Term Premia in Emerging Markets

Pavel Solís

Johns Hopkins University

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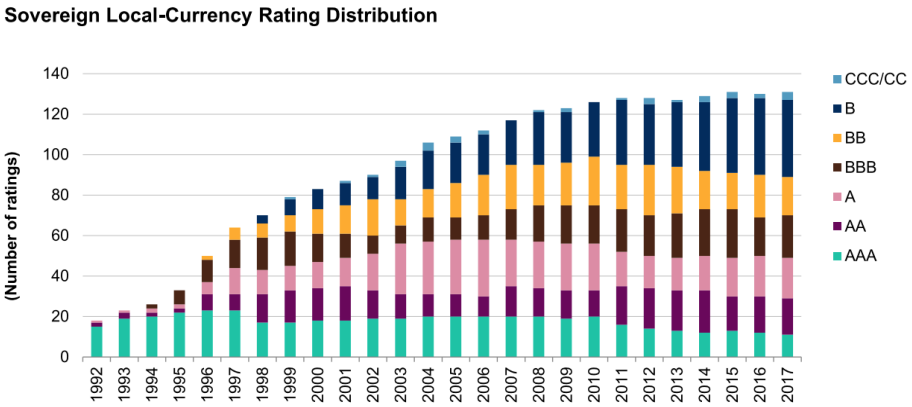
  - ⇀ Expected short-term interest rate
  - ⇀ Term premium
- Sovereign debt of advanced economies is considered risk-free
- **Problem:** Debt of emerging markets (EMs) is *not* risk-free
  - ⇀ Credit risks embedded in local currency (LC) debt

Motivation



Source: S&P Global Fixed Income Research.

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- Decompose LC yields of EMs *without* credit risk
  - ⇀ Analyze components, especially the term premium
- **Main idea:** What if the U.S. issue debt in other currencies?
  - ⇀ Use synthetic zero-coupon yield curves
  - ⇀ Swap U.S. Treasury yields into LC using derivatives
    - — Forward premium

Why Is This Important?

- Determinants of LC yields
  - ⇀ Market expectations about monetary policy
  - ⇀ Monetary policy transmission in EMs

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- Global financial cycle
  - ⇀ EMs vs advanced economies
- Testing asset pricing theories in EMs
  - ⇀ Buraschi, Piatti and Whelan (2018)

What Has Been Done?

- Vast literature on yield curve decomposition for advanced economies (AEs)
- Fewer papers decompose of EM yield curves
  - ⇀ Blake, Rule, and Rummel (2015)

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- Vast literature on yield curve decomposition for advanced economies (AEs)
- Fewer papers decompose of EM yield curves
  - ⇀ Blake, Rule, and Rummel (2015)
- Synthetic yield curves
  - ⇀ LC credit spread (Du and Schreger, 2016)
  - ⇀ Convenience yield (Du, Im, and Schreger, 2018a)

Roadmap

- Construction of yield curves: synthetic and nominal
- Affine term structure models
- Results
- Proposals

Construction of **Synthetic** Yield Curves

$$\widetilde{y}_{t,n}^{LC} = y_{t,n}^{US} + \rho_{t,n}$$

- $\widetilde{y}_{t,n}^{LC}$ is the n-period zero-coupon yield of a country in LC at time t
- $y_{t,n}^{US}$ is the n-period zero-coupon yield of the U.S. in USD at time t
- $\rho_{t,n}$ is the n-period forward premium from USD to LC at time t

Construction of Synthetic Yield Curves: Forward Premium

$$\rho_{t,n}$$

- < 1 year: FX forwards $\rightarrow (forward_{t,n} - spot_t)/n$
- ≥ 1 year: Fixed-for-fixed cross-currency swaps (CCS)

Construction of Synthetic Yield Curves: Forward Premium

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- < 1 year: FX forwards $\rightarrow (forward_{t,n} - spot_t)/n$
- ≥ 1 year: Fixed-for-fixed cross-currency swaps (CCS)
  - Constructed using cross-currency basis swaps and interest rate swaps
  - Why CCS?
    - Defaults on LC bonds not considered trigger events of credit default swaps (CDS)
    - CCS are collateralized $\rightarrow$ Bilateral counterparty risk in CCS is small

Construction of **Nominal** Yield Curves

- Focus on synthetic yield curve $\widetilde{y}_{t,n}^{LC}$ but nominal yield curve $y_{t,n}^{LC}$ also of interest
  - ⇀ Assess benefits of 'adjusting' for credit risk
  - ⇀ Calculate deviations from covered interest rate parity (CIP)
- $y_{t,n}^{LC}$ estimated from:
  - ⇀ Bloomberg Fair Value (BFV) curves
  - ⇀ Nelson and Siegel (1987)

Deviations from CIP

$$\phi_{t,n} = y_{t,n}^{LC} - \widetilde{y}_{t,n}^{LC}$$

- $\phi_{t,n}$ measures CIP deviations between government bond yields
- Explanations:
  - ⇀ Sovereign credit risk (Du and Schreger, 2016)
  - ⇀ Liquidity and convenience yields (Du, Im, and Schreger, 2018a)
  - ⇀ Financial market frictions (Du, Tepper, and Verdelhan, 2018b)

Affine Term Structure Model

- ATSMs standard tool to estimate dynamics of *nominal* yield curves for AEs
  - ⇀ A set of stochastic factors drive the dynamics of the term structure
  - ⇀ No-arbitrage restrictions: Consistency in (cross section/time series) bond yields
  - ⇀ Yields are affine functions of the set of pricing factors
- Key assumption: Yields are risk-free

ATSM for EMs

- For EMs,
  - $y_{t,n}^{LC}$ is not risk-free since $\phi_{t,n} \neq 0$ (Du and Schreger, 2016)
  - Focusing on $\widetilde{y}_{t,n}^{LC}$ better aligns with the risk-free assumption
- Estimating an ATSM for the dynamics of $\widetilde{y}_{t,n}^{LC}$ allows to decompose $y_{t,n}^{LC}$ into:
  - Expected future short-term interest rate
  - Term premium
  - LC credit spread

Identification Problem

- Bond yields are persistent → Small sample bias (Kim and Orphanides, 2012)
  - ⇀ Overestimates the stability of the expected path of the short-term interest rate
  - ⇀ Most variability in yields will be attributed to fluctuations in the term premium
- Solutions: parameter restrictions, bias-corrected estimators, survey forecasts
- Surveys is an effective solution to obtain robust decompositions of the yield curve (Guimarães, 2014)

Data

- Countries:
  - 15 EMs: BRL, COP, HUF, IDR, ILS, KRW, MYR, MXN, PEN, PHP, PLN, RUB, ZAR, THB, TRY
  - 10 AEs: G-3 (EUR, JPY, GBP), SOE (AUD, CAD, DKK, NOK, NZD, SEK, CHF)

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  - $\rho_{t,n}$: Bloomberg and Datastream
  - Expected short-term rate: Consensus Economics + BIS policy rate statistics

Results

- Goal: Decompose synthetic yield curves $\widetilde{y}_{t,n}^{LC}$ of EMs
  - ⇀ Byproduct: Decomposition of nominal yield curves $y_{t,n}^{LC}$ of EMs
- To assess the relevance of the results:
  - ⇀ Compare estimated term premia of EMs to those of advanced SOEs
  - ⇀ Compare the term premia obtained from both $y_{t,n}^{LC}$ and $\widetilde{y}_{t,n}^{LC}$
- Results reported for 10-year maturity

Dynamics of EM Term Premia: Stylized Facts

- U.S. benchmark
  1. U.S. term premium (USTP) is time-varying
  2. USTP increases during periods of uncertainty
  3. USTP has declined over time
  4. USTP turned negative in recent years
- Estimates for EMs consistent with 1 and 2, some countries with 3 and 4

EM Term Premium Estimates: 10Y

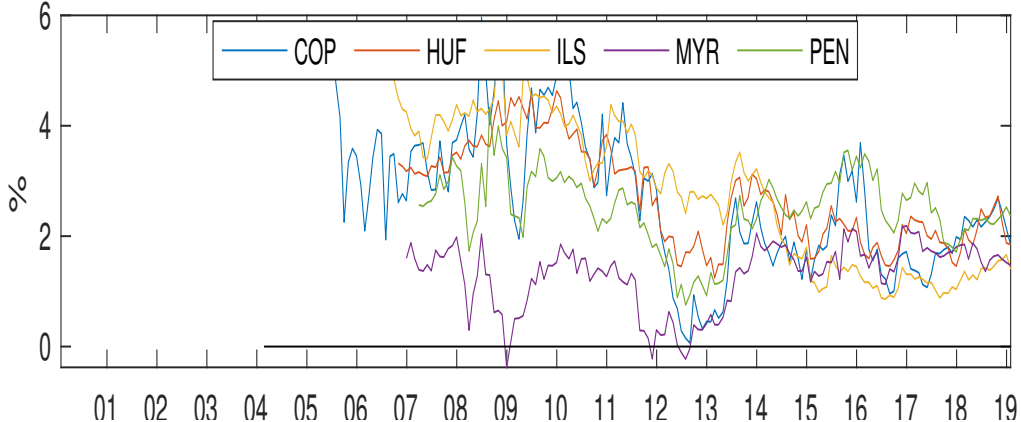


Figure: Estimated 10-Year Term Premia.

Term Structure of Term Premia

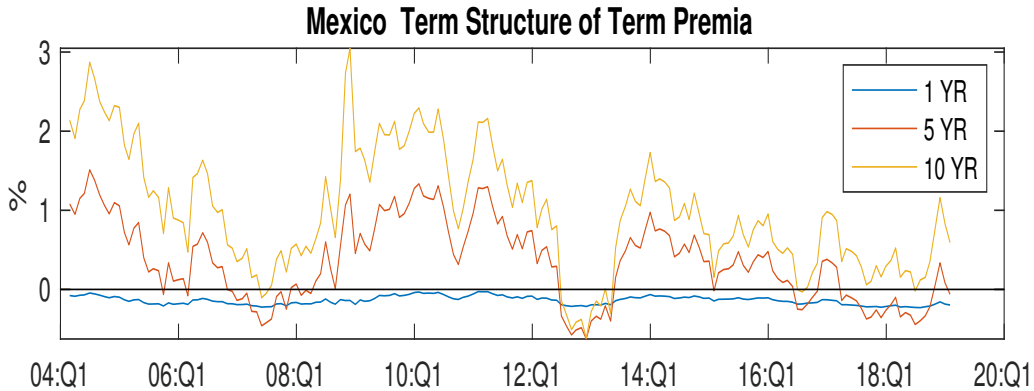


Figure: Estimated 1-, 5- and 10-Year Term Premia.

Nominal Yield Curve Decomposition

	Nominal	Synthetic	Expected	Term Premium	CIP Dev
EM	7.10	6.11	4.29	1.74	0.85
A-SOE	3.48	3.52	1.54	1.97	-0.23
G-3	2.41	2.13	0.52	1.60	0.15

Table: 10-Year Yield Decomposition (%).

- Estimated TP is higher on average than CIP deviations
- Main component of the nominal yield curve:
  - ⇀ For EMs, the expectation of the future short-term interest rate
  - ⇀ For AEs, the term premium

Term Premia: Does It Matter Which Curve Is Used?

	Nominal	Synthetic
EM	2.17	1.74
A-SOE	2.03	1.97
G-3	1.70	1.60

Table: 10-Year Term Premium Comparison (%).

- Difference between the two TP estimates is larger for EMs on average
  - ⇀ Null of equal means is rejected at 5% for 13 EMs vs 4 AEs
  - ⇀ For EMs, risk premium $\neq$ term premium

Is There A Global Factor in EM Term Premia?

	Dec-2006	Jun-2005
EM	81.01	94.46
AE	98.07	97.83

Table: Total Variation Explained by First 3 PCs (%): 10-Year Term Premium.

- Global financial cycle: Common factors on capital flows (Rey, 2013)
- For AEs, a global factor seems more relevant for TP
- For EMs, both domestic and global factors appear more relevant for TP

Relationship with Risk and Uncertainty Measures

- Comparison with US term premium
  - ⇀ TP
  - ⇀ $\perp$TP
- CIP deviations:
  - ⇀ LC credit spread (Du and Schreger, 2016)
  - ⇀ Convenience yield (Du et al., 2018a)
- Uncertainty indexes (Baker et al., 2016)

	TP-USTP	TP-CIP Dev	⊥TP-CIP Dev
EM	0.60	-0.28	-0.13
A-SOE	0.80	-0.01	-0.20
G-3	0.71	-0.29	-0.22

Table: Correlations of 10-Year Term Premia: U.S TP and LCCS.

	BRL	COP	KRW	MXN	RUB
TP-EPU	0.14	0.46	-0.32	0.40	-0.22
⊥TP-EPU	0.11	0.28	-0.31	0.20	-0.09

Table: Correlations of 10-Year Term Premia: EPU Index.

Drivers of EM Term Premia

- Panel regressions per maturity

$$tp_{it} = \alpha_i + \beta' z_{it} + u_{it}$$

  - tp_{it}: model-based n-year term premium of country i in month t
  - z_{it}: vector of regressors
  - α_i: country fixed effects

Drivers of EM Term Premia: Regressors

- Global financial variables
  - ⇀ VIX, Fed funds rate, S&P, oil price
- Domestic variables
  - ⇀ Macro: Inflation, unemployment rate, industrial production
  - ⇀ Financial: exchange rate (LC per USD), stock market

Panel Regression: 10-Year TP

	(1)	(2)	(3)	(4)	(5)	(6)
log(VIX)	0.20		0.26	0.24	0.65***	0.10
	(0.35)		(0.24)	(0.16)	(0.21)	(0.19)
FFR	0.07		0.23**	0.13	0.22**	0.11
	(0.11)		(0.09)	(0.09)	(0.10)	(0.10)
USTP10	1.49***			1.30***		1.22***
	(0.20)			(0.12)		(0.16)
S&P	-0.00		-0.00*			
	(0.00)		(0.00)			
Oil	-0.01*		0.00			
	(0.01)		(0.00)			

Work in Progress

- Survey forecasts so far as a robustness check. Next: supplement ATSM
- Controls to include when studying the drivers of TP:
  - ⇀ Measures of inflation uncertainty (Stock and Watson, 2007)
  - ⇀ Measures of political uncertainty (Baker et al., 2016)
- How U.S. monetary policy moves EM yields?
  - ⇀ Event study methodology (Gürkaynak and Wright, 2013)
  - ⇀ Local projections (Jordà, 2005)

Conclusions

- 'Clean' EM TP estimates using synthetic LC yield curves
  - ⇀ Gains from 'adjusting' for credit risk
  - ⇀ In EMs, risk premium $\neq$ term premium
  - ⇀ More disaggregated decomposition of nominal LC yield curves
- Properties of EM term premia
- Several potential extensions

Internship Proposals

Proposals

- Effects of changes in the yield curve on the banking system
- Effects of monetary policy on the banking system
  - Whose monetary policy?
    - Mexico vs U.S.
  - Effects on what?
    - Prices: bank stock returns, deposit rates
    - Quantities: size of deposits, loans, balance sheet
    - Performance: interest rate risk, NIM, ROA, ROE

Proposal 1

- Challenge of assessing impact of MP: Isolate exogenous policy changes
- Identification of monetary policy shocks
  - ⇀ SVAR for quarterly data and macro variables (e.g. GDP, inflation, policy rate)
  - ⇀ Ordering is not straight forward when using other financial variables
- In such cases, high-frequency event studies allow for identification
  - ⇀ Changes in interest rate futures contracts around MP announcements
  - ⇀ But tool rely on federal funds futures rates → U.S. specific

Proposal 1

- **Proposal**: Are there real effects of HF-identified U.S. MP shocks on local credit conditions?
  - ⇀ Quantities: size of deposits, loans, bank balance sheets
- Evidence on the international bank-lending channel using Mexican data
  - ⇀ Morais, Peydró, Roldán-Peña and Ruiz (2019)
  - ⇀ But they don't identify U.S. MP shocks using HF data

Proposal 2

- Theoretically, effects of expansionary MP on bank performance are ambiguous
  - ⇀ Higher present value of future cash flows → Higher stock price
  - ⇀ Lower net interest margin → Lower ROA
- Mixed evidence on the effects of MP on bank performance
  - ⇀ Negative effect (−): English et al. (2018)
  - ⇀ Positive effect (+): Claessens et al. (2018)
  - ⇀ Reversal effect (−, +): Ampudia and Van den Heuvel (2018), Yuan (2019)
  - ⇀ No effect: Altavilla et al. (2018), Drechsler et al. (2018)

Proposal 2

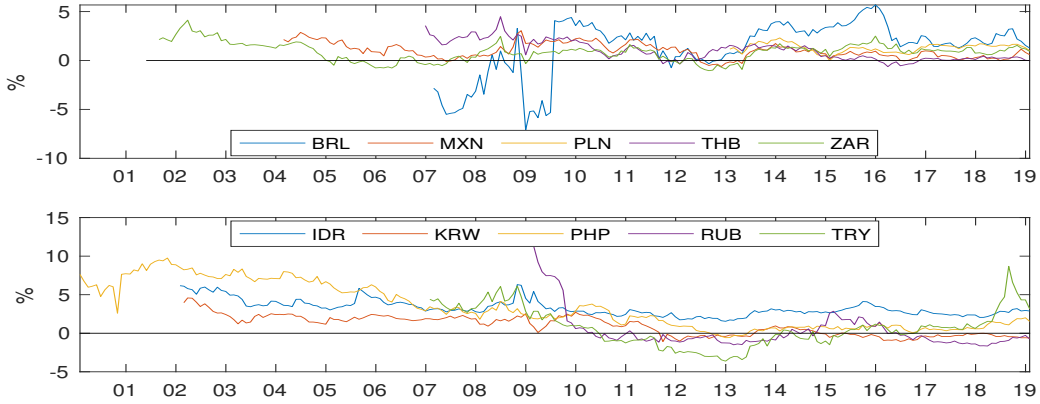
- **Proposal**: Effects of MXN monetary policy changes on banks' performance
  - ⇀ Interest rate risk, NIM, ROA
- Main implication of no effect → Deposits channel of MP not limited to AEs
  - ⇀ Banks unexposed to interest rate risk
    - — Market power over deposits lowers sensitivity of banks' expenses
  - ⇀ Maturity transformation *hedges* banks' interest rate risk
    - — Banks invest in long-term assets to hedge their deposit franchise
- DC might be behind both: bank-lending and risk-taking channels of MP

Data Needed

- EM TP: Surveys from Consensus Economics for Latam countries since 2013
- Proposal 1: Quantities
  - ⇀ Size of deposits, loans, bank balance sheets
- Proposal 2: Interest expense and interest income over assets. Plus:
  - ⇀ Deposit rates, durations of assets and liabilities
- P1 & P2: NIM, ROA

Appendix

EM Term Premium Estimates: 10Y (cont.)



Term Premium Estimates

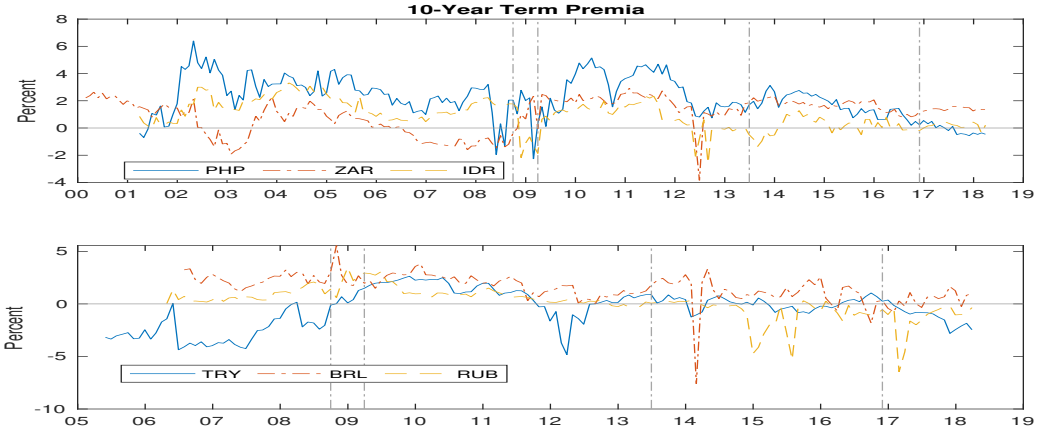


Figure: Estimated 10-Year Term Premia (cont.).

Gains from 'Adjusting' for Default Risk

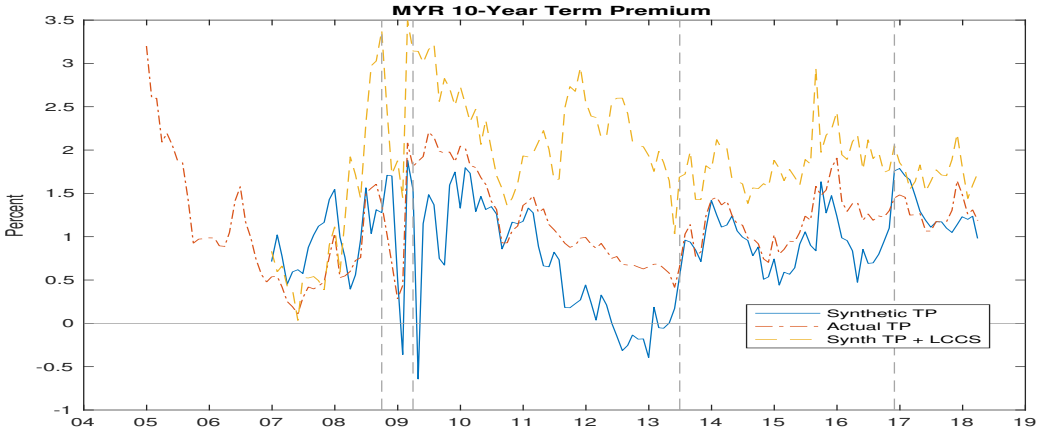


Figure: Estimated Term Premium: Synthetic vs Actual.

	N	Actual	Synthetic	Expected	TP	LCCS
BRL	141	-	8.64	7.05	1.59	-
COP	154	8.21	6.22	4.92	1.31	1.39
HUF	138	6.53	3.73	3.46	0.26	1.93
IDR	205	8.89	8.97	8.48	0.49	0.66
ILS	146	3.65	2.35	1.55	0.80	0.83
MXN	173	6.91	6.22	5.35	0.87	0.56
PEN	141	5.16	4.63	2.98	1.66	0.47
PHP	219	7.14	6.55	5.66	0.89	0.88
PLN	157	5.67	3.33	2.71	0.63	1.02
TRY	155	11.71	10.52	10.88	-0.35	0.63
KRW	219	4.31	3.00	2.53	0.46	1.30
MYR	136	3.74	2.67	2.33	0.33	0.98
RUB	144	8.06	7.87	8.10	-0.23	0.11
THB	137	3.42	2.40	1.78	0.63	0.68
ZAR	218	8.68	8.38	7.85	0.54	0.27

Table: LC Decomposition, 5-Year: Average Values.

	US TP	LCCS	EPU
BRL	0.20	-	0.12
COP	0.61	0.43	0.08
HUF	0.10	-0.46	-
IDR	0.17	0.35	-
ILS	0.26	-0.05	-
MXN	0.62	0.15	-0.14
PEN	0.49	0.06	-
PHP	0.40	0.17	-
PLN	0.41	0.03	-
TRY	0.79	-0.26	-
KRW	0.49	0.30	-0.07
MYR	0.07	-0.62	-
RUB	0.12	-0.32	-0.46
THB	0.53	-0.35	-
ZAR	0.20	0.21	-

Table: Correlations of 5-Year Term Premia.

◂ 10YR

Panel Regression: 5-Year TP

log(VIX)	-0.284	-0.337		0.299**	0.481**
	(0.32)	(0.31)		(0.14)	(0.19)
FFR	-0.157*	-0.024		-0.061	0.135
	(0.08)	(0.08)		(0.08)	(0.08)
USTP5		0.499***			0.754***
		(0.06)			(0.08)
SPX	-0.001*	-0.000		-0.001***	
	(0.00)	(0.00)		(0.00)	
INF			-0.096*	-0.138**	-0.136***
			(0.05)	(0.05)	(0.04)
UNE			0.153	0.069	0.072
			(0.1)	(0.08)	(0.07)
IP			-0.005	-0.002	0.001
			(0.01)	(0.01)	(0.01)
Country FE	Yes	Yes	Yes	Yes	Yes
Observations	2483	2483	1757	1757	1757