Trade Credit and International Stock Return Comovement

Rui Albuquerque, Tarun Ramadorai and Sumudu W. Watugala

SBS, Oxford-Man, CEPR

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  - Wealth shocks cause redistributions.

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  - Model of return correlations and empirical tests.

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- Neglected in the study of stock return comovement.

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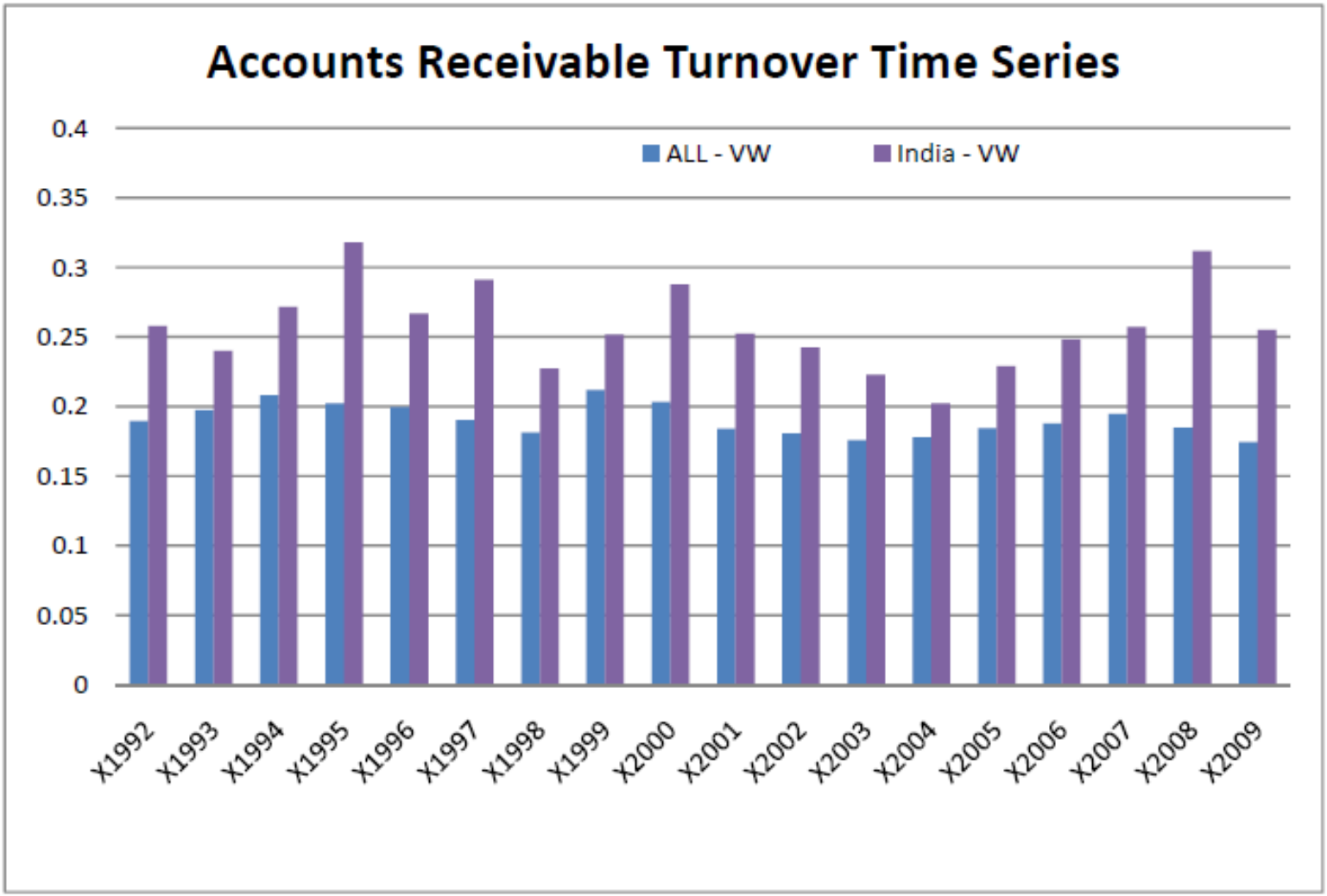

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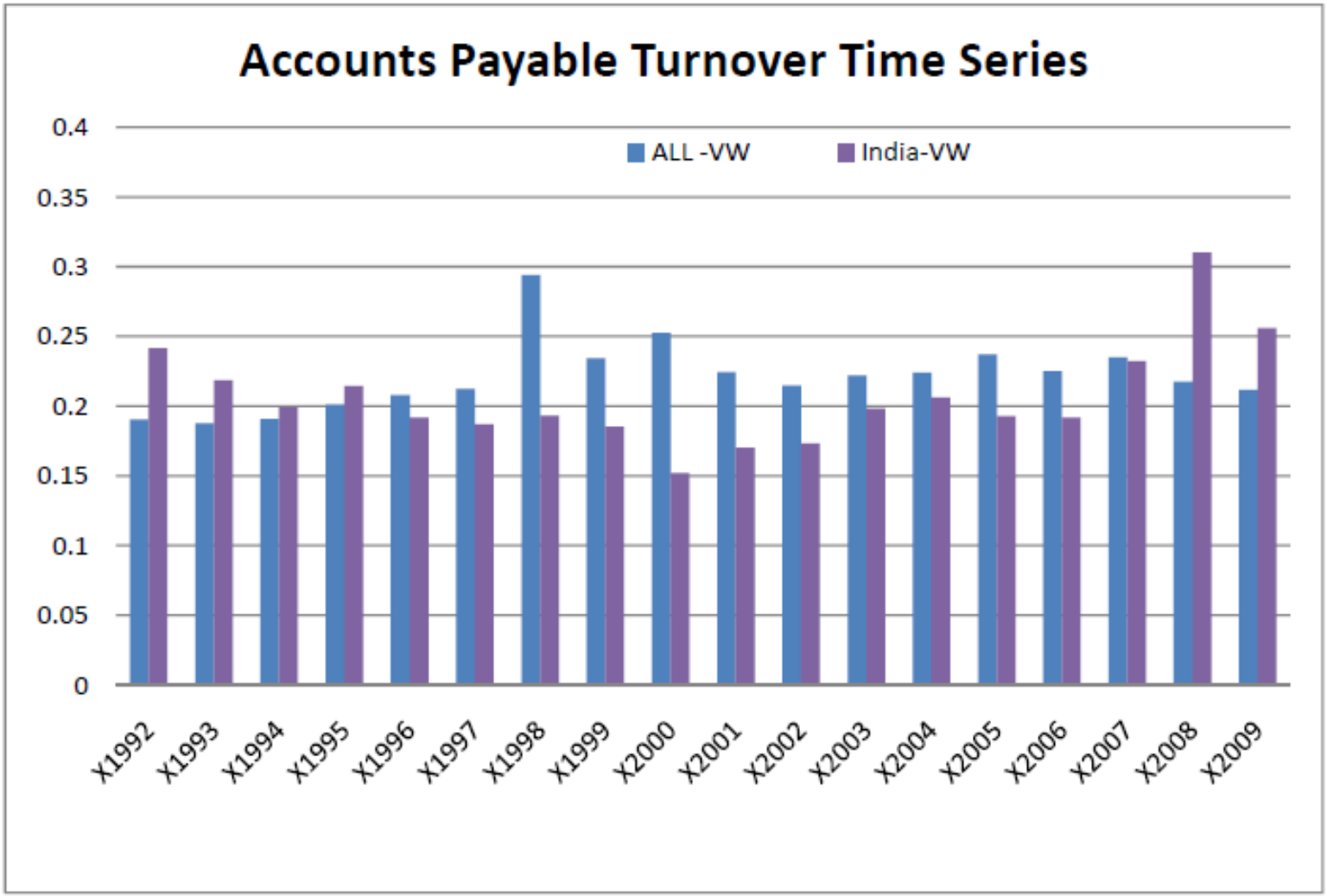

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- Equilibrium price is such that total stock demand equals total stock supply.

Dividends

- Each country has a representative firm paying a liquidating dividend at date 2.

$$\begin{aligned} \text{Consumer} &: D_t^C = \varepsilon_t^C + u_t^C. \\ \text{Producer} &: D_t^P = \alpha D_t^C + \varepsilon_t^P + u_t^P, \alpha > 0 \end{aligned}$$

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- We leave unmodeled the choice of trade credit. Reduced form, so we can focus on asset pricing effects.

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- Domestic investors learn from prices, but only from local prices.

Asset Demands

- Domestic demand:

$$\theta_t^i = \frac{\mathrm{E}_t^d \left[D_{t+1}^i - P_t^i \right]}{\gamma \mathrm{Var}_t^d \left[D_{t+1}^i - P_t^i \right]}.$$

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- Speculator demand:

$$\begin{bmatrix} \eta^C \\ \eta^P \end{bmatrix} = \frac{1}{\gamma \sigma_{uP}^2} \begin{bmatrix} \frac{\sigma_{uP}^2 + \alpha^2 \sigma_{uC}^2}{\sigma_{uC}^2} \left(\bar{D}_{t+1}^C - P_t^C \right) - \alpha \left(\bar{D}_{t+1}^P - P_t^P \right) \\ \overbrace{\bar{D}_{t+1}^P - P_t^P}^{\text{Expected returns}} \quad \overbrace{-\alpha \left(\bar{D}_{t+1}^C - P_t^C \right)}^{\text{Rebalancing}} \end{bmatrix}.$$

Equilibrium

- Equilibrium prices:

$$P_t^C = \overbrace{\bar{D}_{t+1}^C}^{\text{signal}} - \overbrace{b_{CC}\left(\bar{D}_{t+1}^C - \mathrm{E}_t^d\left(\bar{D}_{t+1}^C\right)\right) - b_{CP}\left(\bar{D}_{t+1}^P - \mathrm{E}_t^d\left(\bar{D}_{t+1}^P\right)\right)}^{\text{forecast errors}}$$
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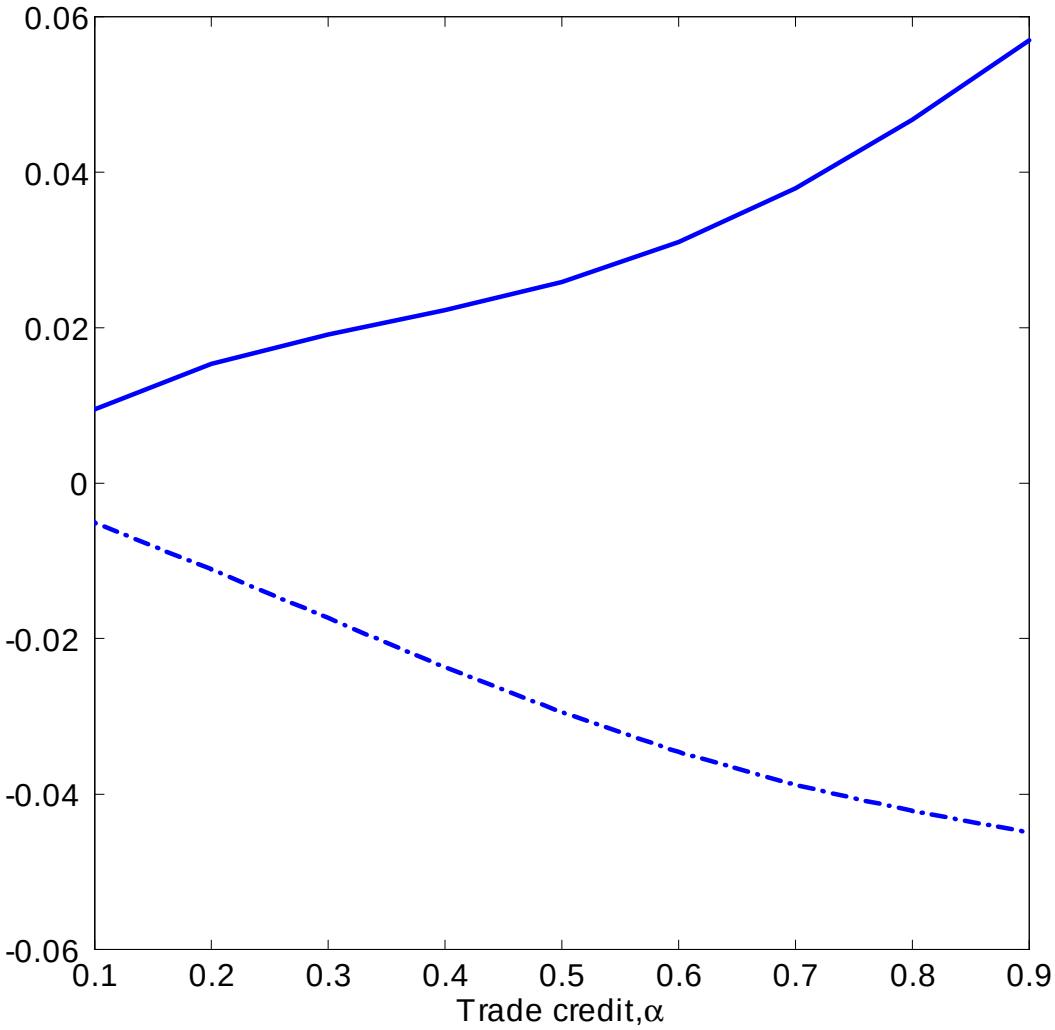
- We are interested in cross-country return correlation, and how it varies with level of trade credit (α):

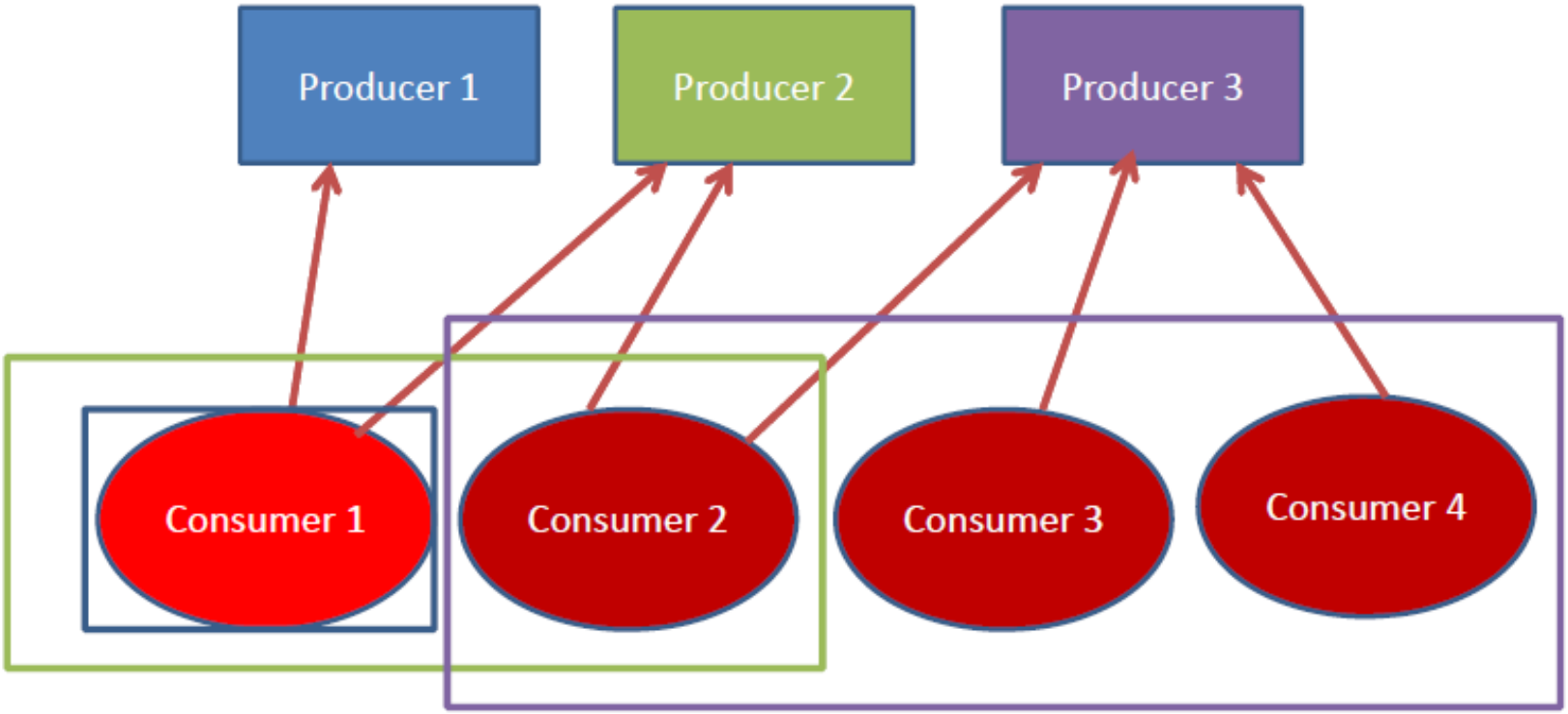
$$\mathrm{E}\left[D_{t+1}^P - P_t^P | P_t^C\right] = \frac{\mathrm{Cov}\left(P_t^C, D_{t+1}^P - P_t^P\right)}{\mathrm{Var}\left(P_t^C\right)} P_t^C$$

Comparative Statics on Trade Credit

Covariance of Future Producer Return with Current Consumer Return



Baseline Empirical Methodology



Our Empirical Methodology

- Create three financial ratios for each firm-year:

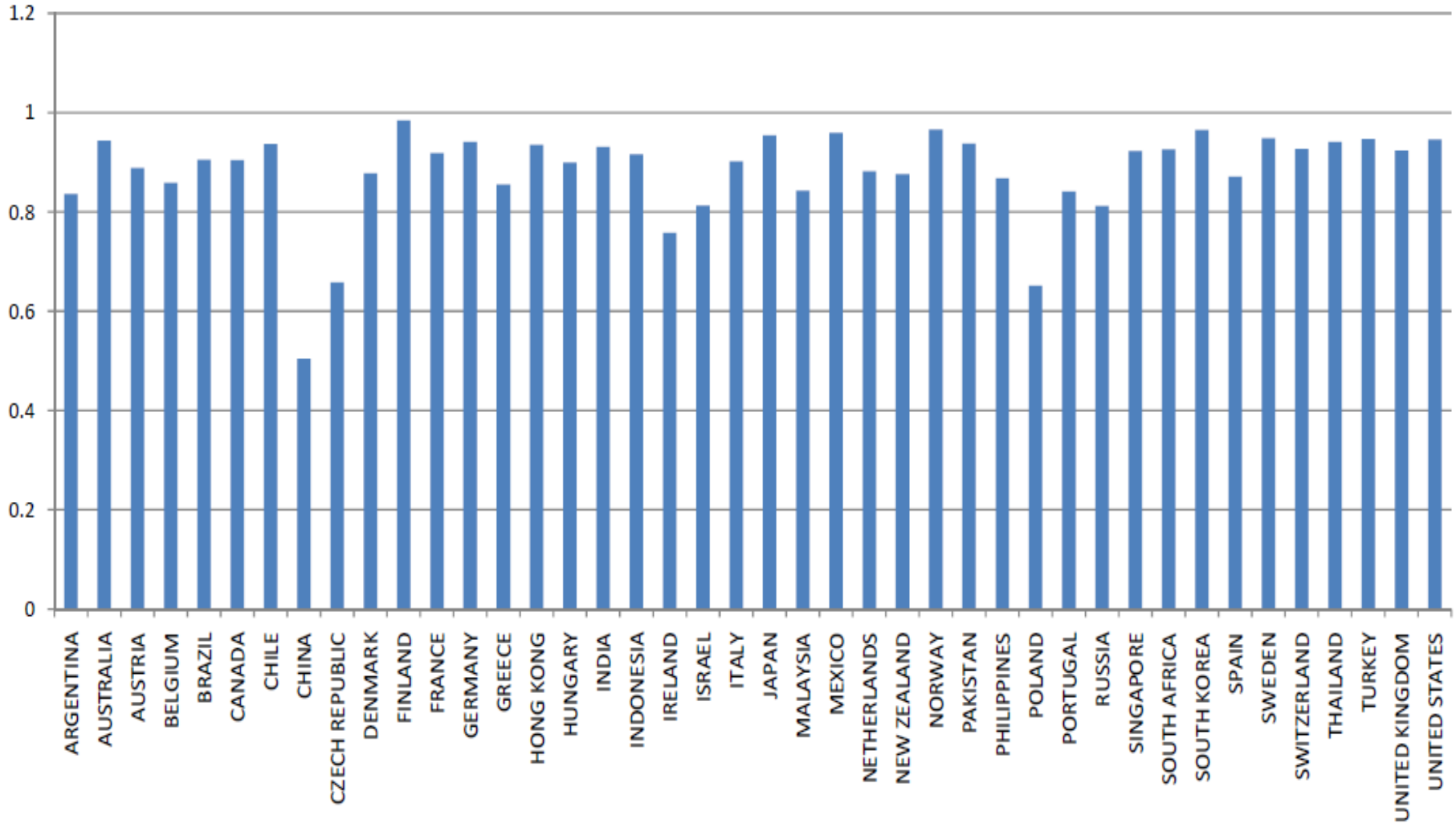
$$
\begin{aligned}
ARTurnover_{i,t} &= \frac{AR_{i,t}}{TotalSales_{i,t}}, \\
APTurnover_{i,t} &= \frac{AP_{i,t}}{COGS_{i,t}}, \\
NetTradeCredit_{i,t} &= \frac{AR_{i,t} - AP_{i,t}}{TotalSales_{i,t}},
\end{aligned}
$$

- Sort firms in each producer tercile by these (lagged) ratios and evaluate their stock returns.
- Comparative statics from the model predict that high trade credit firms will have larger stock return effects.

Data

- Worldscope: trade credit (annual), stock return (monthly), and balance-sheet (annual) information for firms.
  - Sample period 1993 to 2009.
  - 39 producer countries, 55 countries in total.
  - 32,598 unique firms.
- Only use industrial firms (exclude transportation, utility, banking, insurance and other financial firms).
- Annual bilateral trade (import and export) data from IMF Direction of Trade Statistics
- Annual GDP data from the IMF World Economic Outlook Database.

Correlations between MSCI and constructed indices



Customers and Producers

Supplier-Importer strategies exist as well.

Country	Export (Customer) Links		Import (Supplier) Links		Mean Stock Returns	Std Dev Stock Returns	Total Num Firms	Average Num Firms	Data Begin Date
	Producer	Trade Partner	Importer	Trade Partner					
Developed									
USA	N	Y	N	Y	0.596	4.858	10034	6949	
UK	Y	Y	Y	Y	0.637	4.405	2797	1925	
Emerging									
China	Y	Y	Y	Y	1.002	13.396	1360	724	
Russia	Y	Y	N	Y	2.262	14.453	103	40	1/31/1997
Brazil	N	Y	N	Y	2.064	13.446	185	136	8/31/1994
India	N	Y	Y	N	0.878	9.056	877	640	

Trade Credit Summary Statistics

Country	Net Trade Credit			AR Turnover			AP Turnover		
	Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
Developed									
United States	0.065	0.064	0.008	0.153	0.155	0.011	0.217	0.222	0.041
United Kingdom	0.075	0.076	0.011	0.181	0.178	0.016	0.205	0.210	0.070
Emerging									
China	0.139	0.165	0.154	0.359	0.362	0.156	0.255	0.428	0.578
Russia	0.159	0.192	0.136	0.230	0.312	0.190	0.252	0.295	0.143
India	0.096	0.106	0.034	0.254	0.257	0.030	0.196	0.206	0.036

Risk Adjustment and Estimation

- Excess returns computed from factor models of the form:

$$r_{p,t} - r_{f,t} = \alpha_p + \sum_{j=1}^{J} \beta_{p,j} F_{j,t} + \varepsilon_{p,t}.$$

  - $J = 1$, with the excess return on the MSCI world index as the factor.
  - $J = 2$, adds a momentum (MOM) factor to the MSCI world index, constructed from terciles of developed country returns, sorted by their past twelve month returns.
  - $J = 3$, adds a value factor (HML), constructed by sorting countries into terciles based on their value-weighted firm-level book-to-market ratios

- Newey-West (1983) standard errors.

Baseline Results

The baseline strategy doesn't hold up over our sample period.

Customer-Producer Sorts

Regression	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)
Top	0.728	0.488	0.543	0.511
	[0.501]	[0.283]	[0.282]	[0.275]
Bottom	0.281	0.037	0.167	0.110
	[0.529]	[0.403]	[0.362]	[0.418]
Top - Bottom	0.447	0.451	0.376	0.401
	[0.441]	[0.445]	[0.428]	[0.455]

Trade Credit Sorts - Bottom Tercile

But there is a clear separation between high and low TC firms.

Measure	**Net Trade Credit**				**AR Turnover**			
Regression	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)
Bottom Trade								
Low TC	0.513 [0.525]	0.271 [0.417]	0.427 [0.382]	0.391 [0.426]	0.582 [0.506]	0.348 [0.399]	0.502 [0.368]	0.482 [0.401]
High TC	-0.127 [0.569]	-0.368 [0.438]	-0.264 [0.403]	-0.354 [0.479]	-0.281 [0.636]	-0.538 [0.496]	-0.427 [0.447]	-0.518 [0.553]
Difference	0.640 [0.304]	0.640 [0.303]	0.691 [0.335]	0.745 [0.380]	0.863 [0.354]	0.885 [0.347]	0.929 [0.363]	1.000 [0.439]

Trade Credit Sorts - Top Tercile

Non-monotonic, and seems to affect the bottom tercile the most.

Measure	**Net Trade Credit**				**AR Turnover**			
Regression	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)
Top Trade								
Low TC	0.910 [0.503]	0.688 [0.329]	0.723 [0.326]	0.647 [0.284]	0.892 [0.493]	0.670 [0.309]	0.721 [0.308]	0.715 [0.275]
High TC	0.574 [0.537]	0.322 [0.309]	0.389 [0.303]	0.416 [0.332]	0.549 [0.552]	0.294 [0.332]	0.368 [0.322]	0.358 [0.355]
Difference	0.336 [0.296]	0.367 [0.299]	0.334 [0.279]	0.231 [0.278]	0.343 [0.273]	0.376 [0.272]	0.352 [0.251]	0.357 [0.291]

Long-Short Portfolios Across Terciles

High monthly returns for model-implied strategies.

Measure	**Net Trade Credit**				**AR Turnover**			
Regression	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)
Long Top – Short Bottom								
Low TC -High TC	0.974 [0.472]	0.969 [0.477]	0.909 [0.455]	0.958 [0.501]	1.289 [0.493]	1.298 [0.499]	1.237 [0.459]	1.292 [0.526]
High TC -High TC	0.983 [0.507]	0.947 [0.501]	0.922 [0.470]	0.821 [0.527]	1.227 [0.516]	1.197 [0.514]	1.162 [0.478]	1.069 [0.536]
Low TC -Low TC	0.629 [0.409]	0.622 [0.417]	0.547 [0.390]	0.360 [0.401]	0.547 [0.438]	0.539 [0.444]	0.464 [0.428]	0.273 [0.442]
High TC -Low TC	0.638 [0.440]	0.601 [0.436]	0.560 [0.398]	0.223 [0.426]	0.485 [0.448]	0.438 [0.436]	0.389 [0.405]	0.049 [0.422]

Robustness Checks

1. Trade credit may be correlated with other firm attributes that generate return spreads across firms.
    1. Firm size.
    2. Level of short-term debt.
2. We independently double-sort firms within the customer induced terciles by our trade credit measures and by these two firm attributes.
    1. Return spreads across the trade credit dimension persist.

Double Sorts

Measure		**AR Turnover**		
		Market Cap		
Bottom Trade		Low	High	Low-High
Trade Credit	Low	0.233 [0.578]	0.081 [0.512]	0.151 [0.283]
	High	--0.203 [0.722]	-0.649 [0.607]	0.446 [0.322]
	Low-High	0.436 [0.258]	0.730 [0.353]	

Measure		**AR Turnover**		
		Short-term Debt		
Bottom Trade		Low	High	Low-High
Trade Credit	Low	0.629 [0.509]	0.220 [0.551]	0.409 [0.285]
	High	0.055 [0.685]	-0.655 [0.628]	0.710 [0.375]
	Low-High	0.574 [0.463]	0.874 [0.274]	

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    2. Use our framework to distinguish models of contagion from fundamentals-based comovement.