

The Relationship Between Oil Prices and Exchange Rates: Theory and Evidence

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Main Conclusions

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- Link between exchange rates and oil prices has intensified
- Strong linkages between exchange rates and oil prices over the long-run
- Exchange rates potentially useful predictor for oil prices (and vice versa) in the short-run but effects are strongly time-varying
 - ➔ Correlation does not imply forecasting ability
- Several important avenues for future research

Agenda

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1. Introduction
2. Theoretical transmission
3. Empirical evidence
4. Conclusion and open questions

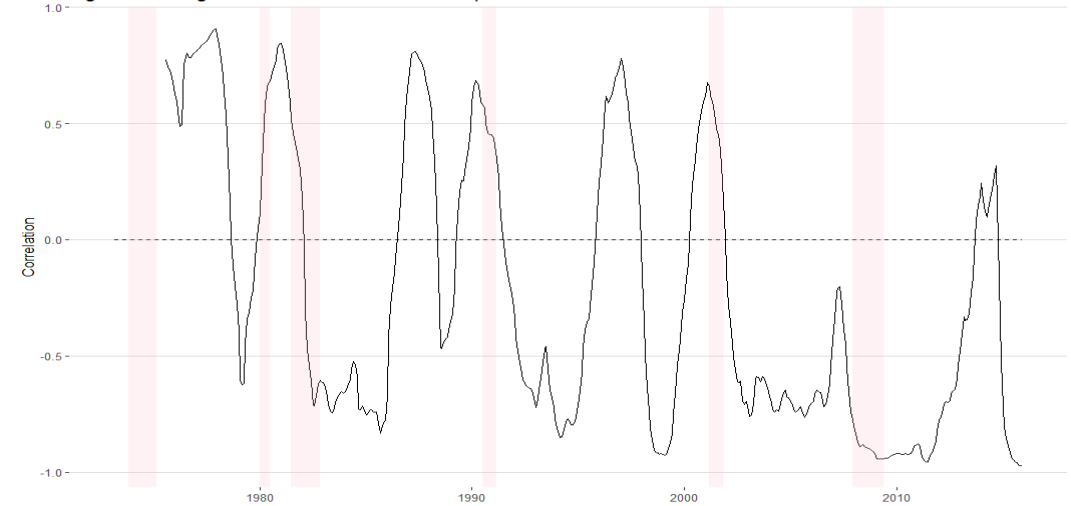
Time Series Pattern

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Figure 1: Oil price vs. broad dollar index



Figure 3: Rolling window correlation between oil price and broad dollar index



- An evolving relationship?
- Correlation vs. causality?

Four Questions

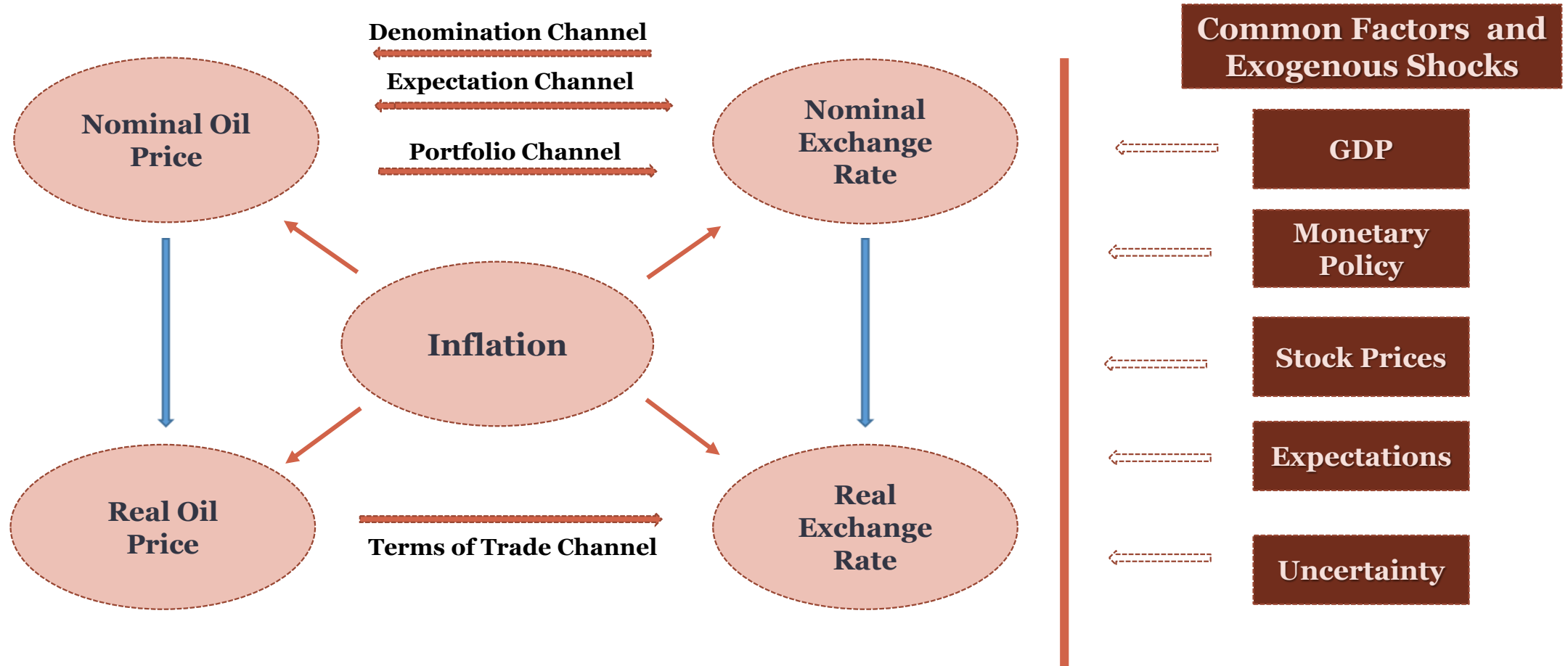
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1. Direct vs. indirect transmission channels?
2. Backward (“in-sample”) and forward looking (“out-of-sample”) evidence?
3. Role of time-variation and nonlinearity?
4. Open questions?

Theoretical Transmission

Direct vs. Indirect Transmission Channels

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Denomination Channel

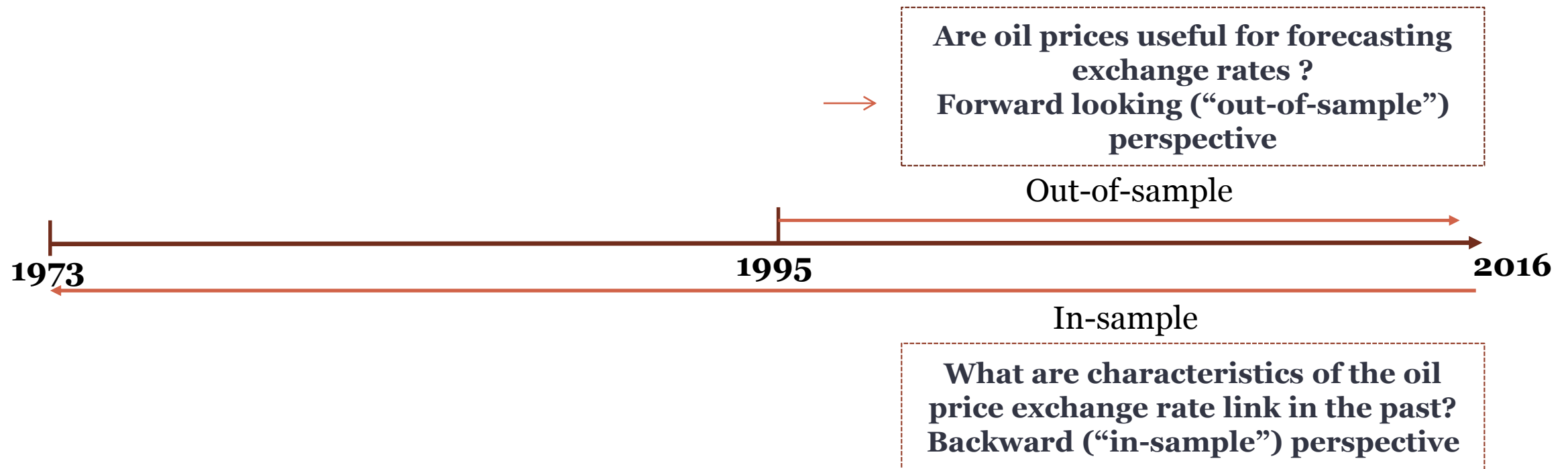
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- **Denomination Channel:** Dollar appreciation increases the price of oil which lowers the demand for oil and results in a drop of the oil price
- Supply side effect of dollar changes less clear: Pricing strategy, exchange rate regime

Looking Back or Predicting the Future?

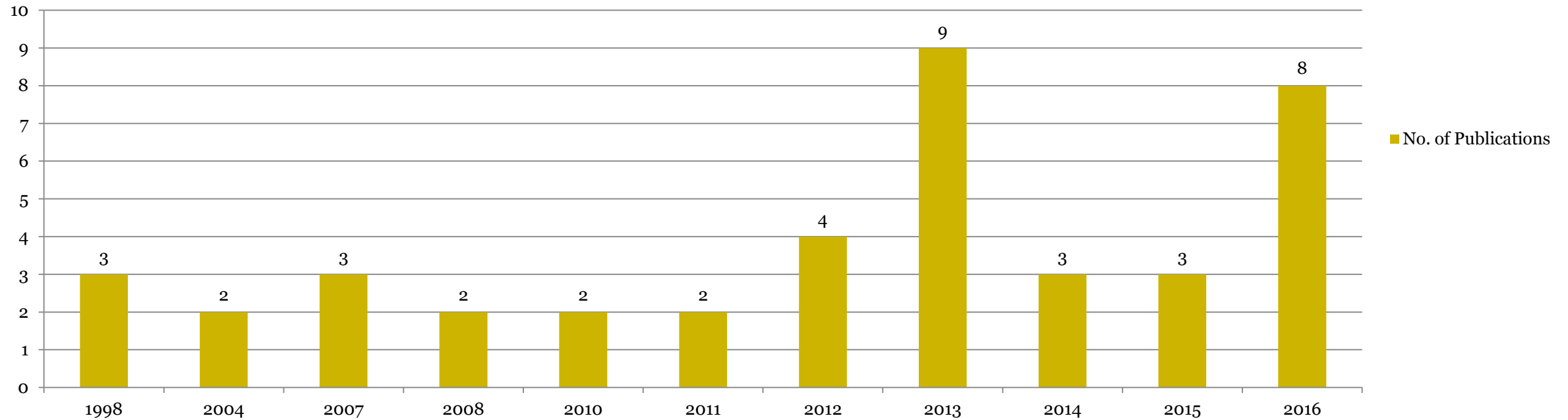
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Empirical Evidence

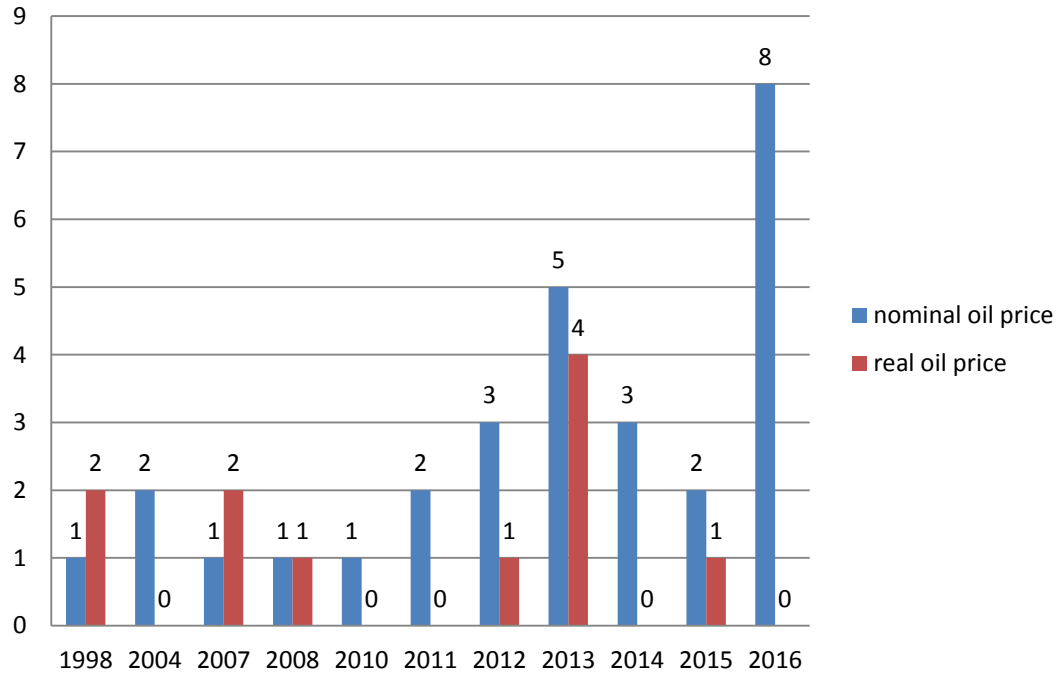
Research dealing with oil price / exchange rate link

Number of publications on oil price/exchange rate link

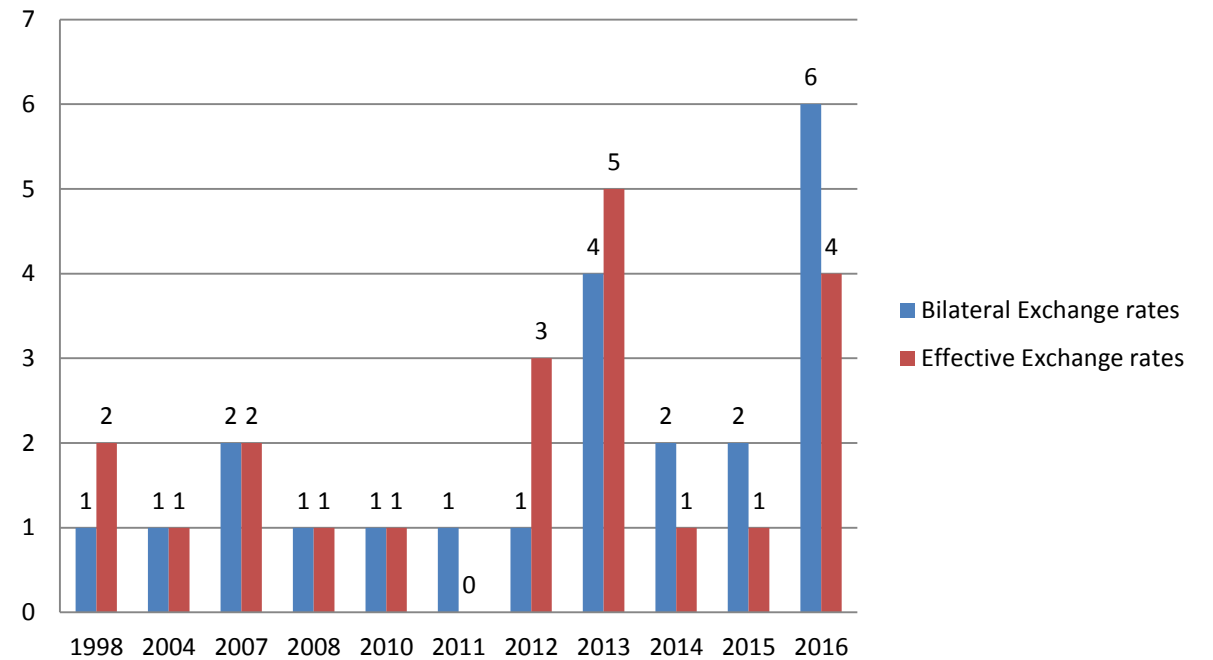


Nominal vs. real Linkages

Number of publications per oil price type

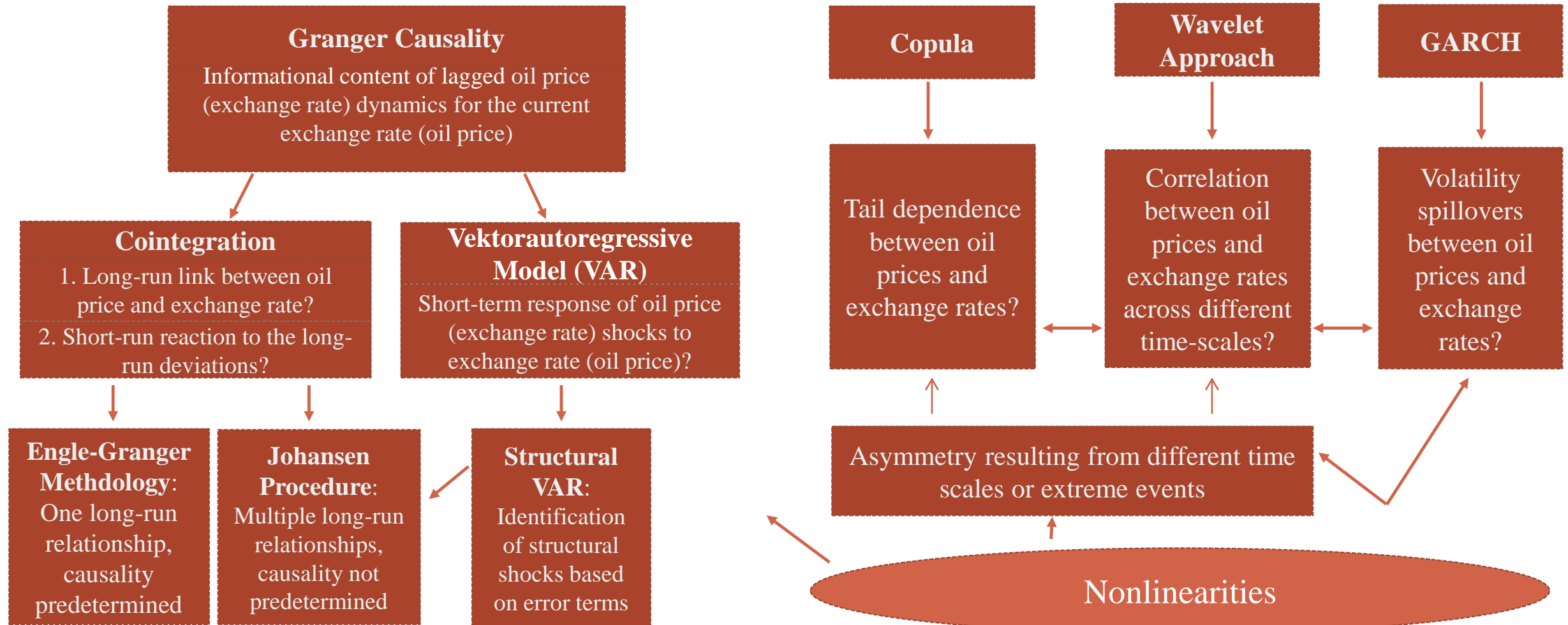


Number of publications per exchange rate type



A Rich Set of Methodologies

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Selective Literature Review

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1998

Amano and van Norden (1998)

Stable long-run link between oil price and the US real effective exchange rate.

Oil price Granger-causes the exchange rate and not vice versa.

2004

Akram (2004);
Nonlinearity:

Changes in low oil price have a strong impact on the exchange rate

Nonlinear model outperforms the random walk model for forecasting

2010

Chen, Rogoff and Rossi (2010):

Structural link between exchange rates and commodity prices through

Exchange rates are very useful in forecasting future commodity prices.

2013

Alquist, Kilian and Vigfusson (2013):

Small but significant improvements in oil forecast accuracy for AUD and CAD.

2014

Fratzscher, Schneider and van Robays (2014)

Bidirectional causality between the US Dollar and oil price since the early 2000s.

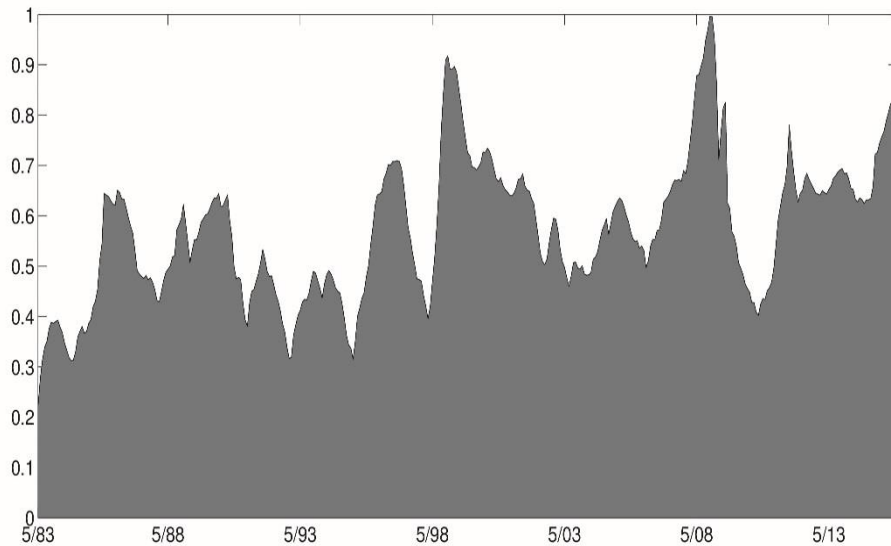
2016

Habib, Bützer and Stracca (2016)

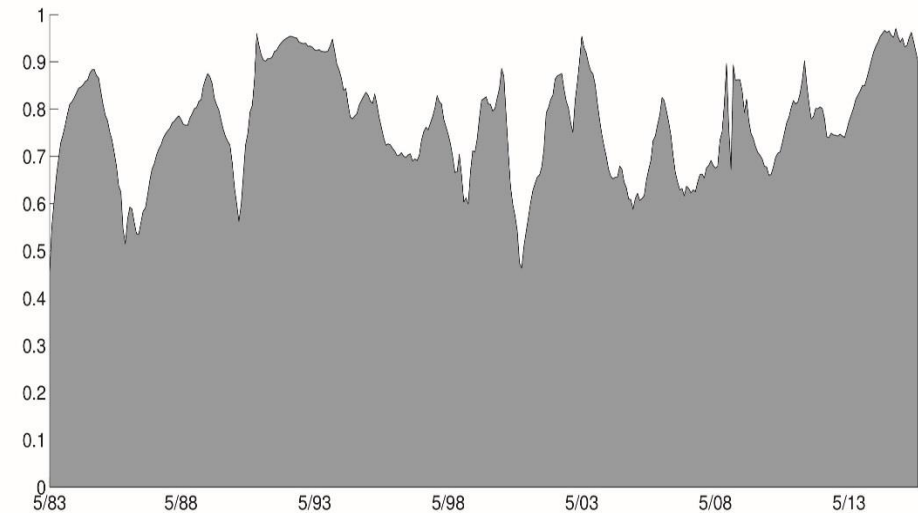
No systematic evidence of a relationship between oil price balance and exchange rate movements following oil price shocks based on a sample of 43 countries

Sample Choice: A Major Issue

Probability to find a causal relationship from the nominal effective dollar exchange rate to the nominal oil price



Probability to find a causal relationship from the nominal oil price to nominal effective dollar exchange rate



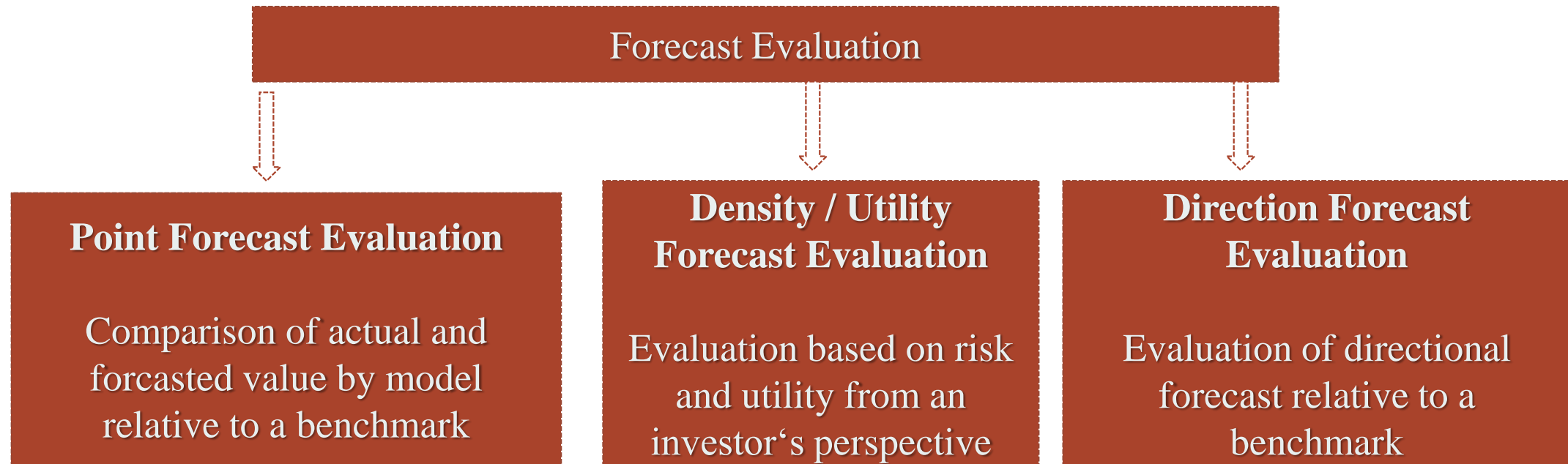
Evidence on Long-Run Relationships and Short Run Dynamics

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- Plenty of evidence for long-run relationship between the real oil price and real effective exchange rates
- Causalities seem to change and run in both directions
- Linkages between nominal oil price and dollar exchange rates also often identified
- Short run linkages have increased
- Many results are highly sample-dependent

Evaluation of Forecasts

Research on predictability mostly based on point forecast evaluation



Evidence on Predictability: A Rolling Regression Exercise

Figure 20: Oil price forecast (h=1)



Share of forecasting superiority of exchange rate models against univariate models		
	h=1	h=12
Broad index	0.7004219	0.5723542
Major index	0.6561181	0.5226782

Evidence on Predictability

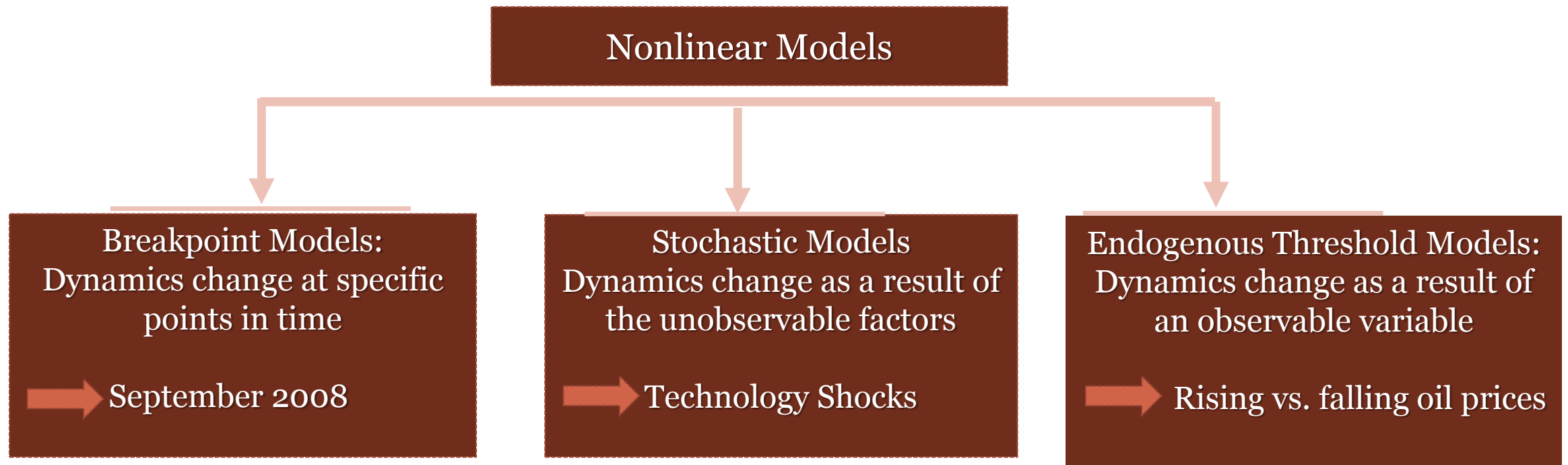
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- Weak link between in-sample and out-of-sample relationship
- Some studies find evidence for exchange rate predictability based on oil prices. However, those studies often suffer from sample dependency or wrong modelling choices
- Weak evidence for systematic oil price predictability based on exchange rates but potential role of commodity currencies

Nonlinearities

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- Plenty of evidence that relationship has intensified over time
 - ➔ Nonlinearities



Market Expectations have also changed

Correlation between forecast uncertainty related to oil prices and exchange rates			
		2005-2010	2010-2015
1 month	EURO	0.000	0.000
	POUND	-0.11134	0.262277
	YEN	-0.35374	0.320367
	BRAZIL REAL	-0.26725	0.284328
12 month	EURO	-0.19756	-0.20159
	POUND	-0.14789	0.143509
	YEN	0.000	0.245369
	BRAZIL REAL	0.000	0.394568

Note: The Table provides correlation coefficients between forecaster disagreement on crude oil prices and dollar exchange rates.

Open Issues

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- Addressing time-varying predictability and optimal sample choice
 - ➔ Model averaging as a possible solution?

- Identifying relevant information in various exchange rates and role of common factors
 - ➔ Factor models as a possible solution?

- Identifying expectation effects?
 - ➔ Survey data and futures contract?

- Disentangling supply and demand effects
 - ➔ Structural shocks / exchange rate pass-through

Policy Implications for Oil Exporters

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- Fixed exchange rates stabilize domestic revenues
- Low oil prices and the need to prevail an exchange rate regime often resemble a negative demand shock
- IMF (2017): Some Exporters should consider depreciation and/or greater exchange rate flexibility...”

Conclusions

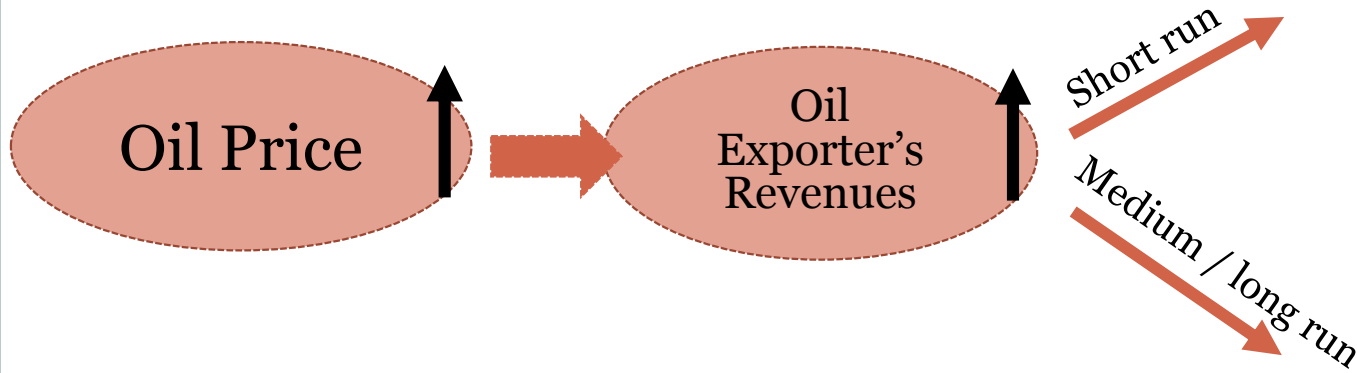
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Thank you very much for your
attention

Wealth vs. Portfolio Channel

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Wealth Effect:

- Dollar?
- Effective Exchange Rate Oil Exporter ↑



Portfolio Effect:

- Dollar?
- Effective Exchange Rate Oil Exporter?
- Trade Structure and Portfolio Choices Oil Exporters?

- **Terms of trade channel:** Oil prices affect exchange rates through affecting the ratio between tradable and non-tradable goods
- **Wealth and portfolio channel:** Oil price changes affect nominal exchange rates as a result of wealth effects. Currencies of oil price exporters appreciate in the short-run

Terms of Trade Effects

Annual Impact of Terms-of-Trade Effects by Group (in percent of GDP)

