The Usefulness of Financial Variables in Predicting Exchange Rate Movements

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Outline

Motivation

- The body of research dedicated to analyzing the predictive power of exchange rate models has reached limited success in forecasting the exchange rate.
- Rossi (2013) concludes that the predictability of the exchange rate models depend on the choice of predictor, forecast horizon, sample period, model and forecast evaluation method.
- Following the financial crisis in 2008 common global factors as liquidity, volatility and risk aversion were placed at center of the debate.

Goal of the paper

- This paper sheds light on this discussion by analyzing the role of globe financial variables on the dynamics of the exchange rate for a set of 27 - advanced and emerging countries.

Contribution of the paper

- The paper performs in-sample and out-of-sample exercises with several financial variables found in the literature for verifying their predictive power on the trajectory of the exchange rate in these countries.

- Besides the traditional forecasting exercises knowing in the exchange rate literature that tries to forecast the exchange rate, the paper also performs more robust tests for dealing with a possible instability in the relationship between liquidity and the exchange rate.

Related Literature

- This paper builds on and relates to the role of liquidity in the financial markets, and exchange rate forecasting literatures.

Related Literature - Liquidity

- Theoretical - Brunnermeier and Pedersen (2009) - Acharya and Viswanathan (2011)
- The interactions between funding and market liquidity leads to illiquidity spirals.

Related Literature - Liquidity

- Lustig et. al. (2011) - Menkoff et. al. (2012) - Carry Trade returns and common factor
- By constructing a measure of FX global liquidity, Banti et. al. (2012) show that there is a link between liquidity across currencies and that liquidity risk is priced in the cross section of currency returns.
- Mancini et. al. (2013), the authors also find the occurrence of strong common movements in liquidity across currencies and with equity and bond markets. They confirm that liquidity risk factor has a strong impact on carry trade returns from 2007 to 2009.
- Banti and Phylaktis (2013) show a relationship between market liquidity and funding liquidity – traders' financial constraints. They find that funding liquidity impact on two different aspects of FX market liquidity, transaction costs and market depth and that the relationship is related to the supply and demand for liquidity.

Related Literature - Liquidity and Co-movements

- Glocker and Towbin (2012), using a structural VAR to Brazil, found that private liquidity shocks dominates public liquidity shocks and that especially for long horizons global shocks dominate domestic ones.
- Fratzscher et. al. (2013) found that US monetary policy have contributed to portfolio reallocation and changes in the price of risk across the world.
- Rey and Agrippino (2012) - one global factor (VIX) explains most of the variance of a large cross section of the price of risky assets around the world.
- Longstaff, Pedersen and Singleton (2011)

Related Literature - Exchange Rate Forecasting

- Rossi (2013) - Survey

Data

- We use weekly data.
- The following countries are used in the analysis: Australia, Canada, Chile, South Korea, Philippines, UK, Israel, Japan, Mexico, New Zealand, Norway, Denmark, Poland, South Africa, Sweden, Switzerland, Turkey, Brazil, Russia, Singapore, Taiwan, Thailand, Peru, Colombia, Hungary, Czech Republic and Indonesia.
- We used exchange rates from the end of the week. tem All exchange rates are relative to the U.S. dollar and follow the convention of local currency quantity per unit of foreign currency.
- All exchange rates are collected from Datastream.

Data

- The 10-year treasury yield as our proxy for long-term interest rate (T10Y)
- VIX, TED, High Yield
- The Merril-Lynch Liquidity Index (Global and Emerging Markets).

The Exchange Rate Model

For each country i, the dynamics of the exchange rate is given by:

$$s_{it+h} - s_{it} = c_i + \beta_i * Z_{it} + \nu_{it+h} \tag{1}$$

where c_{it} is a constant, Z_{it} is one of the proxies for liquidity (changes) and ν_{it+h} is a shock-term.

Methodology - Questions

- Lagged or Contemporaneous Fundamentals?
- Levels, ECM or Panel?
- Rolling, Recursive or Fixed?
- Linear or non-Linear?
- Forecast Horizon?
- Benchmark?
- Evaluation?
- Instability on the relationship?
- Window size (Data snooping?)

Methodology - In-Sample

- OLS
- R2
- Market Timing Test
- Granger Causality
- Granger Causality Robust

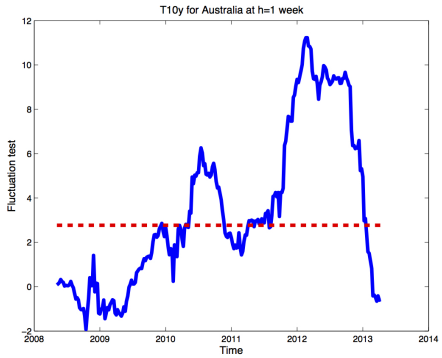
Methodology - Out-of-Sample

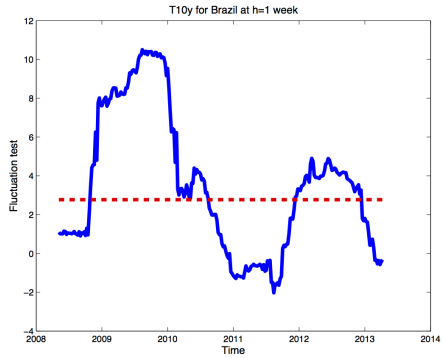
- 1,2,4 and 8 periods ahead
- Ratio RMSFE
- Benchmark : Random Walk without drift
- Clark and West (2006)
- Giacomini and Rossi (2010)
- Inoue and Rossi (2012)

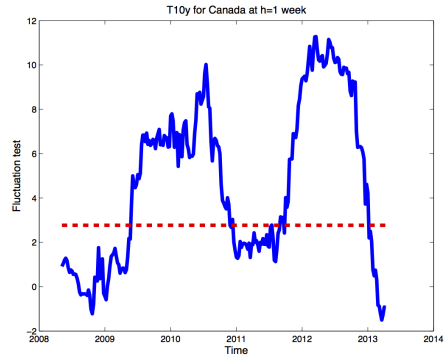
Results - In-sample and out-of-sample

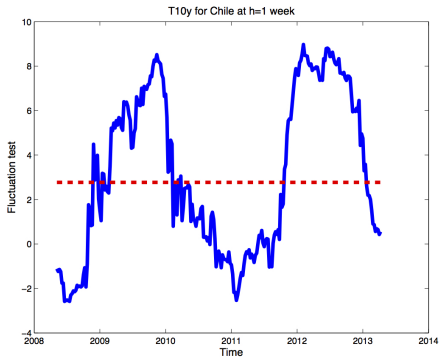
	T10Y									
Countries	In-Sample					Out-of-Sample				
	OLS	R^2	HR	GC	GC Robust	1 Week	P-Value CW	2 Weeks	4 Weeks	8 Weeks
Australia	-2.76*	0,025	51,9%	0,000	0,000	**0,990**	0,000	**0,976**	**0,999**	**0,997**
Canada	-2.67*	0,048	54,5%	0,000	0,000	**0,997**	0,000	**0,978**	**0,988**	**0,992**
Japan	4.09*	0,109	60,6%	0,000	0,000	**0,916**	0,000	**0,944**	**0,965**	**0,980**
New Zealand	-2.78*	0,023	53,3%	0,000	0,000	**0,982**	0,000	**0,997**	**1,000**	**1,000**
Sweden	-0,987	0,003	52,3%	0,220	0,000	**0,996**	0,070	**0,998**	**1,001**	1,005
UK	-1,031	0,007	54,1%	0,160	0,000	**0,999**	0,040	1,002	1,006	1,007
Switzerland	1.45**	0,010	53,1%	0,040	0,000	1,004	0,300	**0,996**	**0,997**	**1,000**
Norway	-0,984	0,004	52,0%	0,220	0,000	**0,992**	0,010	**0,993**	**0,999**	1,002
Denmark	0,288	0,000	52,7%	0,650	0,000	1,004	0,510	**0,999**	**1,000**	1,004
Israel	-0,900	0,006	54,1%	0,120	0,000	1,002	0,630	1,001	1,003	1,003
Brazil	-5.67*	0,071	57,8%	0,000	0,000	**0,942**	0,000	**0,979**	**0,988**	**0,996**
South Africa	-2.42*	0,012	53,4%	0,030	0,000	**0,990**	0,020	**0,997**	**1,001**	**0,997**
Turkey	-1,072	0,001	47,2%	0,370	0,000	1,003	0,270	1,001	1,002	1,003
Russia	-2.16*	0,039	52,3%	0,000	0,000	**0,973**	0,000	**0,989**	**0,997**	**1,000**
South Korea	-2.03*	0,023	53,3%	0,000	0,020	**0,991**	0,040	1,002	1,002	**0,999**
Mexico	-3.11*	0,050	54,5%	0,000	0,000	**0,973**	0,000	**0,990**	**0,992**	**0,994**
Singapore	-0,188	0,001	55,2%	0,570	0,190	**0,995**	0,050	**0,997**	**0,996**	**0,996**
Phillipines	-0.778*	0,011	54,4%	0,020	0,230	**0,992**	0,010	**1,000**	**0,997**	**0,996**
Poland	-2.43*	0,016	50,2%	0,010	0,000	**0,988**	0,010	**0,994**	**1,000**	1,002
Taiwan	-0.679*	0,016	52,7%	0,010	0,040	**0,989**	0,020	**0,995**	**0,998**	**0,996**
Chile	-2.86*	0,035	50,8%	0,000	0,000	**0,986**	0,000	1,006	1,003	**0,998**
Hungary	-0,798	0,002	48,9%	0,420	0,000	**0,998**	0,013	**0,996**	**0,999**	1,003
Czech	-0,226	0,000	55,6%	0,760	0,000	1,002	0,290	**0,998**	**0,999**	1,002
Colombia	-1.72*	0,014	54,5%	0,010	0,130	**0,994**	0,020	1,003	**1,000**	**1,000**
Peru	-0,271	0,002	57,7%	0,230	0,180	1,001	0,350	**0,999**	**0,998**	**0,999**
Indonesia	0,039	0,000	46,4%	0,940	0,340	1,005	0,830	1,007	1,008	1,006
Thailand	0,089	0,000	54,2%	0,720	0,580	1,001	0,220	**0,998**	**0,996**	**0,998**

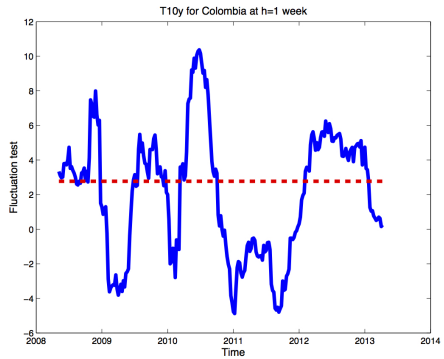
Results - Giacomini and Rossi (2010) test - T10Y

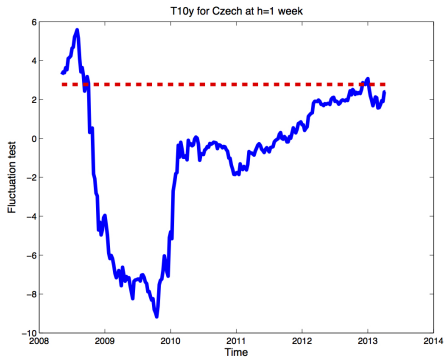


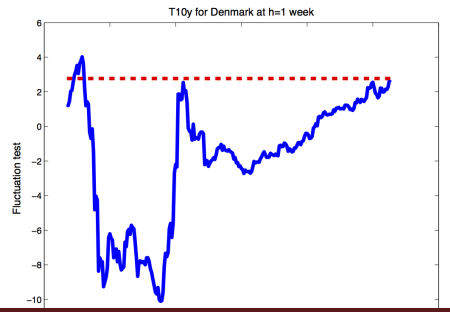


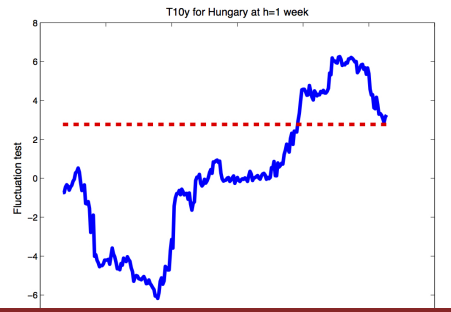


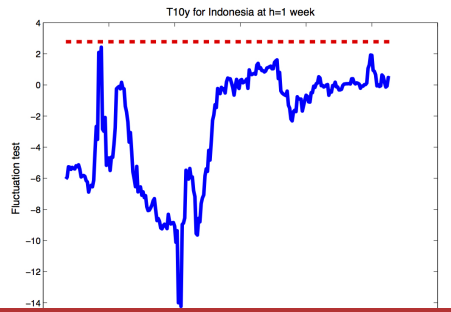




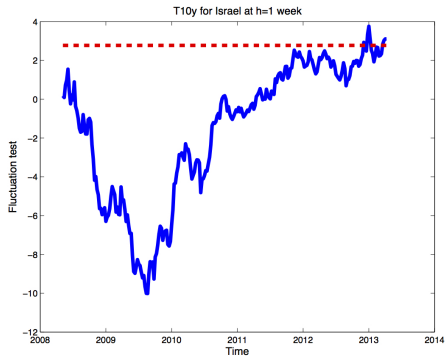


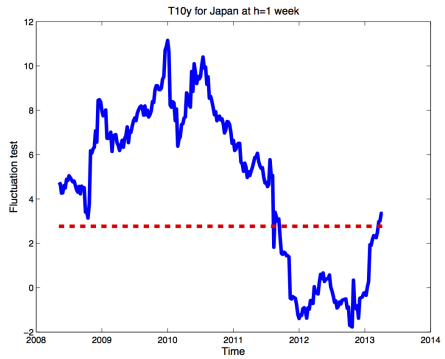


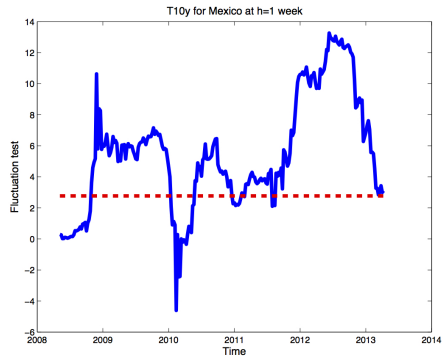


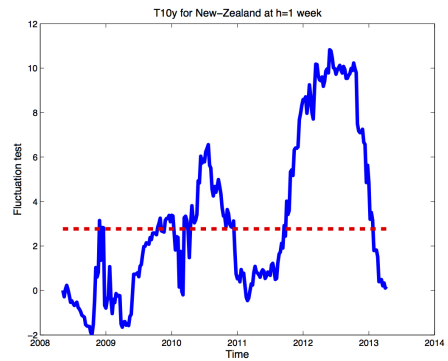


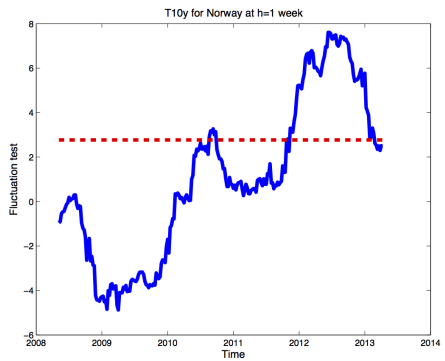
Results - Giacomini and Rossi (2010) test - T10Y

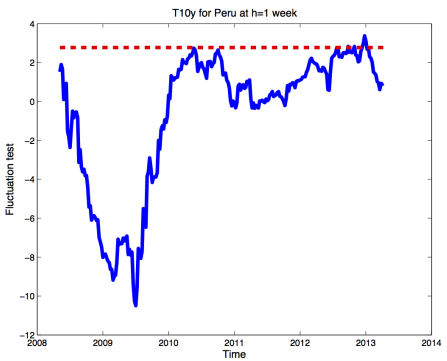


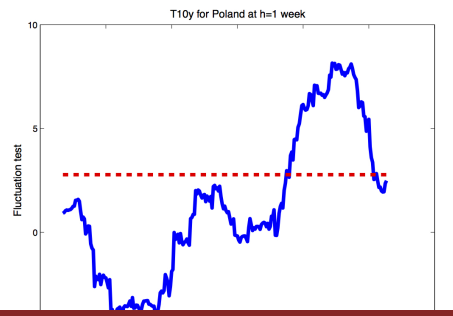


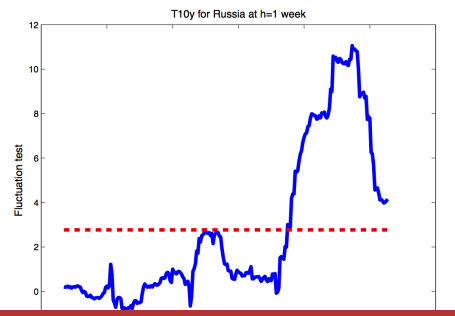




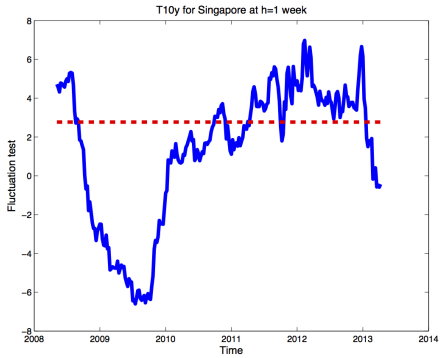


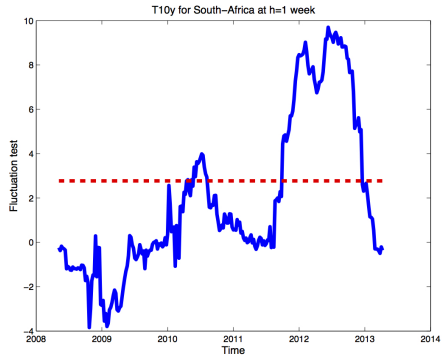


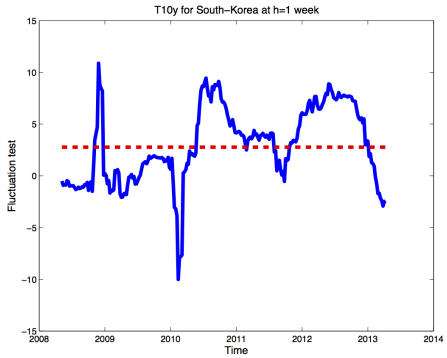


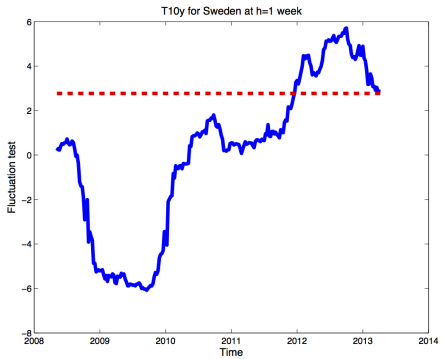


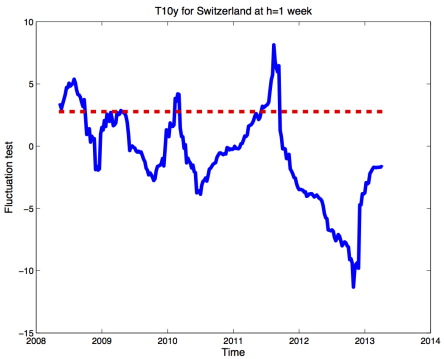
Results - Giacomini and Rossi (2010) test - T10Y

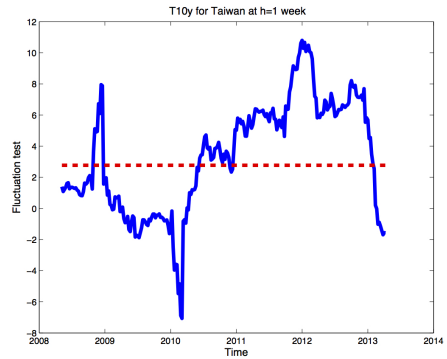


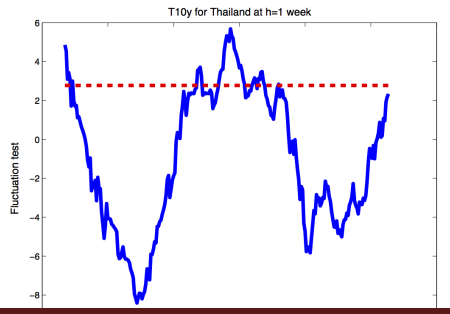


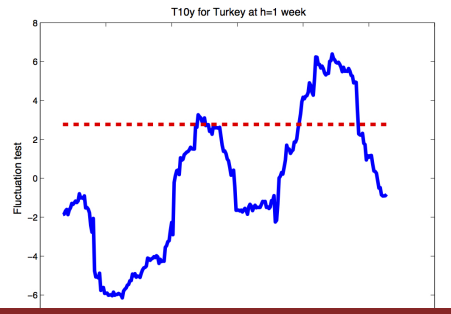


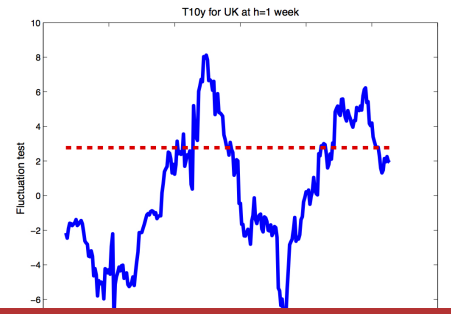








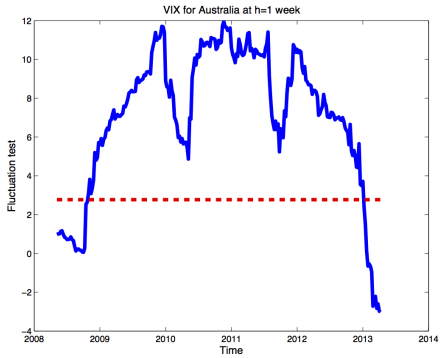


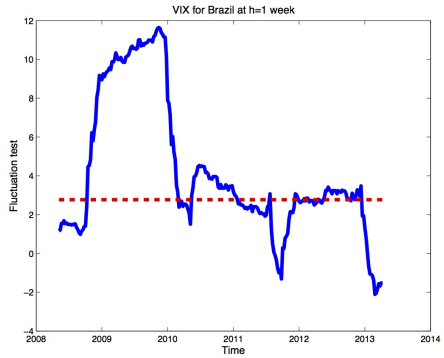


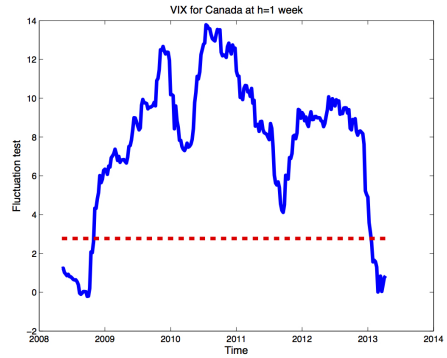
Results - In-sample and out-of-sample

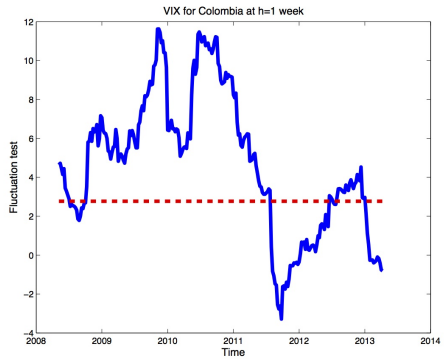
	VIX									
Countries	In-Sample					Out-of-Sample				
	OLS	R^2	HR	GC	GC Robust	1 Week	P-Value CW	2 Weeks	4 Weeks	8 Weeks
Australia	0.049*	0,104	56,6%	0,000	0,000	0,929	0,000	0,986	0,997	0,998
Canada	0.041*	0,144	60,3%	0,000	0,000	0,897	0,000	0,967	0,996	1,000
Japan	-0.023*	0,045	53,4%	0,000	0,000	0,966	0,000	0,997	0,994	1,000
New Zealand	0.056*	0,121	58,3%	0,000	0,000	0,910	0,000	0,986	1,000	1,004
Sweden	0.034*	0,060	53,0%	0,000	0,000	0,953	0,000	0,991	0,998	1,001
UK	0.013*	0,013	49,7%	0,000	0,030	0,990	0,010	1,000	1,008	1,005
Switzerland	-0,003	0,001	52,2%	0,560	0,020	1,002	0,310	1,003	1,001	1,001
Norway	0.027*	0,038	51,9%	0,000	0,000	0,960	0,000	0,993	1,000	1,001
Denmark	0.014*	0,014	50,9%	0,000	0,000	0,983	0,000	0,999	1,000	1,002
Israel	0.028*	0,074	58,4%	0,000	0,000	0,962	0,000	1,001	1,008	1,005
Brazil	0.073*	0,151	62,0%	0,000	0,000	0,892	0,000	0,966	0,989	0,999
South Africa	0.058*	0,088	56,1%	0,000	0,000	0,917	0,000	0,983	0,998	0,998
Turkey	0.074*	0,075	59,4%	0,000	0,000	0,888	0,000	0,983	0,999	1,002
Russia	0.024*	0,061	54,7%	0,000	0,000	0,965	0,000	0,995	1,000	1,003
South Korea	0.036*	0,092	57,7%	0,000	0,000	0,943	0,000	0,986	0,999	1,003
Mexico	0.052*	0,176	60,3%	0,000	0,000	0,879	0,000	0,964	0,987	0,999
Singapore	0.016*	0,077	55,9%	0,000	0,000	0,939	0,000	0,981	0,996	0,997
Phillipines	0.018*	0,070	54,5%	0,000	0,000	0,946	0,000	0,989	0,999	1,002
Poland	0.053*	0,100	55,8%	0,000	0,000	0,929	0,000	0,987	0,995	0,999
Taiwan	0.010*	0,045	55,8%	0,000	0,000	0,961	0,000	0,992	0,998	1,000
Chile	0.045*	0,114	62,2%	0,000	0,000	0,935	0,000	0,995	0,997	0,999
Hungary	0.050*	0,082	53,6%	0,000	0,000	0,938	0,000	0,988	0,996	1,000
Czech	0.023*	0,026	54,8%	0,000	0,000	0,976	0,000	0,997	0,999	1,001
Colombia	0.040*	0,094	60,9%	0,000	0,000	0,951	0,000	0,987	0,988	0,994
Peru	0.006*	0,016	58,9%	0,000	0,000	0,991	0,000	0,996	0,996	0,997
Indonesia	0.014*	0,015	50,8%	0,000	0,050	0,993	0,030	1,003	1,003	1,004
Thailand	0.008*	0,017	55,9%	0,000	0,030	0,987	0,000	0,995	0,998	0,996

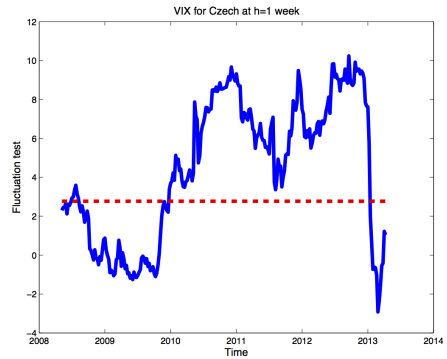
Results - Giacomini and Rossi (test) - VIX

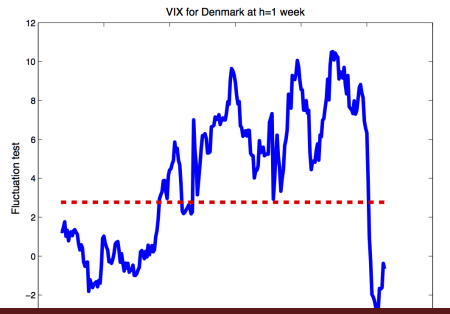


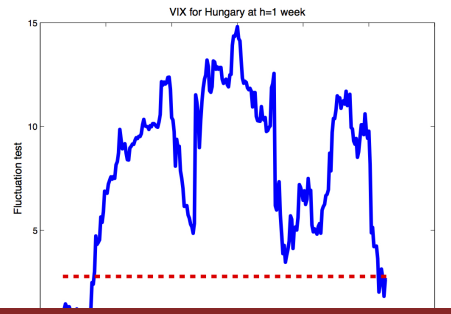




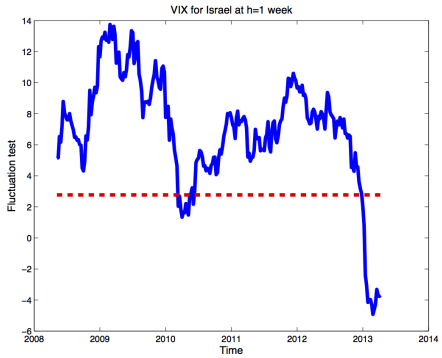


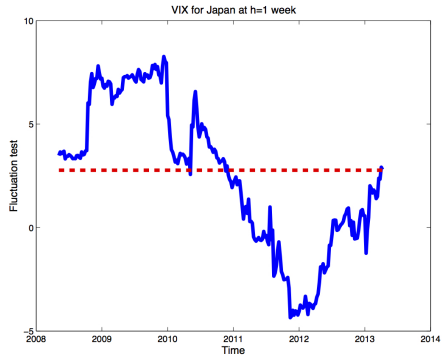


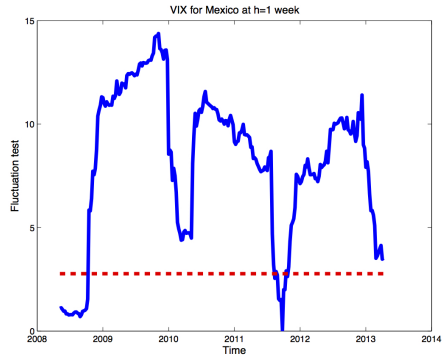


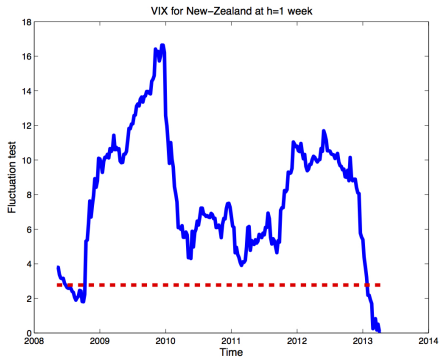


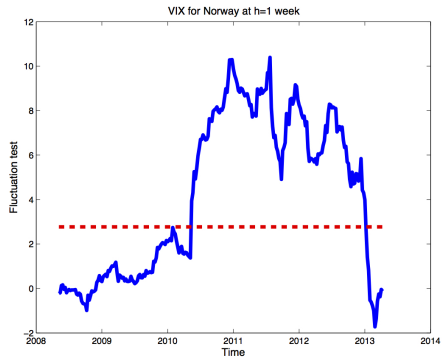
Results - Giacomini and Rossi (test) - VIX

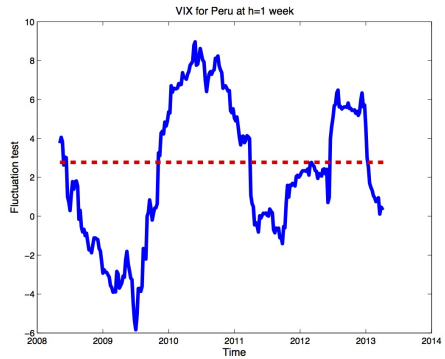


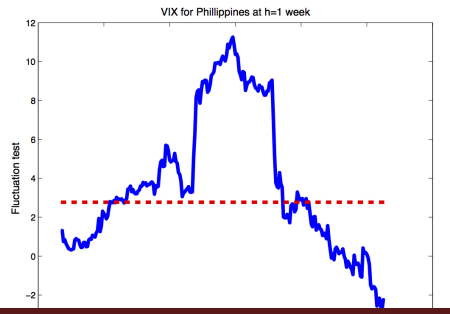


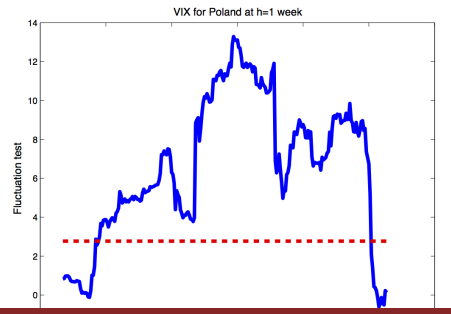


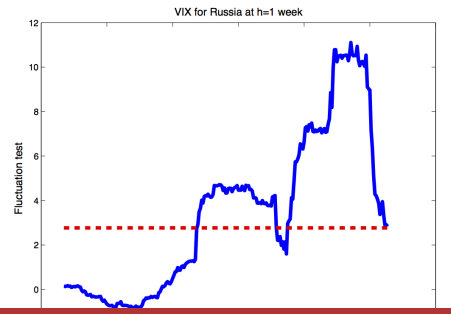




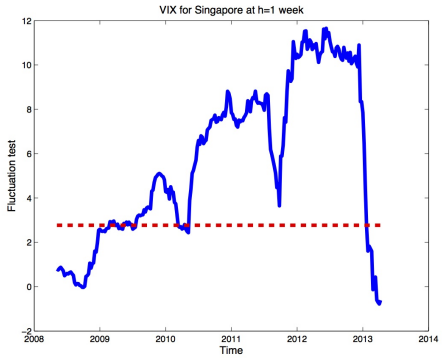


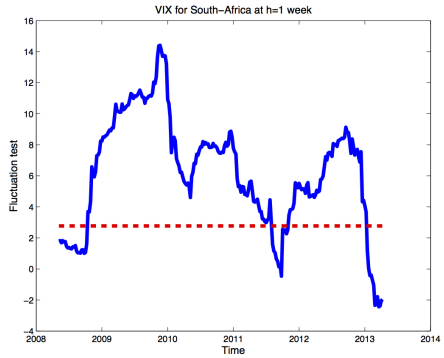


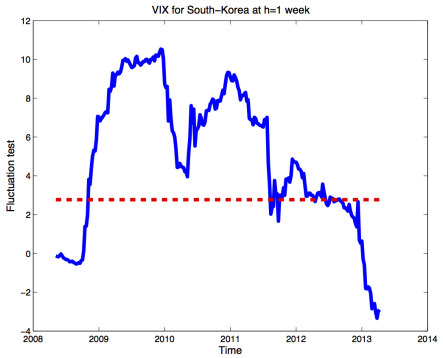


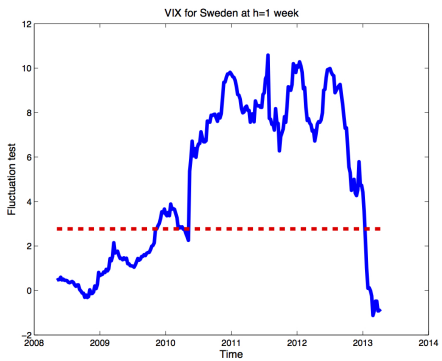


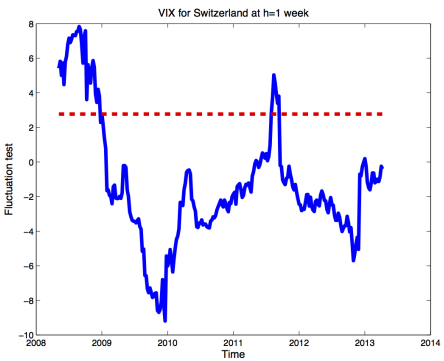
Results - Giacomini and Rossi (test) - VIX

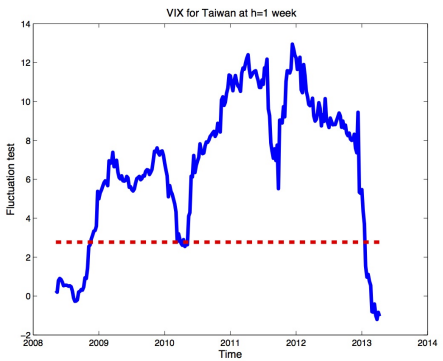


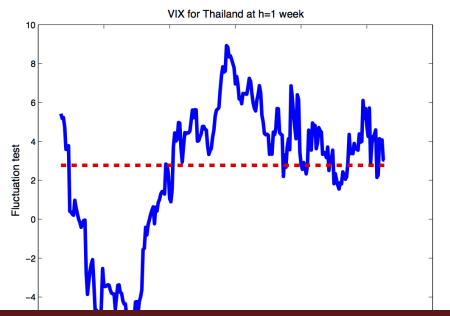


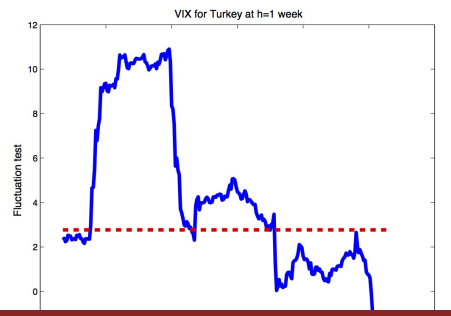


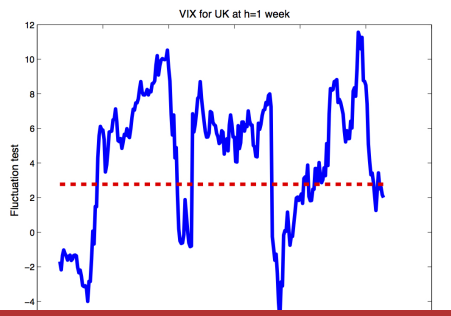












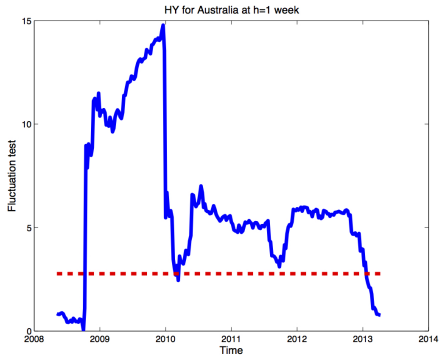
Results - In-sample and out-of-sample

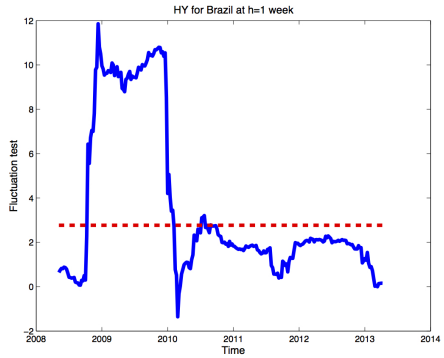
Countries	TED									
	In-Sample					Out-of-Sample				
	OLS	R^2	HR	GC	GC Robust	1 Week	P-Value CW	2 Weeks	4 Weeks	8 Weeks
Australia	**3.37***	0,052	55,8%	0,030	0,020	**0,982**	0,050	1,004	**0,995**	1,002
Canada	0,797	0,006	54,2%	0,470	0,660	1,010	0,630	1,013	**1,000**	1,003
Japan	-0,787	0,005	49,4%	0,350	0,030	1,009	0,220	1,012	1,006	1,007
New Zealand	**2.55***	0,026	57,2%	0,120	0,000	**1,002**	0,080	1,017	1,003	1,011
Sweden	0,637	0,002	53,6%	0,540	0,080	1,012	0,510	1,013	1,005	1,004
UK	-0,106	0,000	51,7%	0,920	0,000	1,016	0,970	1,014	1,002	1,005
Switzerland	-0,141	0,000	51,7%	0,810	0,010	1,010	0,760	1,006	1,001	**1,000**
Norway	0,569	0,002	54,5%	0,560	0,260	1,010	0,650	1,014	1,006	1,002
Denmark	-0,014	0,001	51,4%	0,760	0,090	1,016	0,930	1,013	1,003	1,001
Israel	-0,355	0,001	50,9%	0,620	0,000	1,009	0,780	1,004	**0,999**	1,003
Brazil	**3.37***	0,034	55,3%	0,030	0,000	**0,982**	0,070	**0,982**	**0,991**	1,002
South Africa	1,073	0,003	49,8%	0,490	0,020	1,013	0,460	1,023	1,011	1,009
Turkey	1,541	0,003	47,2%	0,390	0,120	1,020	0,400	1,029	1,007	1,010
Russia	-0,055	0,000	51,9%	0,920	0,100	1,006	0,990	1,006	1,003	1,002
South Korea	**1.60****	0,020	58,3%	0,130	0,000	1,001	0,250	1,005	1,005	1,002
Mexico	**1.91***	0,025	49,8%	0,120	0,400	**0,996**	0,095	1,001	**0,998**	1,006
Singapore	0,491	0,008	54,8%	0,120	0,000	**0,998**	0,090	**0,990**	**0,996**	**0,995**
Phillipines	0,355	0,003	51,3%	0,340	0,000	1,006	0,300	1,005	**0,998**	**0,997**
Poland	0,193	0,000	54,1%	0,910	0,040	1,014	0,840	1,014	1,002	1,003
Taiwan	0,237	0,003	50,9%	0,460	0,000	1,010	0,360	1,008	1,003	1,000
Chile	**2.18***	0,028	52,0%	0,100	0,000	1,000	0,180	1,003	1,003	1,003
Hungary	0,580	0,001	52,2%	0,690	0,080	1,010	0,760	1,014	1,002	1,002
Czech	-0,062	0,000	55,5%	0,940	0,030	1,011	0,820	1,009	**0,999**	**0,999**
Colombia	**2.46***	0,038	55,0%	0,010	0,020	**0,990**	0,020	**1,000**	**0,987**	**0,995**
Peru	**0.392****	0,007	55,6%	0,210	1,000	1,001	0,230	1,003	**0,998**	**0,993**
Indonesia	0,010	0,000	50,6%	0,950	0,130	1,008	0,830	1,006	1,004	1,003
Thailand	0,199	0,001	54,2%	0,510	0,000	1,007	0,250	1,005	**0,999**	**0,998**

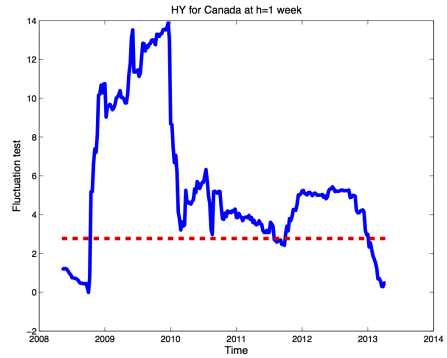
Results - In-sample and out-of-sample

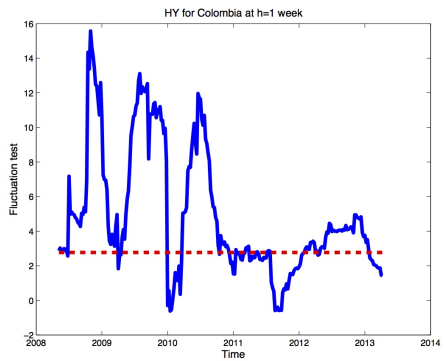
	High Yield									
Countries	In-Sample					Out-of-Sample				
	OLS	R^2	HR	GC	GC Robust	1 Week	P-Value CW	2 Weeks	4 Weeks	8 Weeks
Australia	2.67*	0,209	59,8%	0,000	0,000	0,865	0,000	0,907	0,933	0,954
Canada	1.74*	0,179	62,7%	0,000	0,000	0,876	0,000	0,896	0,933	0,962
Japan	-1.15*	0,076	54,5%	0,000	0,000	0,937	0,000	0,973	0,990	0,986
New Zealand	2.31*	0,139	58,1%	0,000	0,000	0,902	0,000	0,919	0,945	0,962
Sweden	1.51*	0,082	53,0%	0,000	0,000	0,933	0,000	0,954	0,969	0,985
UK	0.840*	0,039	54,5%	0,000	0,000	0,969	0,000	0,973	0,984	1,001
Switzerland	0,017	0,000	51,6%	0,940	0,000	1,009	0,260	1,014	1,007	1,017
Norway	1.26*	0,058	54,7%	0,000	0,000	0,946	0,000	0,958	0,975	0,994
Denmark	0.495*	0,013	54,8%	0,010	0,000	0,993	0,050	0,998	0,995	1,004
Israel	0.836*	0,047	58,6%	0,000	0,000	0,978	0,010	0,982	0,984	0,994
Brazil	2.98*	0,172	59,7%	0,000	0,000	0,864	0,000	0,840	0,892	0,941
South Africa	2.32*	0,094	55,2%	0,000	0,000	0,906	0,000	0,926	0,952	0,959
Turkey	2.53*	0,060	57,5%	0,000	0,000	0,893	0,000	0,926	0,959	0,966
Russia	0,843	0,052	54,4%	0,000	0,000	0,973	0,000	0,986	0,995	1,001
South Korea	1.96*	0,192	60,6%	0,000	0,000	0,870	0,000	0,896	0,927	0,958
Mexico	2.11*	0,199	59,8%	0,000	0,000	0,881	0,000	0,919	0,937	0,967
Singapore	0.583*	0,069	59,8%	0,000	0,000	0,944	0,000	0,953	0,969	0,985
Phillipines	0.709*	0,078	58,1%	0,000	0,000	0,939	0,000	0,959	0,969	0,980
Poland	1.90*	0,086	56,6%	0,000	0,000	0,939	0,000	0,965	0,976	0,991
Taiwan	0.470*	0,067	60,2%	0,000	0,000	0,946	0,000	0,959	0,974	0,984
Chile	1.96*	0,146	60,5%	0,000	0,000	0,917	0,000	0,948	0,950	0,962
Hungary	1.63*	0,059	56,4%	0,000	0,000	0,961	0,000	0,976	0,984	0,989
Czech	0.789*	0,020	55,5%	0,000	0,000	0,987	0,010	0,994	0,993	1,000
Colombia	1.50*	0,091	62,3%	0,000	0,000	0,951	0,000	0,959	0,952	0,960
Peru	0.418*	0,048	59,7%	0,000	0,000	0,975	0,000	0,984	0,986	0,990
Indonesia	1.07*	0,057	54,7%	0,000	0,000	0,945	0,000	0,955	0,956	0,979
Thailand	0.307*	0,019	56,4%	0,000	0,000	0,989	0,000	0,989	0,992	0,994

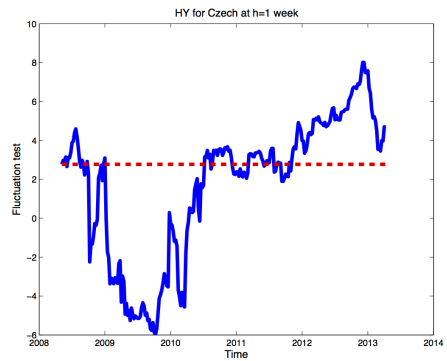
Results - Giacomini and Rossi (2010) test - HY

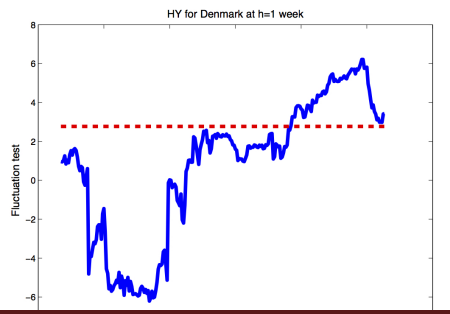


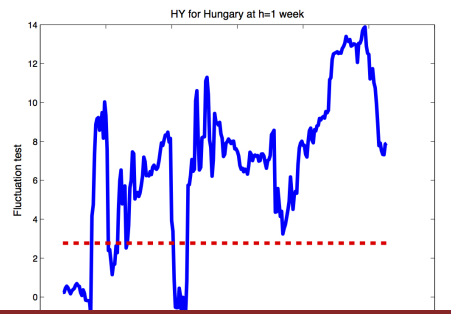


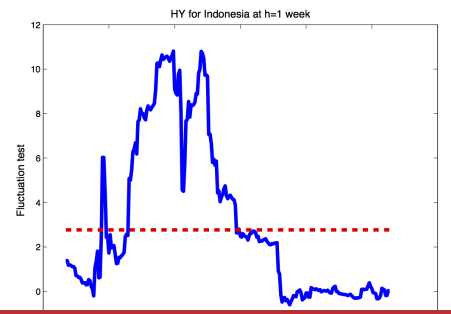




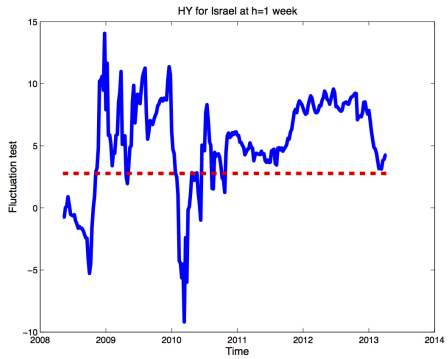


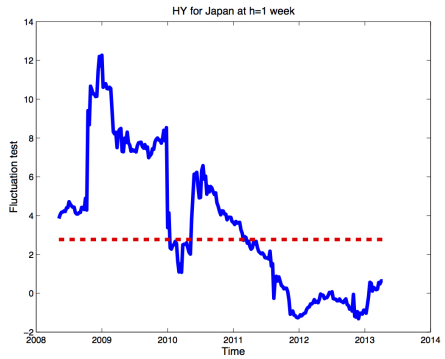


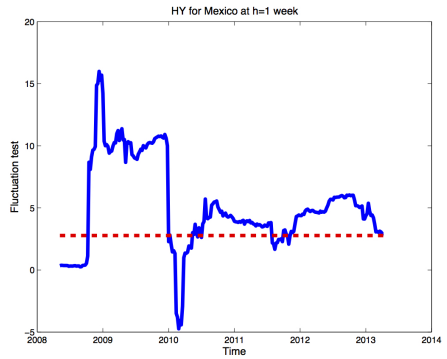


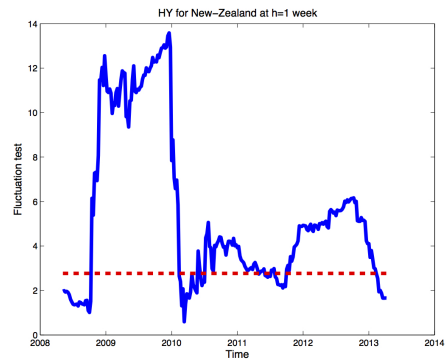


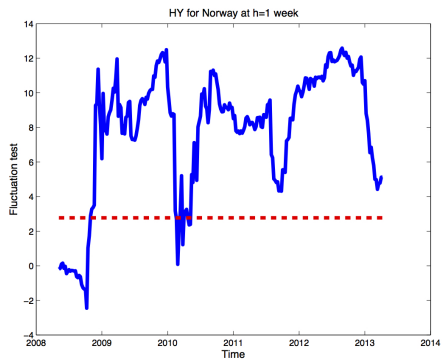
Results - Giacomini and Rossi (2010) test - HY

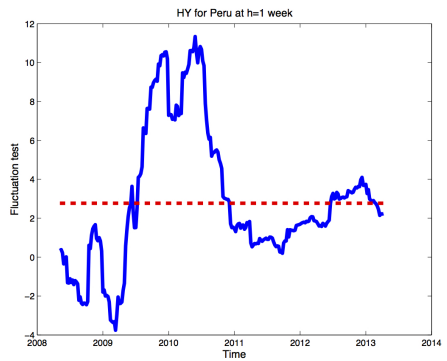


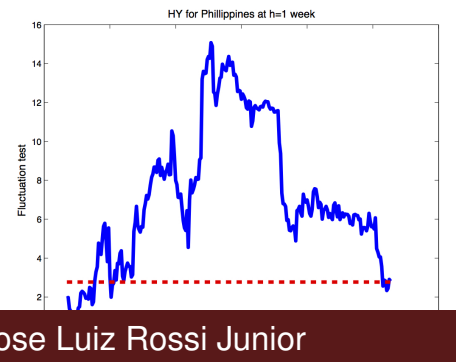


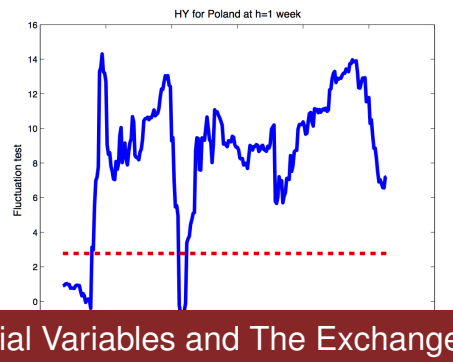


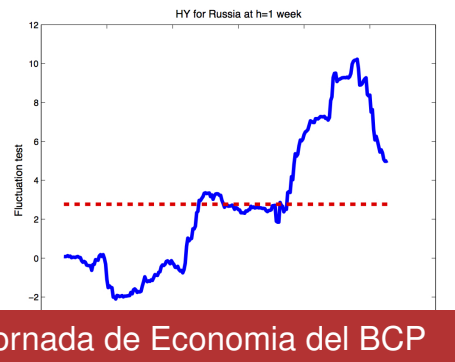




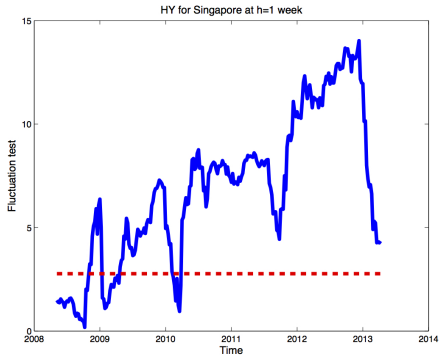


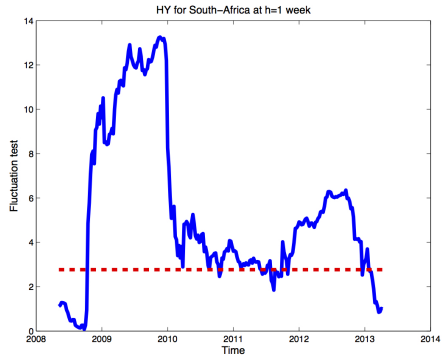


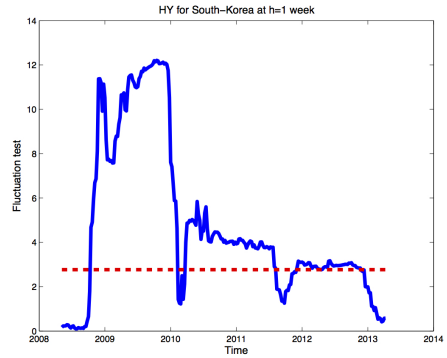


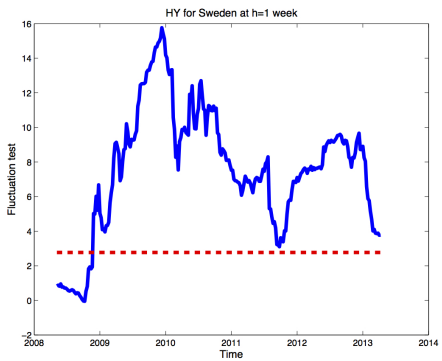


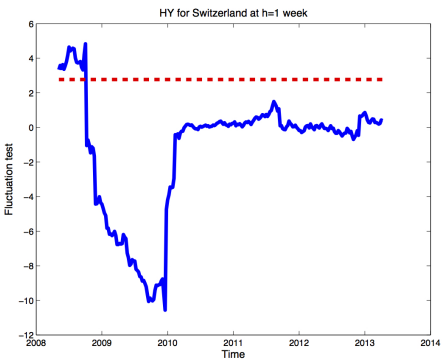
Results - Giacomini and Rossi (2010) test - HY

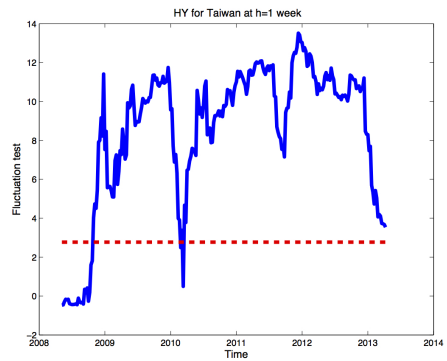


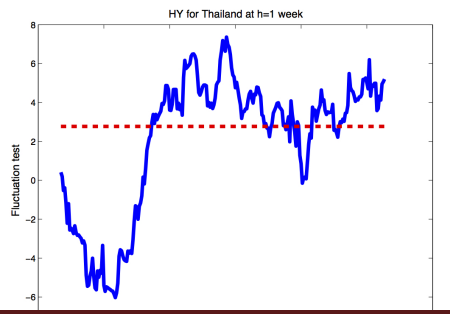


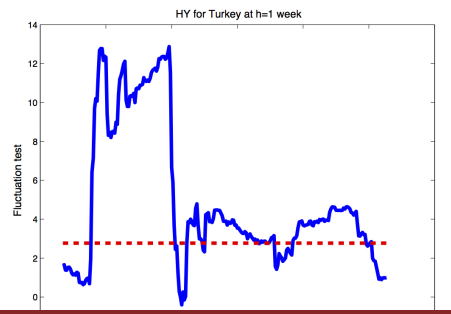


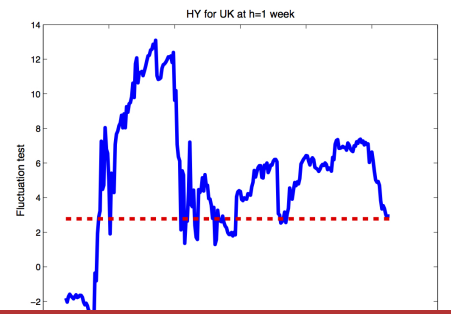












Results - In-sample and out-of-sample

	ML									
Countries	In-Sample					Out-of-Sample				
	OLS	R^2	HR	GC	GC Robust	1 Week	P-Value CW	2 Weeks	4 Weeks	8 Weeks
Australia	-0.033*	0,063	57,2%	0,030	0,000	**0,991**	0,040	**0,947**	**0,925**	**0,944**
Canada	-0.018*	0,037	55,8%	0,060	0,140	**1,000**	0,015	**0,970**	**0,969**	**0,969**
Japan	0.009**	0,008	47,5%	0,220	0,880	1,010	0,480	**0,994**	**0,997**	**1,000**
New Zealand	-0.026*	0,033	55,9%	0,060	0,160	**1,000**	0,090	**0,968**	**0,962**	**0,964**
Sweden	-0.019*	0,026	53,4%	0,000	0,120	**0,991**	0,080	**0,979**	**0,981**	**0,988**
UK	-0.016*	0,025	49,7%	0,060	0,300	**0,997**	0,100	**0,976**	**0,979**	**0,982**
Switzerland	-0.008**	0,005	53,3%	0,110	0,500	1,000	0,210	**0,998**	**0,995**	**0,996**
Norway	-0.023*	0,037	54,7%	0,000	0,000	**0,977**	0,020	**0,962**	**0,967**	**0,986**
Denmark	-0.014*	0,019	52,8%	0,020	0,190	**0,994**	0,080	**0,987**	**0,986**	**0,991**
Israel	-0,006	0,005	52,8%	0,320	0,180	1,009	0,610	1,008	1,008	1,001
Brazil	-0.030*	0,034	55,2%	0,050	0,020	1,003	0,110	**0,945**	**0,936**	**0,970**
South Africa	-0.031*	0,033	54,2%	0,030	0,000	**0,991**	0,013	**0,949**	**0,942**	**0,956**
Turkey	-0.029*	0,015	51,3%	0,050	0,000	1,010	0,220	**0,960**	**0,957**	**0,974**
Russia	-0,010	0,013	52,8%	0,070	0,030	1,002	0,390	1,001	1,002	1,005
South Korea	-0.021*	0,040	55,8%	0,060	0,000	0,996	0,018	**0,956**	**0,953**	**0,962**
Mexico	-0.021*	0,037	53,4%	0,110	0,010	1,004	0,200	**0,979**	**0,976**	**0,993**
Singapore	-0.0064*	0,016	54,8%	0,030	0,150	**0,995**	0,050	**0,984**	**0,983**	**0,985**
Phillipines	-0,007	0,014	52,0%	0,000	0,110	**0,997**	0,060	**0,992**	**0,993**	**0,987**
Poland	-0.022*	0,020	55,9%	0,130	0,080	1,007	0,340	**0,987**	**0,993**	**0,999**
Taiwan	-0.006*	0,021	54,1%	0,020	0,030	**0,996**	0,050	**0,981**	**0,983**	**0,989**
Chile	-0.029*	0,060	55,2%	0,000	0,000	**0,984**	0,020	**0,952**	**0,956**	**0,976**
Hungary	-0.022*	0,021	54,7%	0,070	0,170	**0,999**	0,030	**0,985**	**0,988**	**0,994**
Czech	-0,012	0,009	54,5%	0,160	0,370	1,005	0,290	**0,997**	**0,997**	**1,000**
Colombia	-0.022*	0,037	54,7%	0,000	0,000	**0,994**	0,040	**0,966**	**0,954**	**0,964**
Peru	-0.005**	0,011	55,0%	0,070	0,440	1,003	0,180	**0,999**	1,003	1,010
Indonesia	-0.021*	0,042	51,1%	0,000	0,040	**0,980**	0,020	**0,965**	**0,971**	**0,974**
Thailand	-0.007*	0,017	56,3%	0,000	0,000	**0,994**	0,010	**0,989**	**0,989**	**0,990**

Results - In-sample and out-of-sample

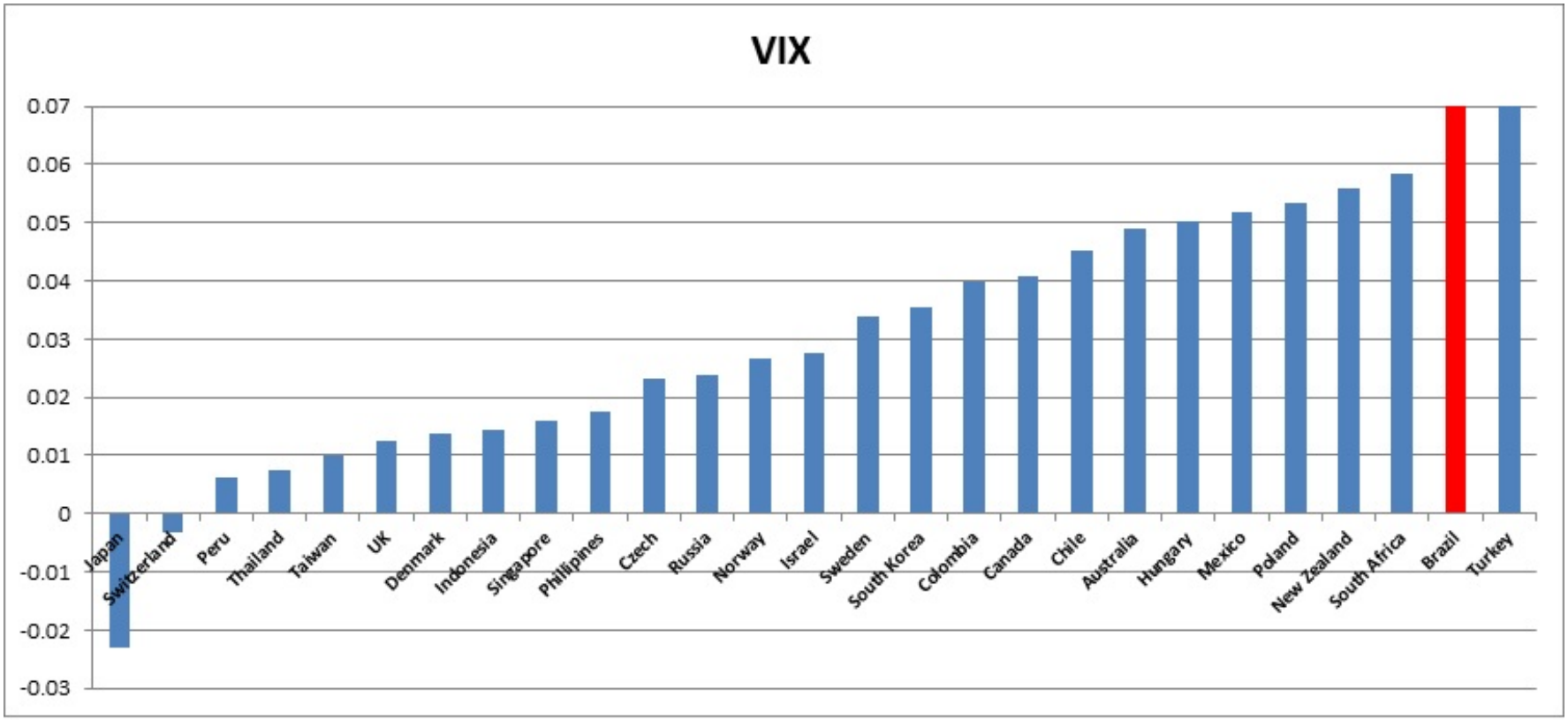
	MLE									
Countries	In-Sample					Out-of-Sample				
	OLS	R^2	HR	GC	GC Robust	1 Week	P-Value CW	2 Weeks	4 Weeks	8 Weeks
Australia	-0.019*	0,059	57,2%	0,000	0,020	0,989	0,000	0,946	0,939	0,950
Canada	-0.011*	0,037	57,0%	0,010	0,300	0,988	0,030	0,965	0,960	0,960
Japan	0,002	0,001	47,8%	0,600	1,000	1,008	0,870	1,003	1,003	1,002
New Zealand	-0.016*	0,037	55,6%	0,000	0,090	0,987	0,000	0,965	0,964	0,965
Sweden	-0.012*	0,030	55,2%	0,000	0,050	0,984	0,010	0,971	0,973	0,977
UK	-0.009*	0,022	52,0%	0,020	0,200	0,992	0,030	0,978	0,979	0,987
Switzerland	-0.006*	0,008	53,1%	0,030	0,160	0,993	0,010	0,990	0,990	0,992
Norway	-0.013*	0,035	54,1%	0,000	0,000	0,973	0,000	0,955	0,958	0,969
Denmark	-0.008*	0,020	51,9%	0,000	0,070	0,985	0,000	0,978	0,979	0,983
Israel	-0,004	0,007	52,7%	0,110	0,310	1,001	0,240	0,999	0,997	0,998
Brazil	-0.018*	0,034	55,2%	0,000	0,120	0,990	0,020	0,952	0,952	0,967
South Africa	-0.015*	0,020	52,7%	0,030	0,310	0,991	0,090	0,968	0,964	0,970
Turkey	-0.021*	0,023	54,8%	0,000	0,000	0,994	0,090	0,950	0,947	0,961
Russia	-0.009*	0,036	50,8%	0,000	0,000	0,984	0,000	0,978	0,982	0,989
South Korea	-0.014*	0,054	56,3%	0,000	0,020	0,976	0,020	0,956	0,959	0,966
Mexico	-0.013*	0,039	52,5%	0,030	0,030	0,990	0,030	0,973	0,975	0,986
Singapore	-0.004*	0,021	55,6%	0,000	0,080	0,984	0,000	0,975	0,976	0,979
Phillipines	-0.004*	0,013	53,1%	0,010	0,240	0,995	0,030	0,990	0,991	0,996
Poland	-0.016*	0,033	55,2%	0,010	0,030	0,988	0,010	0,973	0,976	0,986
Taiwan	-0.004*	0,033	56,3%	0,000	0,000	0,981	0,000	0,968	0,973	0,980
Chile	-0.015*	0,049	54,5%	0,000	0,000	0,985	0,010	0,961	0,962	0,972
Hungary	-0.014*	0,024	52,7%	0,010	0,070	0,990	0,020	0,978	0,979	0,984
Czech	-0.009*	0,013	54,2%	0,030	0,170	0,995	0,020	0,988	0,987	0,991
Colombia	-0.012*	0,032	52,2%	0,000	0,060	0,990	0,020	0,970	0,966	0,973
Peru	-0.003*	0,011	55,9%	0,030	0,140	0,994	0,020	0,989	0,987	0,989
Indonesia	-0.012*	0,040	53,8%	0,000	0,040	0,957	0,000	0,943	0,955	0,966
Thailand	-0.005*	0,023	54,5%	0,000	0,000	0,986	0,000	0,976	0,977	0,980

Conclusion and Future Research

- Financial Variables matter a lot.
- Confirming theoretical results, volatility seems to be the main drivers.
- It is necessary to decompose the financial variables to analyze each component and its predictive power (Bekaert et. al. (2013)).

Future Research - Heterogeneity

- It is necessary understand the determinants of the heterogeneity on the impact of liquidity among countries. (fundamentals ?)



Future Research - Heterogeneity