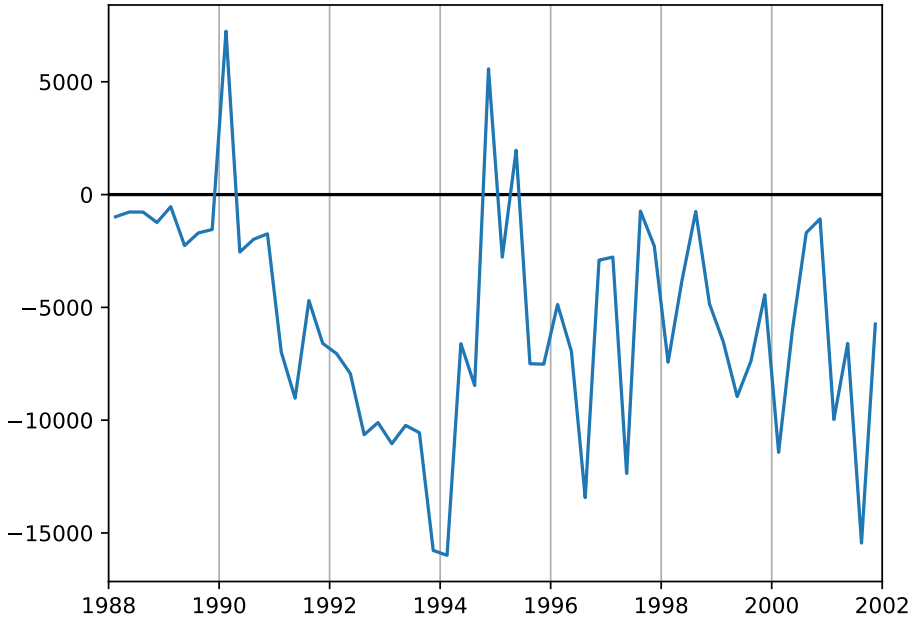
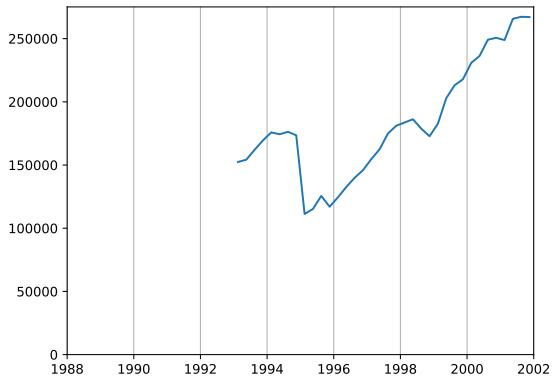
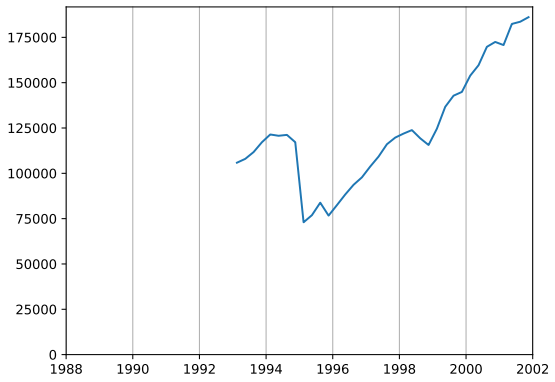


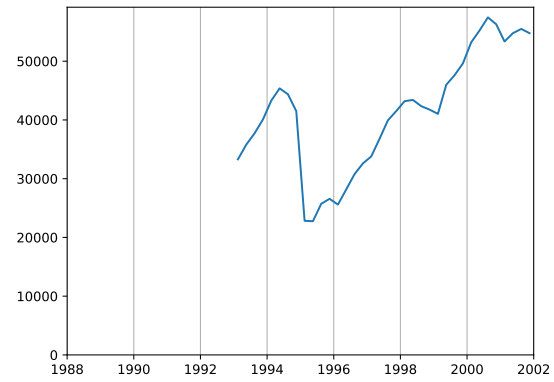
Figure 3: Net capital outflows (excluding loan investment outflows), approximately equal to the sum of direct investment and portfolio investment outflows, $\text{DI}_t + \text{PI}_t$, of Mexico. Negative values indicate net capital inflows. Quarterly data in billions of 2010 US dollars (USD). The ticks on the horizontal axis correspond to the start of the corresponding years. Source: International Financial Statistics (IMF).



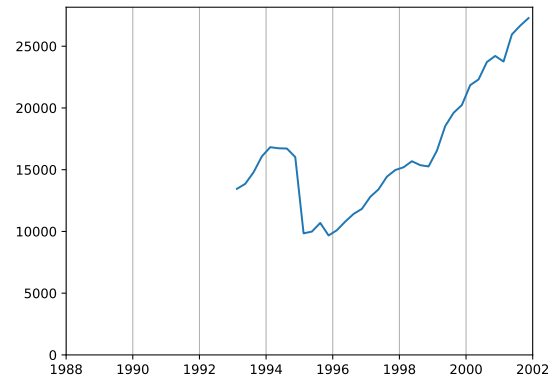
(a) GDP, Y_t^{P}



(b) Consumption spending, C_t



(c) Investment spending, I_t



(d) Government spending, G_t

Figure 4: GDP, household consumption, investment and government spending in Mexico. Quarterly data in billions of 2010 US dollars (USD). The ticks on the horizontal axis correspond to the start of the corresponding years. Source: International Financial Statistics (IMF).

This questions looks at the exchange rate performance of Mexico since the 1970s. Consider figure 1, which plots Mexico's nominal effective (= trade-weighted) and real effective (= trade-weighted) exchange rates. We can observe a large nominal and real depreciation at the end of 1994 and beginning of 1995. Use the information provided in table 1 and figures 1 to 4 as well as in the current account rankings provided at the end of this question to answer the following questions.

(a) State the two criteria that we discussed in class and that according to Frankel and Rose (1996) have to be fulfilled for a currency crisis to have taken place? [1]

(b) Table 1 lists the months of the past decades in which the Mexican peso depreciated most strongly (Δ_4 is the 4-quarter difference; that is, $\Delta_4 s_t = s_t - s_{t-4}$). According to the criteria mentioned in part a of this question, in which years and quarters, if any, did currency crises occur in Mexico? (Instead of indicating in which periods currency crises *did* occur, if you prefer you may indicate in which periods currency crises did *not* occur.) [1]

(c) In 1994–1995, Mexico's nominal exchange rate experienced a steep fall. Independently of whether the criteria of part a were fulfilled, the fall of the Mexican peso in 1994–1995 is generally considered a currency crisis. According to one theory, currency crises are the result loose fiscal policy and high money growth. Why can we rule out that this theory played a significant role in the 1994–1995 currency crisis. (Hint: Look at behaviour of s_t and q_t.) [1]

(d) If it was not high budget deficits and large increases in the money supply, what was the cause of the 1994–1995 currency crisis then? Make sure you take into account all the relevant evidence provided. [4]

(e) According to figure 1b, from 1988 until the end of 1993, the nominal exchange rate, s_t, fell and the real exchange rate, q_t, rose. The same behaviour of both variables could be observed in the period from 1995 to 2001. Based on this evidence, what can we say about the Mexican inflation rate during those two periods? State how you arrive at your answer. [1]

Total of question 1: [8]

Current account rankings - surplus and deficit countries						
Computation: Nikolas A. Müller-Plantenberg						
Data: IMF World Economic Outlook (13/04/2020)						
Country codes: ISO 3166-1 alpha-3						
https://en.wikipedia.org/wiki/ISO_3166-1_alpha-3						
Surplus countries						
Year	**Rank**					
	1	**2**	**3**	**4**	**5**	**6**
[1980]	'SAU'	'KWT'	'ARE'	'QAT'	'LBY'	'NGA'
[1981]	'SAU'	'KWT'	'ARE'	'GBR'	'QAT'	'USA'
[1982]	'SAU'	'ARE'	'JPN'	'DEU'	'QAT'	'NLD'
[1983]	'JPN'	'MEX'	'KWT'	'ARE'	'NLD'	'VEN'
[1984]	'JPN'	'MEX'	'DEU'	'ARE'	'KWT'	'TWN'
[1985]	'JPN'	'DEU'	'TWN'	'ARE'	'CHE'	'MEX'
[1986]	'JPN'	'DEU'	'TWN'	'KWT'	'CHE'	'NLD'
[1987]	'JPN'	'DEU'	'TWN'	'KOR'	'MEX'	'CHE'
[1988]	'JPN'	'DEU'	'KOR'	'TWN'	'CHE'	'NLD'
[1989]	'JPN'	'DEU'	'TWN'	'NLD'	'KWT'	'CHE'
[1990]	'DEU'	'JPN'	'TWN'	'VEN'	'CHE'	'NLD'
[1991]	'JPN'	'TWN'	'CHE'	'NLD'	'SGP'	'BEL'
[1992]	'JPN'	'CHE'	'TWN'	'NLD'	'BEL'	'BRA'
[1993]	'JPN'	'CHE'	'NLD'	'ITA'	'BEL'	'FRA'
[1994]	'JPN'	'CHE'	'NLD'	'ITA'	'BEL'	'SGP'
[1995]	'JPN'	'NLD'	'ITA'	'CHE'	'BEL'	'SGP'
[1996]	'JPN'	'ITA'	'NLD'	'FRA'	'CHE'	'SGP'
[1997]	'JPN'	'FRA'	'CHN'	'ITA'	'CHE'	'NLD'
[1998]	'JPN'	'FRA'	'KOR'	'CHN'	'ITA'	'CHE'
[1999]	'JPN'	'FRA'	'CHE'	'RUS'	'KOR'	'CHN'
[2000]	'JPN'	'RUS'	'FRA'	'CHE'	'NOR'	'CHN'
[2001]	'JPN'	'FRA'	'RUS'	'NOR'	'CHE'	'CHN'
[2002]	'JPN'	'DEU'	'CHN'	'FRA'	'RUS'	'CHE'
[2003]	'JPN'	'CHE'	'CHN'	'DEU'	'RUS'	'NLD'
[2004]	'JPN'	'DEU'	'CHN'	'RUS'	'CHE'	'SAU'
[2005]	'JPN'	'DEU'	'CHN'	'SAU'	'RUS'	'CHE'
[2006]	'CHN'	'JPN'	'DEU'	'SAU'	'RUS'	'NLD'
[2007]	'CHN'	'DEU'	'JPN'	'SAU'	'RUS'	'NLD'
[2008]	'CHN'	'DEU'	'JPN'	'SAU'	'RUS'	'NOR'
[2009]	'CHN'	'DEU'	'JPN'	'RUS'	'NLD'	'NOR'
[2010]	'CHN'	'JPN'	'DEU'	'CHE'	'RUS'	'SAU'
[2011]	'DEU'	'SAU'	'CHN'	'JPN'	'RUS'	'NLD'
[2012]	'DEU'	'CHN'	'SAU'	'NLD'	'KWT'	'ARE'
[2013]	'DEU'	'CHN'	'SAU'	'NLD'	'CHE'	'KOR'
[2014]	'DEU'	'CHN'	'KOR'	'SAU'	'NLD'	'TWN'
[2015]	'CHN'	'DEU'	'JPN'	'KOR'	'CHE'	'TWN'
[2016]	'DEU'	'CHN'	'JPN'	'KOR'	'TWN'	'CHE'
[2017]	'DEU'	'JPN'	'CHN'	'NLD'	'TWN'	'KOR'
[2018]	'DEU'	'JPN'	'RUS'	'NLD'	'KOR'	'SAU'
[2019]	'DEU'	'JPN'	'CHN'	'RUS'	'NLD'	'CHE'
[2020]	'DEU'	'JPN'	'CHN'	'NLD'	'CHE'	'RUS'
[2021]	'DEU'	'JPN'	'CHN'	'NLD'	'CHE'	'TWN'
[2022]	'DEU'	'JPN'	'CHN'	'NLD'	'CHE'	'SGP'
[2023]	'DEU'	'JPN'	'CHN'	'NLD'	'CHE'	'SGP'
[2024]	'DEU'	'JPN'	'NLD'	'CHE'	'CHN'	'SGP'

Deficit countries						
Year	Rank					
	1	2	3	4	5	6
[1980]	'ITA'	'DEU'	'BRA'	'MEX'	'JPN'	'KOR'
[1981]	'MEX'	'ITA'	'CAN'	'BRA'	'AUS'	'KOR'
[1982]	'BRA'	'FRA'	'ITA'	'AUS'	'NGA'	'KOR'
[1983]	'USA'	'SAU'	'BRA'	'IDN'	'AUS'	'FRA'
[1984]	'USA'	'SAU'	'AUS'	'ITA'	'EGY'	'GBR'
[1985]	'USA'	'SAU'	'AUS'	'CAN'	'ITA'	'IND'
[1986]	'USA'	'SAU'	'CAN'	'AUS'	'GBR'	'IRN'
[1987]	'USA'	'CAN'	'GBR'	'SAU'	'AUS'	'IND'
[1988]	'USA'	'GBR'	'CAN'	'AUS'	'ITA'	'SAU'
[1989]	'USA'	'GBR'	'CAN'	'AUS'	'ITA'	'ESP'
[1990]	'USA'	'GBR'	'ITA'	'CAN'	'ESP'	'AUS'
[1991]	'ITA'	'SAU'	'DEU'	'KWT'	'CAN'	'MEX'
[1992]	'USA'	'MEX'	'ITA'	'DEU'	'CAN'	'ESP'
[1993]	'USA'	'MEX'	'CAN'	'DEU'	'SAU'	'GBR'
[1994]	'USA'	'MEX'	'DEU'	'AUS'	'CAN'	'ARG'
[1995]	'USA'	'DEU'	'AUS'	'BRA'	'THA'	'KOR'
[1996]	'USA'	'KOR'	'BRA'	'DEU'	'AUS'	'THA'
[1997]	'USA'	'BRA'	'AUS'	'ARG'	'DEU'	'KOR'
[1998]	'USA'	'BRA'	'AUS'	'MEX'	'DEU'	'ARG'
[1999]	'USA'	'GBR'	'DEU'	'BRA'	'AUS'	'ESP'
[2000]	'USA'	'GBR'	'DEU'	'ESP'	'BRA'	'MEX'
[2001]	'USA'	'GBR'	'ESP'	'BRA'	'MEX'	'PRT'
[2002]	'USA'	'GBR'	'ESP'	'AUS'	'MEX'	'PRT'
[2003]	'USA'	'GBR'	'ESP'	'AUS'	'GRC'	'PRT'
[2004]	'USA'	'ESP'	'GBR'	'AUS'	'PRT'	'TUR'
[2005]	'USA'	'ESP'	'GBR'	'AUS'	'TUR'	'PRT'
[2006]	'USA'	'ESP'	'GBR'	'AUS'	'TUR'	'GRC'
[2007]	'USA'	'ESP'	'GBR'	'AUS'	'GRC'	'TUR'
[2008]	'USA'	'ESP'	'GBR'	'ITA'	'GRC'	'AUS'
[2009]	'USA'	'GBR'	'ESP'	'AUS'	'ITA'	'CAN'
[2010]	'USA'	'GBR'	'BRA'	'ITA'	'CAN'	'ESP'
[2011]	'USA'	'IND'	'BRA'	'TUR'	'ITA'	'GBR'
[2012]	'USA'	'GBR'	'IND'	'BRA'	'AUS'	'CAN'
[2013]	'USA'	'GBR'	'BRA'	'TUR'	'CAN'	'AUS'
[2014]	'USA'	'GBR'	'BRA'	'AUS'	'TUR'	'CAN'
[2015]	'USA'	'GBR'	'AUS'	'SAU'	'CAN'	'BRA'
[2016]	'USA'	'GBR'	'CAN'	'AUS'	'TUR'	'DZA'
[2017]	'USA'	'GBR'	'IND'	'TUR'	'CAN'	'AUS'
[2018]	'USA'	'GBR'	'IND'	'CAN'	'IDN'	'AUS'
[2019]	'USA'	'GBR'	'IND'	'CAN'	'IDN'	'BRA'
[2020]	'USA'	'GBR'	'IND'	'IDN'	'CAN'	'AUS'
[2021]	'USA'	'GBR'	'IND'	'IDN'	'CAN'	'MEX'
[2022]	'USA'	'GBR'	'IND'	'IDN'	'CAN'	'MEX'
[2023]	'USA'	'GBR'	'IND'	'IDN'	'CAN'	'BRA'
[2024]	'USA'	'IND'	'GBR'	'IDN'	'BRA'	'CAN'

2. (a) The intertemporal approach to the current account is a theory that explains the behaviour of the current account balance. Please write down its assumptions and show how the following equilibrium values for the current account in periods 1 and 2 can be derived: [6]

$$CA_1 = Y_1 - C_1 = \frac{1}{2}(-z_0^{\text{HF}} + Y_1 - Y_2 + z_2^{\text{HF}}), \tag{1}$$

$$CA_2 = Y_2 - C_2 = \frac{1}{2}(-z_0^{\text{HF}} - Y_1 + Y_2 + z_2^{\text{HF}}). \tag{2}$$

(b) In the light of the empirical evidence of the Mexican currency crisis of 1994–1995 (see question 1), why is the intertemporal approach to the current account not entirely convincing? In other words, which key economic implication of the theory is contradicted by the data? [2]

Total of question 2: [8]

3. (a) What does the typical balance sheet of a commercial bank look like? [2]

(b) Use the balance sheet you have provided to explain the following terms: [4]

- Maturity mismatch
- Bank reserves
- Illiquidity
- Insolvency

(c) If you'd be shown the balance sheets of two commercial banks, how would you decide which of the two banks has a higher risk of a bank run? [2]

Total of question 3: [8]

4. (a) What is the difference between S_t and s_t? [1]

(b) What does the term $\frac{S_t - S_{t-1}}{S_{t-1}}$ represent? [1]

(c) What does the Greek letter Δ in the mathematical term Δs_t represent? [1]

(d) Show mathematically that $\Delta s_t \approx \frac{S_t - S_{t-1}}{S_{t-1}}$. [1]

(e) What do Δs_t, Δq_t, Δp_t^{H} and Δp_t^{F} represent in economic terms? [1]

(f) How is Δs_t related to Δq_t, Δp_t^{H} and Δp_t^{F}? [1]

(g) Is the relationship between Δs_t, Δq_t, Δp_t^{H} and Δp_t^{F} that you have just written down an *exact* or an *approximate* one? Explain briefly. [1]

(h) What do $\frac{1}{P^{\text{H}}}$ and m_t^{HF} stand for, respectively? [1]

Total of question 4: [8]

5. (a) What is comparative static analysis? [2]

(b) Use comparative static analysis to examine the effects of a one-percent rise in the domestic money supply, M_t^{H}, in the monetary model of exchange rate determination with flexible prices. [6]

Total of question 5: [8]

References

Frankel, Jeffrey A. and Andrew K. Rose. Currency crashes in emerging markets: An empirical treatment. *Journal of International Economics*, vol. 41, no. 3, Nov. 1996, 351–366.