Cross-Border M&A Flows, Economic Growth, and Foreign Exchange Rates

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$$s_t = (1 - \beta)\Sigma_{q=0}^{\infty}\beta^q E_t(f_{t+q} - f_{t+q}^*)$$

where s_t is the exchange rate, β is a discount rate, E_t is the expectations operator, and $f_{t+q} - f_{t+q}^*$ is the differential in domestic and foreign future fundamentals

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Theoretical predictions:

❶ Exchange rates update to changing expectations about fundamentals

❷ Heterogeneous expectations imply exchange rate predictability

Empirical Challenge and Contribution

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- ...econometrician cannot observe the market's changing expectations.

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This Paper

- ⋆ We attempt to overcome this empirical challenge using a **novel empirical approach**

- ⋆ Aim is to **shed new light** on the "macroeconomic disconnect puzzle"

The Empirical Approach

Main idea: The econometrician can **indirectly** learn about changing expectations from the **observable actions** of informed agents

- If actions are conditioned on private information about future macro fundamentals then they reveal a (noisy) predictive signal
- Since the signal is publicly revealed, the market will update its expectations about future macro fundamentals

$\implies$ Agents' actions can be used to proxy for changing expectations

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Q: But *which* agents are privately informed about future macro fundamentals?

Firms and Investment Decisions

We choose to investigate **firms** because of their unique position in the economy, allowing them to observe real-time economic information about:

- current sales
- future demand (through interacting with customers and suppliers)
- overall industry trends

$\implies$ firms have private information about the future economic state

Crucially, firms can **condition on this information** when making their major financial decisions (e.g. investments, financing)

- Announcements of these actions partially reveal the information

Relative Fundamentals

Empirically, the aim is to study signals about **relative** economic conditions

- We choose to investigate **international investments** since higher levels of international investment activity is potentially revealing information about both countries
- Potentially good news about the recipient country and potentially bad news about the country from which the investment is flowing

In the paper, we incorporate a toy model of exchange rate determination that makes clear:

- Changing expectations about relative fundamentals drive spot rates
- Heterogeneous expectations imply the public signal predicts exchange rates

The Empirical Approach

We undertake the following **empirical steps**:

1. Extract a signal about future economic states from international investments

2. Test whether the signals predicts **changes in economic conditions**, measured using the speed of economic growth

3. Test for exchange rate return predictability

Cross-Border Mergers and Acquisitions

We study international investments using **cross-border mergers and acquisitions** (M&As), the largest form of foreign direct investments

- Data is from *SDC Platinum* and includes nationality of acquiror and target firms, date of announcement, form of payment, deal value

- For 40 countries vis-à-vis the United States
  - 19 developed market economy; 21 emerging market economy

- Daily data from January 1994 to December 2018
  - Relatively few M&A deals prior to the early 1990s
  - In the analysis, we typically aggregate to a monthly frequency

Standardizing M&A Activity

Each month we construct a **bilateral measure** of cross-border M&A activity:

$$MA_{i,t} = In_{i,t} - Out_{i,t}$$

$In_{i,t}$ is # of announced M&A inflows to country i from US in month t
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Some countries have high M&A activity (in absolute terms) and so we normalize by the median and standard deviation

$$\widetilde{MA}_{i,t} = \frac{MA_{i,t} - \overline{MA}_{i,t}}{\sigma_{i,t}}, \ \sigma_{i,t} > 0$$

N.B. If $MA_{i,t} = \overline{MA}_{i,t} = 0$, then we set the observation to be missing, since it is not providing any new information about fundamentals

Measuring Macroeconomic Conditions

Question: Does abnormal M&A activity predict a change in economic growth? We measure growth following Dahlquist and Hasseltoft (2020)

$$g_{i,t} = \frac{1}{3} \left[log \left(\frac{IP_{i,t}}{IP_{i,t-12}} \right) + log \left(\frac{RS_{i,t}}{RS_{i,t-12}} \right) + log \left(\frac{UE_{i,t-12}}{UE_{i,t}} \right) \right]$$

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The change in growth is then simply:

$$\Delta g_{i,t+s} = g_{i,t+s} - g_{i,t},$$

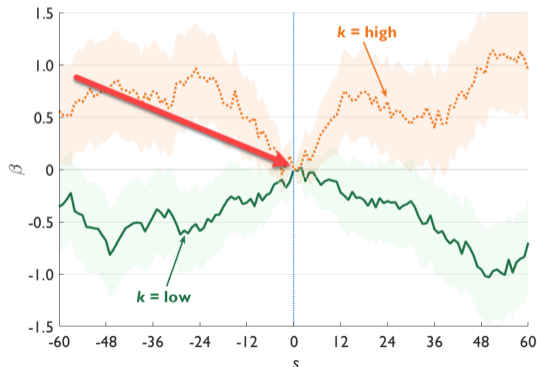i.e., the difference between economic growth recorded at times $t+s$ and t

Changing Economic Growth: A First Look

Each month we sort countries into three baskets based on $\widetilde{MA}_{i,t}$ (low, medium, and high) and estimate the following regression:

$$\Delta g_{i,t+s} = \alpha + \beta D_{ik,t} + \kappa_i + \lambda_{t+s} + \varepsilon_{i,t+s},$$

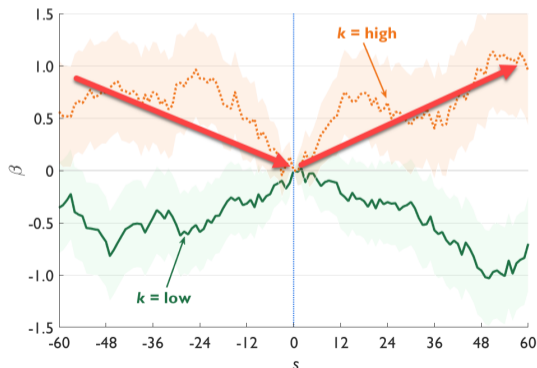where $D_{ik,t}$ is an indicator variable $= 1$ if in basket k at time t

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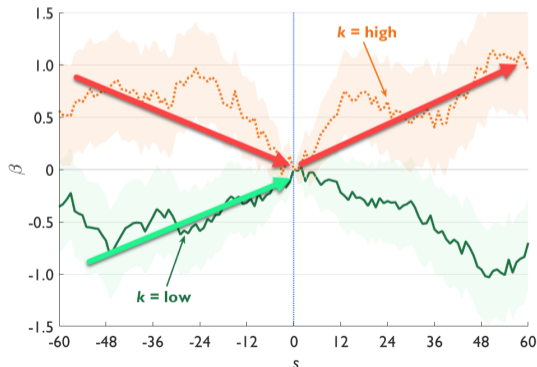where $D_{ik,t}$ is an indicator variable $= 1$ if in basket k at time t

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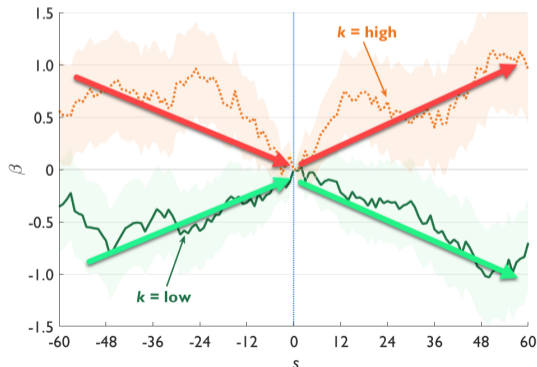where $D_{ik,t}$ is an indicator variable $= 1$ if in basket k at time t

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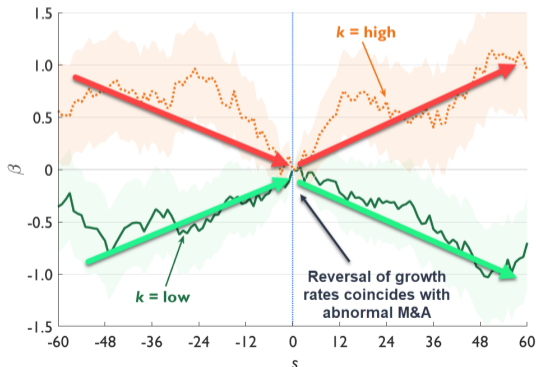where $D_{ik,t}$ is an indicator variable $= 1$ if in basket k at time t

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Regression Analysis

To formally test if economic growth changes following abnormal M&A net inflows, we run the following predictive panel regression:

$$\Delta g_{i,t+s} = \alpha_i + \beta \widetilde{MA}_{i,t} + \gamma' X_{i,t} + \kappa_i + \lambda_t + \varepsilon_{i,t+s},$$

where,

- $\Delta g_{i,t+s} = g_{i,t+s} - g_{i,t}$ is the growth acceleration of country i
- $\widetilde{MA}_{i,t}$ is the abnormal M&A net inflow announced at time t
- $X_{i,t}$ is a vector of controls (leading indicators of economic activity)
- κ_i and λ_t are country and time fixed effects
- s varies between 12 and 60 months ahead

Predicting Changing Economic Growth

$$\Delta g_{i,t+s} = \alpha_i + \beta \widetilde{MA}_{i,t} + \gamma' X_{i,t} + \kappa_i + \lambda_t + \varepsilon_{i,t+s}$$

	Dep: $\Delta g_{i,t+12}$		Dep: $\Delta g_{i,t+24}$		Dep: $\Delta g_{i,t+36}$	
	(1)	(2)	(3)	(4)	(5)	(6)
$\widetilde{MA}$	0.082	0.111	0.147**	0.179**	0.238***	0.273***
	(0.066)	(0.068)	(0.075)	(0.079)	(0.079)	(0.086)
CLI	−0.893***		−1.575***		−1.715***	
	(0.098)		(0.104)		(0.105)	
Dividend yield		0.139		0.098		−0.022
		(0.213)		(0.221)		(0.238)
Stock return		0.031		0.015		0.021
		(0.031)		(0.032)		(0.034)
Term spread		0.023		0.465**		0.584***
		(0.195)		(0.195)		(0.221)
Short rate		−0.438***		−0.173		0.205
		(0.140)		(0.144)		(0.182)
Country FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Nobs.	2,693	2,386	2,571	2,278	2,439	2,161
Adj. R^2	0.45	0.47	0.52	0.53	0.49	0.47

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Sources of Information

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Question: If this is an information mechanism, which firms should we expect to hold private information about future economic conditions?

We consider two possibilities:

❶ Domestic firms are more likely to have information about **local** economic conditions (large literature in asymmetric information)

❷ Cyclical firms may see turning points faster than non-cyclical firms

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1. Domestic firms are more likely to have information about **local** economic conditions (large literature in asymmetric information)

2. Cyclical firms may see turning points faster than non-cyclical firms

We begin with domestic firms, and construct two alternative measures of $\widetilde{MA}_{i,t}$: (i) outflows (domestic firms) and (ii) inflows (foreign driven)...

...we then turn to further split by cyclical firms

Domestic and Foreign Driven Investment Flows

$$\Delta g_{i,t+s} = \alpha_i + \beta_1 \widetilde{MA}_{i,t}^{out} + \beta_2 \widetilde{MA}_{i,t}^{in} + \gamma' X_{i,t} + \kappa_i + \lambda_t + \varepsilon_{i,t+s}$$

| | Dep: $\Delta g_{i,t+12}$ | | Dep: $\Delta g_{i,t+24}$ | | Dep: $\Delta g_{i,t+36}$ | |
	(1)	(2)	(3)	(4)	(5)	(6)
$\widetilde{MA}^{out}$	−0.264***	−0.294***	−0.499***	−0.454***	−0.532***	−0.588***
	(0.098)	(0.099)	(0.119)	(0.124)	(0.127)	(0.134)
$\widetilde{MA}^{in}$	−0.135	−0.164	−0.143	−0.100	0.036	0.019
	(0.099)	(0.104)	(0.107)	(0.113)	(0.113)	(0.127)
CLI	−0.885***		−1.557***		−1.700***	
	(0.099)		(0.104)		(0.106)	
Dividend yield		0.132		0.090		−0.030
		(0.212)		(0.220)		(0.237)
Stock return		0.031		0.014		0.021
		(0.031)		(0.032)		(0.034)
Term spread		−0.005		0.432**		0.552**
		(0.192)		(0.194)		(0.219)
Short rate		−0.433***		−0.164		0.215
		(0.138)		(0.143)		(0.180)
Adj. R^2	0.45	0.47	0.52	0.53	0.50	0.48

Cyclical Industries

$$\Delta g_{i,t+s} = \alpha_i + \beta_1 \widetilde{MA}_{i,t}^{out,high} + \beta_2 \widetilde{MA}_{i,t}^{out,low} + \beta_3 \widetilde{MA}_{i,t}^{in,high} + \beta_4 \widetilde{MA}_{i,t}^{in,low} + \gamma' X_{i,t} + \kappa_i + \lambda_t + \varepsilon_{i,t+s}$$

We follow Sharpe (1994) and measure cyclicality for each industry-country pair as covariance between log sales growth of industry and GDP growth

	Dep: $\Delta g_{i,t+12}$		Dep: $\Delta g_{i,t+24}$		Dep: $\Delta g_{i,t+36}$	
	(1)	(2)	(3)	(4)	(5)	(6)
$\widetilde{MA}^{out,high}$	-0.341^{**}	-0.401^{**}	-0.825^{***}	-0.707^{***}	-0.774^{***}	-0.840^{***}
	(0.152)	(0.156)	(0.184)	(0.181)	(0.197)	(0.205)
$\widetilde{MA}^{out,low}$	-0.203	-0.216	-0.394^{**}	-0.432^{**}	-0.468^{**}	-0.533^{**}
	(0.164)	(0.162)	(0.184)	(0.204)	(0.200)	(0.215)
$\widetilde{MA}^{in,high}$	0.129	0.040	0.074	0.022	0.231	0.157
	(0.125)	(0.131)	(0.144)	(0.148)	(0.153)	(0.161)
$\widetilde{MA}^{in,low}$	-0.112	0.005	-0.005	0.120	0.023	-0.071
	(0.152)	(0.172)	(0.160)	(0.176)	(0.166)	(0.196)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Nobs.	2,693	2,386	2,571	2,278	2,439	2,161
Adj. R^2	0.45	0.47	0.52	0.53	0.50	0.48

Note: "high" $\implies$ above median cyclicality

Currency Return Predictability

$\widetilde{MA}_{i,t}$ provides a predictive signal for future macroeconomic fundamentals

$\implies$ $\widetilde{MA}_{i,t}$ **should also predict exchange rate returns** if exchange rates are linked to fundamentals

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We follow the recent exchange rate literature and explore if countries with higher values of $\widetilde{MA}_{i,t}$ experience larger exchange rate appreciations

- Cross-sectional approach
- Form portfolios by sorting currencies using $\widetilde{MA}_{i,t}$ from low to high
- Construct zero-cost portfolios using HML, linear, and rank weights

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Key hypothesis:

- ⋆ The higher the value of $\widetilde{MA}_{i,t}$, the greater the FX appreciation

Observation #1: Annualized currency excess returns increase monotonically from low to high values of $\widetilde{MA}_{i,t}$

	Low $\widetilde{MA}_{i,t}$	P_2	High $\widetilde{MA}_{i,t}$	**HML**	**Linear**	**Rank**	$Rank_{DM}$	$Rank_{EM}$
mean (%)	−0.86	1.19	3.43	4.29	4.06	4.13	3.01	6.01
t-stat	−0.44	0.68	1.89	3.76	3.61	3.79	2.48	3.25
SR	−0.11	0.16	0.42	0.76	0.73	0.76	0.53	0.67
fx (%)	−2.41	−0.07	0.52	2.93	2.60	2.89	2.67	5.04
fp (%)	1.55	1.26	2.91	1.36	1.46	1.24	0.33	0.97
$\mu_{\widetilde{MA}_{i,t}}$	−1.13	0.41	1.80					

Observation #2: Zero-cost portfolios all generate positive, highly statistically significant, and economically meaningful returns

- Potentially substantial implications for global investors

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Observation #3: The majority of the returns stem from the foreign exchange rate (fx) component

- Currencies with high (low) $\widetilde{MA}_{i,t}$ appreciate (depreciate) on average

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Observation #4: The results continue to be observed when focussing only on developed market (DM) or emerging market (EM) currencies

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SR	−0.11	0.16	0.42	0.76	0.73	0.76	**0.53**	**0.67**
fx (%)	−2.41	−0.07	0.52	2.93	2.60	2.89	**2.67**	**5.04**
fp (%)	1.55	1.26	2.91	1.36	1.46	1.24	**0.33**	**0.97**
$\mu_{\widetilde{MA}_{i,t}}$	−1.13	0.41	1.80					

Sources of Information

We explore if the predictability of exchange rates is also driven principally by **domestic firms** operating in **cyclical industries**

We **reclassify currencies** entering P_1 and P_3 (i.e., the extreme portfolios) as being allocated to those portfolios because of either abnormal levels of outflows (domestic driven) or inflows (foreign driven)

- Use the allocation to construct new portfolios based on domestic- and foreign-driven flows

- Then split further by the cyclicality of the industry

The Sources of Currency Return Predictability

Observation #1: The spread in returns is only statistically significant when currencies are sorted by abnormal domestic-driven outflows

Observation #2: The returns are entirely driven by the exchange rate component—the interest rate component is negative

	Domestic Driven Outflows			Foreign Driven Inflows		
	P_1	P_3	**HML**	P_1	P_3	**HML**
mean (%)	−2.99	5.48	8.47**	0.74	3.59	2.85
SR	−0.27	0.65	0.82	0.07	0.37	0.34
fx (%)	−5.07	5.02	10.09***	−1.11	−0.11	1.00
fp (%)	2.08	0.47	−1.62***	1.85	3.70	1.85***
$\mu_{\widetilde{MA}_{i,t}}$	−1.27	1.29		−0.76	1.90	

Cyclical Industries

Observation: The strength of the exchange rate predictability is driven by the outflow decisions of **high cyclicality domestic firms**

	High Cyclicality Outflows		Low Cyclicality Outflows		High Cyclicality Inflows		Low Cyclicality Inflows	
	P_1	P_3	P_1	P_3	P_1	P_3	P_1	P_3
mean (%)	−2.41	9.62**	−0.35	3.10	0.78	1.85	−5.00	0.54
SR	−0.27	0.98	−0.13	0.91	0.07	0.19	−0.49	0.05
fx (%)	−3.72	8.13*	−1.51	2.68	−1.14	−1.30	−6.56	−3.04
fp (%)	1.30	1.49***	1.14	0.41	1.92	3.15***	1.57	3.58***
$\mu_{\widetilde{MA}_{i,t}}$	−1.33	1.36	−1.37	1.22	−0.78	1.88	−0.60	1.86
Obs	190	39	166	35	117	232	65	172

Other Analyses

In further analyses, we ask a series of additional questions:

1. Is the predictability caused by M&A driving economic growth?
   No. Big deals contain no more information.

2. Could other factors be driving both the signal and exchange rates (is there an endogeneity problem)?
   No. The residuals of $\widetilde{MA}_{i,t}$ after controlling for many variables (inc. past returns, past growth, etc) are the source of predictability

3. Could investor front-running lead to exchange rate predictability?
   No. \$-value of deals is no more informative than the number of deals, and deals with missing payment type are still informative

4. Are the portfolio returns subsumed by other strategies (e.g., carry)?
   No. Other strategies explain almost none of the returns ($R^2 \approx 0$)

Main Takeaways

There is a **disconnect** between exchange rates and macro fundamentals

- A potential reason for the weak link is that the relationship is hard to empirically test because we cannot directly observe the market's changing expectations

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There is a **disconnect** between exchange rates and macro fundamentals

- A potential reason for the weak link is that the relationship is hard to empirically test because we cannot directly observe the market's changing expectations

We provide a **new approach** to measuring these changing expectations

- Evidence supports the link between fundamentals and exchange rates

- The results have implications for **academics** (exchange rate determination), **policy makers** (studying economic growth and capital flows), and **investors** (portfolio formation)