

# On-Line Appendix to “Non-Core Bank Liabilities and Financial Vulnerability”

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This on-line appendix provides additional robustness checks on the empirical results reported in Hahm, Shin and Shin (2012) “Non-Core Liabilities and Financial Vulnerability”. The purpose of the appendix is to provide additional results from empirical investigations that extend those conducted in the main body of the paper.

This appendix and the additional empirical findings are organized into four sections. More detailed explanations follow under each sub-heading.

- Open Economy Subsample
- Closed Economy Subsample
- Credit Booms
- Interaction Effects

# 1 Open Economy Sample

In this section and the next, we run the probit regressions for separate subsamples of open and closed economies. The criterion for openness is the Chinn-Ito index. Banks in open emerging market economies operate in a different environment from those in closed economies, and hence banks in the two subsamples may display different sensitivities to external conditions and differ in their access to foreign financing, which is a key component of non-core bank liabilities. To explore potential differences between an open versus closed economy, we split the sample countries using Chinn-Ito index. Countries with Chinn-Ito index greater than zero are included in the open economy subsample, and those with less than zero are included in the closed economy subsample. We find that non-core liability ratios are statistically significant predictor of a currency crisis in both open and closed economy subsamples.

When we include credit/GDP ratio in the regression, we find that the credit/GDP ratio seems to play a more important role in closed economies while foreign borrowings are more significant in open economies for both currency crisis and credit crisis. Overall our results are consistent with the hypothesis that non-core bank liabilities in the form of foreign borrowing would matter more in open emerging market countries than in relatively closed economies.

Table 1. **Random effects Panel Probit Regression for Currency Crisis: Monthly Data for Non-Core Sum.**

	(1)	(2)	(3)	(4)	(5)	(6)
Noncore1/M1	2.62*** (0.27)					
Noncore1/M2		4.72*** (0.69)				
Noncore1/Core			3.81*** (0.65)			
Noncore2/M1				1.04*** (0.14)		
Noncore2/M2					1.89*** (0.32)	
Noncore2/Core						3.17*** (0.48)
Pseudo $R^2$	0.18	0.12	0.03	0.05	0.03	0.04
Log-likelihood	-410.60	-437.22	-520.23	-607.69	-623.95	-616.46
Observations	1,821	1,840	2,026	2,170	2,274	2,269
Countries	25	25	27	30	31	31

Table 2. **Random effects Panel Probit Regression for Currency Crisis: Monthly Data for Separate Non-Core to Core Ratios.**

	(1)	(2)	(3)	(4)	(5)	(6)
<hr/> <b>Noncore1</b> <hr/>						
Foreign/M1	3.50*** (0.41)					
Nonbank/M1	1.74*** (0.64)					
Foreign/M2		5.97*** (0.92)				
Nonbank/M2		9.20*** (2.36)				
Foreign/Core			3.47*** (0.62)			
Nonbank/Core			9.97*** (2.31)			
<hr/> <b>Noncore2</b> <hr/>						
Foreign/M1				5.60*** (0.45)		
(M3-M2)/M1				-0.59*** (0.22)		
Foreign/M2					10.12*** (0.93)	
(M3-M2)/M2					-2.38*** (0.57)	
Foreign/Core						14.02*** (1.21)
Nonbank/Core						-2.09*** (0.77)
Pseudo $R^2$	0.21	0.16	0.05	0.19	0.13	0.15
Log-likelihood	-396.30	-421.00	-510.80	-517.02	-556.59	-544.54
Observations	1,821	1,840	2,026	2,170	2,175	2,269
Countries	25	25	27	30	30	31

Table 3. Random effects Panel Probit Regression for Currency Crisis: Annual Data with Credit to GDP Ratio Included.

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	7.35*** (2.32)	12.26** (5.54)	12.20** (5.60)	10.03*** (3.48)	11.10*** (4.21)	10.07*** (3.43)
Noncore1/M2		1.72 (1.34)				
Foreign/M2			1.78 (1.43)			
Nonbank/M2			2.62 (3.64)			
Noncore2/M2				1.46 (1.08)		
Foreign/M2					5.74** (2.83)	2.88** (1.31)
(M3-M2)/M2					-2.27 (2.08)	
Pseudo $R^2$	0.07	0.14	0.15	0.10	0.15	0.16
Log-likelihood	-82.75	-44.68	-44.50	-57.77	-54.50	-67.73
Observations	268	142	142	169	169	235
Countries	43	23	23	28	28	39

Table 4. **Random effects Panel Probit Regression for Credit Crisis: Monthly Data for Non-Core Sum.**

	(1)	(2)	(3)	(4)	(5)	(6)
Noncore1/M1	0.81*** (0.13)					
Noncore1/M2		1.51*** (0.26)				
Noncore1/Core			15.41*** (1.42)			
Noncore2/M1				0.86*** (0.14)		
Noncore2/M2					1.78*** (0.24)	
Noncore2/Core						10.92*** (1.27)
Pseudo $R^2$	0.09	0.08	0.29	0.14	0.15	0.52
Log-likelihood	-258.03	-307.61	-242.90	-136.52	-176.29	-99.03
Observations	1,414	1,403	1,595	1,740	1,809	1,784
Countries	19	19	21	25	26	26

Table 5. **Random effects Panel Probit Regression for Credit Crisis: Monthly Data for Separate Non-Core to Core Ratios.**

	(1)	(2)	(3)	(4)	(5)	(6)
<hr/> <b>Noncore1</b> <hr/>						
Foreign/M1	0.64*** (0.13)					
Nonbank/M1	5.08*** (1.29)					
Foreign/M2		1.35*** (0.25)				
Nonbank/M2		8.83*** (2.20)				
Foreign/Core			17.31*** (1.58)			
Nonbank/Core			16.54*** (4.75)			
<hr/> <b>Noncore2</b> <hr/>						
Foreign/M1				8.48*** (1.67)		
(M3-M2)/M1				-1.11*** (0.33)		
Foreign/M2					9.26*** (1.62)	
(M3-M2)/M2					-0.99** (0.43)	
Foreign/Core						13.56*** (1.90)
Nonbank/Core						10.59*** (2.55)
Pseudo $R^2$	0.13	0.10	0.33	0.43	0.37	0.55
Log-likelihood	-247.78	-300.31	-228.37	-90.70	-100.25	-93.02
Observations	1,414	1,403	1,595	1,740	1,740	1,784
Countries	19	19	21	25	25	26

Table 6. Random effects Panel Probit Regression for Credit Crisis: Annual Data with Credit to GDP Ratio Included.

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	3.37*	5.12	6.51	4.06	3.37	0.77
	(1.77)	(5.76)	(6.36)	(3.99)	(4.43)	(2.35)
Noncore1/M2		1.26				
		(1.31)				
Foreign/M2			0.85			
			(1.30)			
Nonbank/M2			3.40			
			(4.35)			
Noncore2/M2				16.21**		
				(7.69)		
Foreign/M2					17.82*	3.21**
					(9.38)	(1.54)
(M3-M2)/M2					8.93	
					(6.98)	
Pseudo $R^2$	0.04	0.09	0.09	0.52	0.50	0.12
Log-likelihood	-55.14	-28.90	-28.85	-12.22	-12.68	-45.78
Observations	266	102	102	143	143	218
Countries	39	17	17	24	24	34



Table 7. **Random effects Panel Probit Regression for Stock Market Crisis: Monthly Data for Non-Core Sum.**

	(1)	(2)	(3)	(4)	(5)	(6)
Noncore1/M1	1.11*** (0.34)					
Noncore1/M2		15.89*** (2.52)				
Noncore1/Core			-2.01*** (0.76)			
Noncore2/M1				0.53*** (0.14)		
Noncore2/M2					0.64** (0.25)	
Noncore2/Core						-0.25 (0.21)
Pseudo $R^2$	0.02	0.11	0.01	0.01	0.01	0.00
Log-likelihood	-269.15	-202.12	-308.11	-540.56	-544.88	-546.38
Observations	473	404	554	1,000	1,000	998
Countries	8	7	9	15	15	15

Table 8. **Random effects Panel Probit Regression for Stock Market Crisis: Monthly Data for Separate Non-Core to Core Ratios.**

	(1)	(2)	(3)	(4)	(5)	(6)
<hr/> <b>Noncore1</b> <hr/>						
Foreign/M1	-0.19 (0.42)					
Nonbank/M1	9.40*** (1.36)					
Foreign/M2		15.23*** (3.00)				
Nonbank/M2		22.54*** (4.99)				
Foreign/Core			-3.26*** (0.89)			
Nonbank/Core			-0.09 (2.90)			
<hr/> <b>Noncore2</b> <hr/>						
Foreign/M1				2.11*** (0.28)		
(M3-M2)/M1				-1.39*** (0.49)		
Foreign/M2					3.15*** (0.57)	
(M3-M2)/M2					-2.47** (1.22)	
Foreign/Core						4.17*** (0.56)
Nonbank/Core						-15.77*** (1.93)
Pseudo $R^2$	0.13	0.13	0.03	0.07	0.04	0.08
Log-likelihood	-239.99	-197.38	-303.82	-510.30	-526.53	-505.27
Observations	473	404	554	1,000	1,000	998
Countries	8	7	9	15	15	15

Table 9. **Random effects Panel Probit Regression for Stock Market Crisis: Annual Data with Credit to GDP Ratio Included**

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	4.00*** (1.45)	272.78 (211.84)	364.40 (330.81)	4.24*** (1.60)	4.10** (1.63)	4.27*** (1.60)
Noncore1/M2		0.18 (28.24)				
Foreign/M2			3.97 (37.82)			
Nonbank/M2			183.38 (297.57)			
Noncore2/M2				2.23 (2.48)		
Foreign/M2					3.30 (2.43)	2.76 (2.10)
(M3-M2)/M2					5.20 (5.88)	
Pseudo $R^2$	0.07	0.81	0.83	0.13	0.14	0.13
Log-likelihood	-62.71	-2.95	-2.61	-36.04	-35.40	-41.09
Observations	110	26	26	68	68	80
Countries	18	5	5	13	13	14

## 2 Closed Economy Sample

Table 10. Random effects Panel Probit Regression for Currency Crisis: Monthly Data for Non-Core Sum.

	(1)	(2)	(3)	(4)	(5)	(6)
Noncore1/M1	7.82*** (1.05)					
Noncore1/M2		6.73*** (1.28)				
Noncore1/Core			14.28*** (2.33)			
Noncore2/M1				1.40*** (0.23)		
Noncore2/M2					1.93*** (0.40)	
Noncore2/Core						7.01*** (1.01)
Pseudo $R^2$	0.20	0.08	0.09	0.08	0.07	0.11
Log-likelihood	-161.69	-185.03	-182.71	-267.45	-269.07	-257.61
Observations	1,420	1,413	1,463	1,262	1,262	1,262
Countries	21	20	21	17	17	17

Table 11. **Random effects Panel Probit Regression for Currency Crisis: Monthly Data for Separate Non-Core to Core Ratios.**

	(1)	(2)	(3)	(4)	(5)	(6)
<hr/> <b>Noncore1</b> <hr/>						
Foreign/M1	8.45*** (1.05)					
Nonbank/M1	-6.74 (5.05)					
Foreign/M2		14.31*** (2.20)				
Nonbank/M2		-4.39 (12.12)				
Foreign/Core			20.97*** (2.72)			
Nonbank/Core			10.34 (11.45)			
<hr/> <b>Noncore2</b> <hr/>						
Foreign/M1				6.06*** (0.79)		
(M3-M2)/M1				-0.30 (0.29)		
Foreign/M2					14.37*** (1.68)	
(M3-M2)/M2					-2.44*** (0.53)	
Foreign/Core						12.73*** (1.87)
Nonbank/Core						5.02*** (1.20)
Pseudo $R^2$	0.24	0.20	0.19	0.18	0.18	0.14
Log-likelihood	-153.48	-161.83	-164.23	-239.13	-238.64	-248.43
Observations	1,420	1,413	1,463	1,262	1,262	1,262
Countries	21	20	21	17	17	17

Table 12. Random effects Panel Probit Regression for Currency Crisis: Annual Data with Credit to GDP Ratio Included.

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	26.40*** (10.06)	80.01** (38.09)	71.75* (39.18)	78.59*** (22.27)	101.61** (47.99)	21.50** (9.87)
Noncore1/M2		20.07 (16.42)				
Foreign/M2			20.22 (17.77)			
Nonbank/M2			-77.32 (86.92)			
Noncore2/M2				13.17* (7.24)		
Foreign/M2					31.09* (16.07)	6.91 (7.04)
(M3-M2)/M2					-2.16 (10.38)	
Pseudo $R^2$	0.15	0.47	0.48	0.41	0.35	0.16
Log-likelihood	-36.43	-10.94	-10.82	-15.10	-16.58	-34.17
Observations	158	81	81	79	79	132
Countries	30	15	15	14	14	26

Table 13. **Random effects Panel Probit Regression for Credit Crisis: Monthly Data for Non-Core Sum.**

	(1)	(2)	(3)	(4)	(5)	(6)
Noncore1/M1	0.45 (0.43)					
Noncore1/M2		4.73*** (1.37)				
Noncore1/Core			5.16*** (1.29)			
Noncore2/M1				0.66*** (0.25)		
Noncore2/M2					5.46*** (1.24)	
Noncore2/Core						8.22*** (0.35)
Pseudo $R^2$	0.00	0.03	0.04	0.02	0.08	0.19
Log-likelihood	-202.40	-196.34	-194.95	-195.10	-181.47	-161.34
Observations	921	914	1,030	834	834	834
Countries	14	13	15	12	12	12

Table 14. **Random effects Panel Probit Regression for Credit Crisis: Monthly Data for Separate Non-Core to Core Ratios.**

	(1)	(2)	(3)	(4)	(5)	(6)
<hr/> <b>Noncore1</b> <hr/>						
Foreign/M1	1.63*** (0.54)					
Nonbank/M1	-3.77*** (1.18)					
Foreign/M2		8.89*** (1.63)				
Nonbank/M2		-13.51*** (4.32)				
Foreign/Core			6.97*** (1.35)			
Nonbank/Core			-16.62*** (5.10)			
<hr/> <b>Noncore2</b> <hr/>						
Foreign/M1				2.85*** (0.49)		
(M3-M2)/M1				-2.43*** (0.79)		
Foreign/M2					12.67*** (1.20)	
(M3-M2)/M2					-6.73*** (2.22)	
Foreign/Core						12.90*** (1.74)
Nonbank/Core						-9.69** (4.79)
Pseudo $R^2$	0.10	0.16	0.12	0.18	0.25	0.23
Log-likelihood	-181.90	-170.00	-179.53	-162.23	-148.66	-153.28
Observations	921	914	1,030	834	834	834
Countries	14	13	15	12	12	12



Table 15. **Random effects Panel Probit Regression for Credit Crisis: Annual Data with Credit to GDP Ratio Included.**

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	20.94** (9.10)	14.46 (12.78)	2.76 (20.13)	27.32 (21.30)	13.96 (22.29)	8.56 (11.66)
Noncore1/M2		2.03 (10.91)				
Foreign/M2			10.54 (15.06)			
Nonbank/M2			-5.40 (19.26)			
Noncore2/M2				-4.53 (12.45)		
Foreign/M2					7.96 (16.42)	12.12 (8.04)
(M3-M2)/M2					-28.57 (31.01)	
Pseudo $R^2$	0.11	0.09	0.11	0.17	0.22	0.14
Log-likelihood	-30.74	-13.64	-13.39	-14.62	-14.62	-26.99
Observations	164	55	55	61	61	139
Countries	28	10	10	10	10	23

Table 16. **Random effects Panel Probit Regression for Stock Market Crisis: Monthly Data for Noncore Sum.**

	(1)	(2)	(3)	(4)	(5)	(6)
Noncore1/M1	2.66*** (0.67)					
Noncore1/M2		13.16*** (2.47)				
Noncore1/Core			15.67*** (3.12)			
Noncore2/M1				2.29*** (0.38)		
Noncore2/M2					7.99*** (1.35)	
Noncore2/Core						10.98*** (1.85)
Pseudo $R^2$	0.05	0.11	0.10	0.14	0.14	0.14
Log-likelihood	-150.49	-141.36	-128.50	-143.44	-143.38	-142.52
Observations	324	317	323	328	328	328
Countries	6	5	6	7	7	7

Table 17. **Random effects Panel Probit Regression for Stock Market Crisis: Monthly Data for Separate Non-Core to Core Ratios.**

	(1)	(2)	(3)	(4)	(5)	(6)
<hr/> <b>Noncore1</b> <hr/>						
Foreign/M1	3.63*** (0.74)					
Nonbank/M1	2.59*** (0.85)					
Foreign/M2		15.83*** (2.58)				
Nonbank/M2		15.22*** (4.13)				
Foreign/Core			20.32*** (3.05)			
Nonbank/Core			14.07* (7.20)			
<hr/> <b>Noncore2</b> <hr/>						
Foreign/M1				3.56*** (0.59)		
(M3-M2)/M1				1.65*** (0.47)		
Foreign/M2					12.87*** (2.08)	
(M3-M2)/M2					4.46** (1.74)	
Foreign/Core						16.36*** (2.49)
Nonbank/Core						-0.19 (3.57)
Pseudo $R^2$	0.09	0.17	0.21	0.18	0.18	0.19
Log-likelihood	-144.72	-131.62	-113.55	-136.19	-136.41	-135.14
Observations	324	317	323	328	328	328
Countries	6	5	6	7	7	7

Table 18. **Random effects Panel Probit Regression for Stock Market Crisis: Annual Data with Credit to GDP Ratio Included.**

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	4.52 (5.17)	10.37 (10.63)	6.27 (10.65)	5.88 (7.93)	5.53 (8.55)	2.55 (6.87)
Noncore1/M2		1.22 (9.47)				
Foreign/M2			8.71 (11.70)			
Nonbank/M2			3.67 (14.81)			
Noncore2/M2				3.86 (5.53)		
Foreign/M2					4.76 (9.28)	6.29 (7.91)
(M3-M2)/M2					3.47 (9.86)	
Pseudo $R^2$	0.02	0.11	0.14	0.08	0.08	0.05
Log-likelihood	-22.92	-8.54	-8.23	-12.66	-12.61	-16.91
Observations	37	16	16	21	21	27
Countries	10	4	4	5	5	7

### **3 Alternative Dependent Variables**

We examine alternative dependent variables indicating crises. The first is the foreign exchange market pressure index, which is constructed as a simple average of the following three variables – rate of depreciation in local currency, rate of decrease in central bank international reserves, and the increase in money market interest rate. We find that our non-core liabilities measure continues to perform well, although they are not as clear-cut as for the probit regression results reported in the body of the paper.

In addition, we also examine the change in credit volumes as a dependent variable. When domestic credit is growing rapidly relative to the pace of real economic activities, such a development may indicate rising credit market vulnerabilities to a crisis, as shown in our theoretical model. Hence, we use the deviation in the credit to GDP ratio around a linear trend as the dependent variable in the regressions reported in this section. As can be seen in the tables, non-core bank liabilities, especially foreign borrowings are again significantly positively associated with the growth in credit to GDP ratio. This finding implies that non-core bank liabilities are indeed an important source of funding in credit expansions.

Table 19. **Panel Regression for Foreign Exchange Market Pressure: Monthly Data for Non-Core Sum.**

	(1)	(2)	(3)	(4)	(5)	(6)
Noncore1/M1	1.53*** (0.47)					
Noncore1/M2		1.20 (0.92)				
Noncore1/Core			10.09*** (2.38)			
Noncore2/M1				0.62 (0.83)		
Noncore2/M2					0.88 (1.53)	
Noncore2/Core						1.14 (0.74)
$R^2$	0.01	0.00	0.01	0.00	0.00	0.00
Observations	1,864	1,840	2,141	2,060	2,129	2,106
Countries	19	19	22	22	23	23

Table 20. **Panel Regression for Foreign Exchange Market Pressure: Monthly Data for Separate Non-Core to Core Ratios.**

	(1)	(2)	(3)	(4)	(5)	(6)
<hr/>						
Noncore1						
<hr/>						
Foreign/M1	2.19***					
	(0.51)					
Nonbank/M1	-2.05					
	(1.40)					
Foreign/M2		2.03**				
		(0.98)				
Nonbank/M2		-5.20*				
		(3.05)				
Foreign/Core			13.14***			
			(2.49)			
Nonbank/Core			-9.65			
			(7.27)			
<hr/>						
Noncore2						
<hr/>						
Foreign/M1				1.34		
				(0.96)		
(M3-M2)/M1				-1.23		
				(1.56)		
Foreign/M2					1.99	
					(1.73)	
(M3-M2)/M2					-4.62	
					(3.46)	
Foreign/Core						2.79*
						(1.60)
Nonbank/Core						-6.71
						(6.85)
<hr/>						
$R^2$	0.01	0.00	0.01	0.00	0.00	0.00
Observations	1,864	1,840	2,141	2,060	2,060	2,106
Countries	19	19	22	22	22	23
<hr/>						

Table 21. Panel Regression for Foreign Exchange Market Pressure: Annual Data with Credit to GDP Ratio Included.

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	50.74** (23.70)	-1.61 (68.15)	-34.35 (68.13)	51.30** (20.37)	37.69* (20.60)	15.18 (27.87)
Noncore1/M2		42.05** (20.20)				
Foreign/M2			63.11*** (21.46)			
Nonbank/M2			-93.78 (59.49)			
Noncore2/M2				36.49** (15.10)		
Foreign/M2					58.33*** (16.75)	56.09*** (14.37)
(M3-M2)/M2					-26.62 (29.53)	
$R^2$	0.01	0.04	0.08	0.09	0.13	0.07
Observations	321	138	138	165	165	256
Countries	39	18	18	23	23	33

Table 22. Panel Regression for Credit growth: Annual data.

	(1)	(2)	(3)	(4)	(5)
Noncore1/M2	0.08*** (0.02)				
Foreign/M2		0.09*** (0.02)		-0.01 (0.03)	0.07*** (0.02)
Nonbank/M2		0.01 (0.06)			
Noncore2/M2			-0.04 (0.02)		
(M3-M2)/M2				-0.07** (0.04)	
$R^2$	0.07	0.08	0.01	0.01	0.02
Observations	282	282	339	339	613
Countries	45	45	49	49	87



## 4 Interaction Effects

In this section, we examine the non-linear interaction effects of non-core bank liabilities with other factors.

- **Sovereign Debt to GDP Ratio.** One potential non-linear interaction is between non-core funding of banks and other factors as a propagation channel into a financial crisis. For instance, when sovereign debt level is already high, financial vulnerability caused by the banking sector could be more likely to materialize into an actual crisis. We test this potential non-linear effect by including an interaction term with sovereign debt to GDP ratio. We obtain sovereign debt to GDP data from two sources – Reinhart and Rogoff (2009), and the World Bank. For both measures, our regression results indicate that, while the increase in sovereign debt to GDP ratio itself raises the probability of a crisis, there seems to be no strong interaction effects between sovereign debt and non-core bank liabilities. Contrary to the conjecture, we find a negative interaction term in some cases, which may be due to the existence of a few advanced countries with large sovereign debts, but have not experienced a financial crisis.
- **Current Account Balance to GDP Ratio.** Another potential interaction effect is the one with current account deficits. Growing current account deficits financed by bank foreign borrowings may exacerbate a banking crisis or a currency crisis into a full-pledged financial crisis. However, the current account balance to GDP ratio or its interaction term with non-core bank liability ratio does not seem to have a significant relationship with a subsequent crisis.
- **Quality of Institutions.** We also consider the quality of institutions

as a potential interacting variable. To denote the institutional quality of legal infrastructure, we use the rule of law index obtained from the World Bank. We find that our non-core bank liability measures are still a significant predictor of a crisis. More interestingly, its interaction term with the rule of law index has a significantly negative coefficient, which means that the probability of a crisis rises non-linearly with non-core bank liabilities in countries with relatively poor institutions.

- **LIBOR as an Alternative Global Factor.** Lastly, we consider an alternative interest rate as a measure of global liquidity – LIBOR instead of the US fed fund rate. As can be seen in the tables, our non-core bank liability measures still have a significant explanatory power even in the presence of the credit to GDP ratio and global factors. A decrease in global GDP growth rate tends to increase the probability of a currency crisis, but the interest rate and commodity price inflation do not show a robust impact.

Table 23. Random effects Panel Probit Regression for Currency Crisis: Annual Data for Non-Core Sum with Interaction Terms Included.

	(1)	(2)	(3)	(4)
Noncore1/M2	31.68*** (10.87)	3.08 (4.58)	5.07** (2.09)	3.37*** (1.30)
Noncore1/M2*Carmen	-0.27** (0.13)			
Carmen	-0.00 (0.00)			
Noncore1/M2*Central Gov		0.07 (0.07)		
Central Gov		-0.04 (0.04)		
Noncore1/M2*Current Account			20.61 (21.33)	
Current Account			-0.04 (2.28)	
Noncore1/M2*Rule of Law				-1.22 (2.27)
Rule of Law				0.26 (0.32)
Pseudo $R^2$	0.18	0.19	0.09	0.07
Log-likelihood	-37.53	-22.86	-70.30	-79.60
Observations	139	77	232	264
Countries	20	16	35	38

Table 24. **Random effects Panel Probit Regression for Currency Crisis: Annual Data for Separate Non-Core to Core Ratios with Interaction Terms Included.**

	(1)	(2)	(3)	(4)
Foreign/M2	22.05 (20.55)	11.27 (7.82)	6.60** (3.01)	4.89** (1.91)
Foreign/M2*Carmen	-0.62 (0.56)			
Nonbank/M2	74.25** (36.04)	204.06* (109.67)	3.46 (4.44)	11.25 (8.18)
Nonbank/M2*Carmen	-1.13 (0.94)			
Carmen	-0.01 (0.01)			
Foreign/M2*Central Gov		0.23* (0.13)		
Nonbank/M2*Central Gov		-3.27 (2.09)		
Central Gov		-0.15** (0.06)		
Foreign/M2*Current Account			25.99 (27.15)	
Nonbank/M2*Current Account			14.75 (77.75)	
Current Account			0.05 (2.34)	
Foreign/M2*Rule of Law				-3.61 (3.30)
Nonbank/M2*Rule of Law				13.11 (12.15)
Rule of Law				0.33 (0.36)
Pseudo $R^2$	0.37	0.25	0.11	0.10
Log-likelihood	-28.97	-21.23	-69.30	-77.06
Observations	139	77	232	264
Countries	20	16	35	38

Table 25. **Random effects Panel Probit Regression for Currency Crisis: Annual Data for Non-Core Sum with Credit to GDP Ratio and Interaction Terms Included.**

	(1)	(2)	(3)	(4)
Credit/GDP	18.70** (7.90)	58.67** (24.67)	22.01*** (7.09)	20.99*** (6.58)
Noncore1/M2	22.49* (11.73)	19.88** (8.53)	3.69 (2.35)	3.23 (2.27)
Noncore1/M2*Carmen	-0.19 (0.15)			
Carmen	-0.00 (0.01)			
Noncore1/M2*Central Gov		-0.02 (0.16)		
Central Gov		-0.16*** (0.06)		
Noncore1/M2*Current Account			14.91 (24.87)	
Current Account			1.98 (3.17)	
Noncore1/M2*Rule of Law				-1.13 (3.01)
Rule of Law				0.08 (0.45)
Pseudo $R^2$	0.27	0.32	0.22	0.21
Log-likelihood	-32.65	-18.99	-60.37	-61.38
Observations	125	76	224	233
Countries	18	16	34	35

Table 26. **Random effects Panel Probit Regression for Currency Crisis: Annual Data for Separate Non-Core to Core Ratios with Credit to GDP Ratio and Interaction Terms Included.**

	(1)	(2)	(3)	(4)
Credit/GDP	17.16 (12.62)	61.21** (27.37)	22.27*** (7.28)	20.38*** (6.84)
Foreign/M2	3.98 (25.99)	17.88** (8.53)	4.51 (2.82)	4.83 (3.29)
Foreign/M2*Carmen	0.94 (0.77)			
Nonbank/M2	82.63** (36.20)	125.15 (117.96)	3.80 (5.53)	8.23 (9.37)
Nonbank/M2*Carmen	-1.46** (0.74)			
Carmen	-0.01 (0.01)			
Foreign/M2*Central Gov		-0.04 (0.17)		
Nonbank/M2*Central Gov		-1.53 (2.27)		
Central Gov		-0.15** (0.06)		
Foreign/M2*Current Account			18.81 (28.61)	
Nonbank/M2*Current Account			-8.66 (89.20)	
Current Account			2.08 (3.24)	
Foreign/M2*Rule of Law				-3.40 (4.46)
Nonbank/M2*Rule of Law				7.57 (13.56)
Rule of Law				0.16 (0.51)
Pseudo $R^2$	0.41	0.34	0.22	0.22
Log-likelihood	-26.10	-18.51	-59.93	-60.63
Observations	125	76	224	233
Countries	18	16	34	35

Table 27. **Random effects Panel Probit Regression for Credit Crisis: Annual Data for Non-Core Sum with Interaction Terms Included.**

	(1)	(2)	(3)	(4)
Noncore1/M2	82.15** (37.11)	15.50 (17.40)	2.00 (1.29)	4.10** (1.65)
Noncore1/M2*Carmen	-0.93** (0.45)			
Carmen	0.11*** (0.03)			
Noncore1/M2*Central Gov		-0.09 (0.17)		
Central Gov		0.02 (0.02)		
Noncore1/M2*Current Account			4.45 (22.97)	
Current Account			-2.41 (2.69)	
Noncore1/M2*Rule of Law				-6.04** (2.99)
Rule of Law				-0.45 (0.53)
Pseudo $R^2$	0.29	0.40	0.06	0.12
Log-likelihood	-19.41	-9.57	-48.30	-48.78
Observations	117	63	155	175
Countries	16	13	23	26

Table 28. **Random effects Panel Probit Regression for Credit Crisis: Annual Data for Separate Non-Core to Core Ratios with Interaction Terms Included.**

	(1)	(2)	(3)	(4)
Foreign/M2	53.61** (26.07)	34.01 (37.38)	2.30 (1.62)	9.00*** (3.03)
Foreign/M2*Carmen	-0.76* (0.44)			
Nonbank/M2	31.32 (56.53)	-29.69 (74.78)	0.20 (4.17)	-18.06 (15.55)
Nonbank/M2*Carmen	-0.31 (0.63)			
Carmen	0.08*** (0.03)			
Foreign/M2*Central Gov		-0.33 (0.42)		
Nonbank/M2*Central Gov		0.34 (0.62)		
Central Gov		0.02 (0.02)		
Foreign/M2*Current Account			11.83 (26.63)	
Nonbank/M2*Current Account			-8.54 (65.96)	
Current Account			-2.13 (2.66)	
Foreign/M2*Rule of Law				-15.13*** (5.61)
Nonbank/M2*Rule of Law				-25.35 (25.19)
Rule of Law				-0.78 (0.72)
Pseudo $R^2$	0.21	0.42	0.06	0.21
Log-likelihood	-21.62	-9.36	-48.24	-44.04
Observations	117	63	155	175
Countries	16	13	23	26



Table 29. **Random effects Panel Probit Regression for Credit Crisis: Annual Data for Non-Core Sum with Credit to GDP Ratio and Interaction Terms Included.**

	(1)	(2)	(3)	(4)
Credit/GDP	2.37 (14.27)	1.65 (17.29)	6.42 (4.59)	7.88 (4.96)
Noncore1/M2	72.93*** (37.13)	15.60 (17.77)	0.99 (1.47)	3.25* (1.70)
Noncore1/M2*Carmen	-0.78 (0.49)			
Carmen	0.09*** (0.03)			
Noncore1/M2*Central Gov		-0.09 (0.17)		
Central Gov		0.02 (0.02)		
Noncore1/M2*Current Account			-2.72 (25.83)	
Current Account			-2.03 (2.75)	
Noncore1/M2*Rule of Law				-6.34** (3.00)
Rule of Law				-0.57 (0.58)
Pseudo $R^2$	0.25	0.40	0.08	0.16
Log-likelihood	-18.00	-9.57	-47.23	-43.65
Observations	113	63	155	165
Countries	15	13	23	25

Table 30. **Random effects Panel Probit Regression for Credit Crisis: Annual Data for Separate Non-Core to Core Ratios with Credit to GDP Ratio and Interaction Terms Included.**

	(1)	(2)	(3)	(4)
Credit/GDP	11.55 (16.87)	60.24* (36.53)	6.40 (4.86)	2.30 (5.69)
Foreign/M2	49.59 (32.48)	121.07** (55.22)	1.08 (1.63)	9.23** (3.60)
Foreign/M2*Carmen	-0.80* (0.46)			
Nonbank/M2	37.46 (61.10)	-12.66 (172.53)	0.63 (4.14)	-22.15 (18.01)
Nonbank/M2*Carmen	-0.35 (0.68)			
Carmen	0.09*** (0.03)			
Foreign/M2*Central Gov		-1.39** (0.69)		
Nonbank/M2*Central Gov		0.52 (1.41)		
Central Gov		-0.02 (0.06)		
Foreign/M2*Current Account			4.87 (28.34)	
Nonbank/M2*Current Account			-17.69 (65.70)	
Current Account			-1.88 (2.70)	
Foreign/M2*Rule of Law				-16.15*** (6.16)
Nonbank/M2*Rule of Law				-32.28 (29.27)
Rule of Law				-1.01 (0.87)
Pseudo $R^2$	0.19	0.46	0.08	0.24
Log-likelihood	-19.60	-8.61	-47.30	-39.72
Observations	113	63	155	165
Countries	15	13	23	25

Table 31. **Random effects Panel Probit Regression for Currency Crisis: Annual Data with Credit to GDP Ratio and Common Factors Included.**

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	7.14*** (2.54)	14.52** (6.21)	14.29** (6.24)	7.16* (4.21)	9.08* (5.14)	9.30** (3.65)
Noncore1/M2		2.22 (1.90)				
Foreign/M2			2.35 (2.01)			
Nonbank/M2			4.56 (5.56)			
Noncore2/M2				2.45* (1.39)		
Foreign/M2					7.25* (3.97)	3.36** (1.65)
(M3-M2)/M2					-0.78 (2.06)	
Libor	0.21** (0.10)	0.35** (0.16)	0.35** (0.16)	0.47*** (0.17)	0.41** (0.18)	0.20* (0.11)
Commodity	7.80*** (2.90)	2.49 (4.38)	2.24 (4.41)	3.86 (3.94)	3.25 (4.32)	5.77* (3.23)
World GDP	-56.65*** (12.45)	-58.97*** (20.91)	-59.78*** (21.14)	-78.68*** (20.23)	-76.41*** (21.65)	-50.71*** (14.18)
Pseudo $R^2$	0.19	0.28	0.28	0.26	0.28	0.23
Log-likelihood	-113.47	-56.08	-55.77	-67.70	-66.25	-98.90
Observations	454	233	233	256	256	385
Countries	66	35	35	39	39	58

Table 32. **Random effects Panel Probit Regression for Credit Crisis: Annual Data with Credit to GDP Ratio and Common Factors Included.**

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	1.70 (2.72)	18.11* (10.60)	14.48 (10.92)	-1.31 (5.26)	-4.42 (7.93)	-1.33 (5.87)
Noncore1/M2		3.51 (3.34)				
Foreign/M2			9.54 (6.76)			
Nonbank/M2			-2.08 (7.34)			
Noncore2/M2				9.26*** (3.09)		
Foreign/M2					16.81*** (6.21)	13.99*** (4.29)
(M3-M2)/M2					2.68 (3.98)	
Libor	0.14 (0.14)	-0.14 (0.24)	-0.21 (0.25)	0.04 (0.22)	0.06 (0.24)	0.11 (0.18)
Commodity	-10.09** (4.63)	-17.09** (7.74)	-18.03** (7.96)	-8.27 (6.77)	-11.48 (7.34)	-16.23*** (6.23)
World GDP	-69.41*** (22.34)	-12.85 (36.96)	2.01 (39.82)	-59.28* (30.66)	-47.80 (32.41)	-44.88* (26.06)
Pseudo $R^2$	0.17	0.29	0.30	0.35	0.39	0.33
Log-likelihood	-69.27	-33.52	-32.73	-30.25	-28.33	-54.44
Observations	432	156	156	199	199	375
Countries	62	25	25	31	31	55

Table 33. **Random effects Panel Probit Regression for Stock Market Crisis: Annual Data with Credit to GDP Ratio and Common Factors Included.**

	(1)	(2)	(3)	(4)	(5)	(6)
Credit/GDP	6.55 (4.02)	16.23 (16.86)	46.57 (97.78)	12.40 (7.83)	14.86* (8.33)	15.73** (7.14)
Noncore1/M2		0.87 (10.35)				
Foreign/M2			208.56* (115.03)			
Nonbank/M2			-222.93 (141.24)			
Noncore2/M2				2.94 (3.26)		
Foreign/M2					1.67 (3.02)	1.80 (2.69)
(M3-M2)/M2					17.95** (8.80)	
Libor	0.73*** (0.17)	0.47 (0.32)	4.23 (2.92)	0.68** (0.27)	0.87** (0.34)	0.47** (0.19)
Commodity	25.33*** (7.96)	21.70 (20.96)	109.86 (141.11)	28.42** (12.58)	29.55** (13.28)	26.01** (10.37)
World GDP	-20.69 (19.26)	11.95 (51.86)	719.79 (628.41)	-8.66 (29.45)	-18.86 (32.78)	6.71 (24.97)
Pseudo $R^2$	0.41	0.39	0.49	0.48	0.52	0.45
Log-likelihood	-50.11	-14.09	-11.82	-28.18	-25.75	-34.40
Observations	139	42	42	87	87	103
Countries	25	8	8	17	17	19