APPENDIX:

Table I SIC Values for Selected ARMA(m, n) Models (daily data)

	ARMA (1,0)	ARMA (0,1)	ARMA (1,1)	ARMA (2,0)	ARMA (2,1)	ARMA (0,2)	ARMA (1,2)	ARMA (2,2)
Panel A. Stock returns								
WIG	3.3042	3.3071	3.3065	3.3052	3.3077	3.3090	3.3073	3.3052
BUX	3.7752	3.7747	3.7767	3.7745	3.7758	3.7752	3.7775	3.7690
PX	3.5892	3.5891	3.5897	3.5867	3.5882	3.5879	3.5888	3.5838
RTS	4.3593	4.3599	4.3619	4.3612	4.3635	4.3622	4.3640	4.3617
S&P500	3.3189	3.3176	3.3192	3.3187	3.3209	3.3186	3.3209	3.3231
Panel B. Exchange rate changes								
Zloty	1.7999	1.7997	1.8022	1.8009	1.8009	1.8018	1.8016	1.8005
Forint	1.8513	1.8511	1.8531	1.8509	1.8506	1.8506	1.8504	1.8529
Koruna	1.0027	1.0028	1.0050	1.0053	1.0064	1.0052	1.0061	1.0024
Ruble	1.7341	1.7323	1.7370	1.7376	1.7419	1.7365	1.7413	1.7462
USD	1.9032	1.9035	1.9055	1.9057	1.9076	1.9060	1.9075	1.9076

Note: Grayed numbers signifies lowest SIC and thus an optimal ARMA(m, n) model.
Source: Authors' calculation

Table II SIC Values for Selected Symmetric/Asymmetric FIGARCH(1,d,1) Models (daily data)

	FIGARCH		FIEGARCH		FIAPARCH		HYGARCH	
	St	SkSt	St	SkSt	St	SkSt	St	SkSt
Panel A. Stock returns								
WIG	3.0611	3.0629	3.0661	3.0686	3.0626	3.0645	3.0632	3.0649
BUX	3.5008	3.5033	3.5017	3.5042	3.4979	3.5003	3.5024	3.5049
PX	3.1361	3.1351	—	3.1384	3.1322	3.1313	3.1373	3.1363
RTS	3.9521	3.9502	3.9643	3.9564	3.9500	3.9478	3.9540	3.9521
S&P500	2.7632	2.7564	2.7326	2.7252	—	—	2.7653	2.7582
Panel B. Exchange rate changes								
Zloty	1.4162	1.4155	1.4166	1.4173	1.4153	1.4146	1.4182	1.4176
Forint	1.4715	1.4625	1.4645	1.4644	1.4628	1.4545	1.4730	1.4639
Koruna	—	—	0.5842	0.5875	0.5940	0.5962	0.5911	0.5935
Ruble	1.4690	1.4733	1.4691	1.4721	—	—	1.4726	1.4769
USD	1.7489	1.7488	—	—	1.7526	1.7524	1.7513	1.7512

Notes: Grayed numbers mark lowest SIC and thus an optimal FIGARCH(p,d,q) model. Straight line denotes that particular model does not converge. St and SkSt label standard Student and skewed Student distributions.
Source: Authors' calculation

Table III SIC Values for Selected ARMA(m, n) Models (weekly data)

	ARMA (1,0)	ARMA (0,1)	ARMA (1,1)	ARMA (2,0)	ARMA (2,1)	ARMA (0,2)	ARMA (1,2)	ARMA (2,2)
Panel A. Stock returns								
WIG	1.8265	1.8302	1.8332	1.8354	1.8404	1.8374	1.8396	1.8489
BUX	3.8835	3.8821	3.8924	3.8912	3.9007	3.8913	3.8875	3.8887
PX	3.6847	3.6842	3.6935	3.6913	3.6988	3.6913	3.6986	3.6805
RTS	4.6230	4.6243	4.6102	4.6310	4.6205	4.6314	4.6192	4.6142
Panel B. Exchange rate changes								
Zloty	3.4755	3.4753	3.4828	3.4801	3.4826	3.4799	3.4823	3.4916
Forint	1.8058	1.8047	1.8141	1.8162	1.8233	1.8143	1.8222	1.8306
Koruna	0.9180	0.9181	0.9177	0.9246	0.9250	0.9241	0.9265	0.9311
Ruble	1.6205	1.6194	1.6015	1.6174	1.6112	1.6173	1.6085	1.6276

Note: Grayed numbers signifies lowest SIC and thus an optimal ARMA(m, n) model.
Source: Authors' calculation

Table IV SIC Values for Selected Symmetric/Asymmetric FIGARCH(1,d,1) Models (weekly data)

	FIGARCH		FIEGARCH		FIAPARCH		HYGARCH	
	St	SkSt	St	SkSt	St	SkSt	St	SkSt
Panel A. Stock returns								
WIG	1.5096	1.5190	—	1.5385	1.5280	1.5375	1.5184	1.5279
BUX	3.6547	3.6588	3.6679	—	3.6644	3.6683	3.6615	3.6662
PX	3.2687	3.2784	3.2934	3.3027	3.2861	3.2958	3.2771	3.2867
RTS	4.1539	4.1551	4.1865	—	4.1731	4.1736	4.1636	4.1649
Panel B. Exchange rate changes								
Zloty	3.2913	3.2992	—	3.3202	3.3101	3.3182	3.2995	3.3073
Forint	1.5186	1.5219	1.5290	1.5372	1.5312	1.5331	1.5282	1.5315
Koruna	0.5960	0.6046	0.5987	0.6199	0.6149	0.6235	0.6052	0.6140
Ruble	1.5102	1.5267	1.5190	1.5331	—	—	1.5122	1.5288

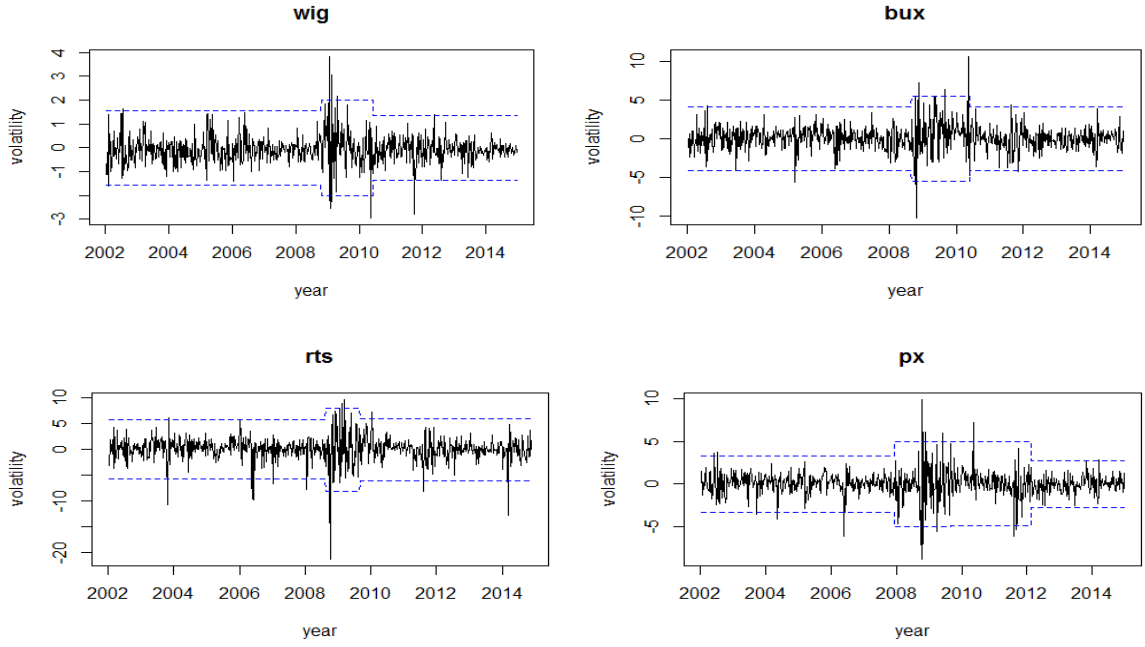
Notes: Grayed numbers mark lowest SIC and thus an optimal FIGARCH(p,d,q) model. Straight line denotes that particular model does not converge. St and SkSt label standard Student and skewed Student distributions.
Source: Authors' calculation

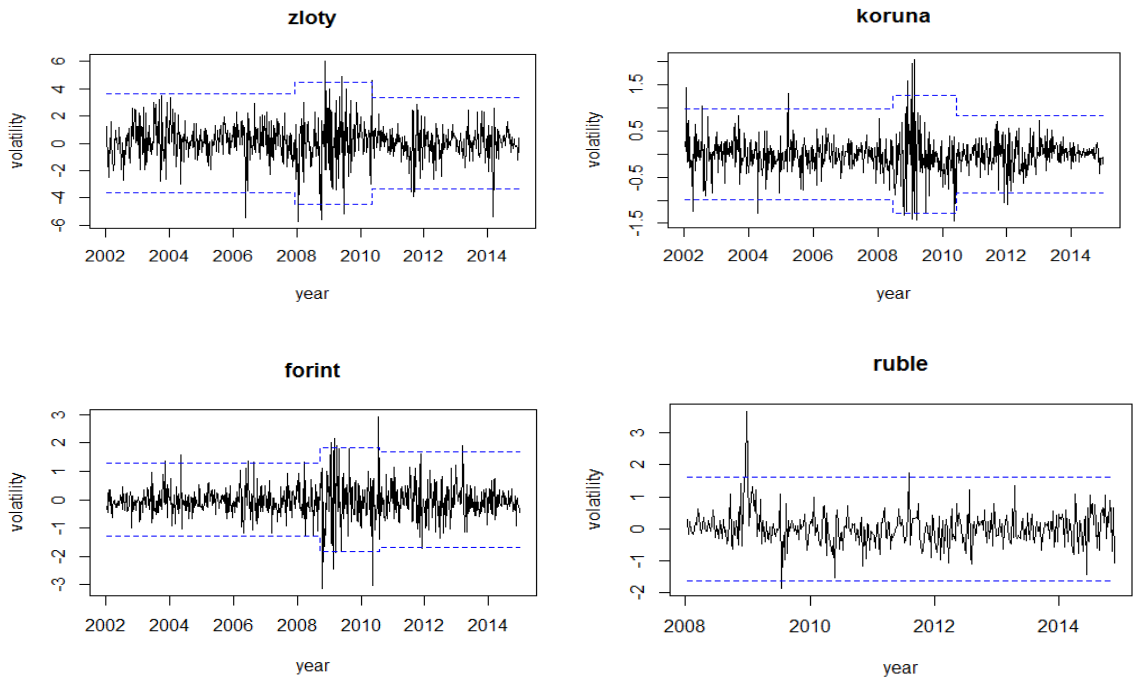
Table V Sudden Changes in Unconditional Volatility (weekly data)

WIG		BUX		PX		RTS	
Time period	s.d.	Time period	s.d.	Time period	s.d.	Time period	s.d.
1/3/02 – 10/20/08	0.517	1/3/02 – 9/1/08	1.369	1/3/02 – 12/10/07	1.112	1/3/02 – 8/18/08	1.911
10/21/08 – 6/7/10	0.670	9/2/08 – 5/25/10	1.826	12/11/07 – 8/31/09	1.657	8/19/08 – 8/24/09	2.687
6/8/10 – 12/30/14	0.451	5/26/10 – 12/30/14	1.367	9/1/09 – 2/13/12	1.648	8/25/09 – 12/30/14	1.995
				2/14/12 – 12/30/14	0.919		

Zloty		Forint		Koruna		Ruble	
Time period	s.d.	Time period	s.d.	Time period	s.d.	Time period	s.d.
1/3/02 – 12/10/07	1.208	1/3/02 – 9/22/08	0.423	1/3/02 – 6/23/08	0.327	1/3/02 – 12/30/14	0.537
12/11/07 – 5/10/10	1.496	9/23/08 – 8/2/10	0.615	6/24/08 – 6/7/10	0.427		
5/11/10 – 12/30/14	1.122	8/3/10 – 12/30/14	0.562	6/8/10 – 12/30/14	0.277		

Figure I Weekly Returns and Detected Breaks for Selected Indices and Currencies





Note: Doted lines denote bands of ±3 standard deviations, where change points are estimated by modified ICSS algorithm.
Source: Authors' calculation

Table VI Volatility Spillover Effect from Currency Market toward Stock Market (weekly data)

	WIG (FIGARCH)		BUX (FIGARCH)		PX (FIGARCH)		RTS (FIGARCH)	
	NB	WB	NB	WB	NB	WB	NB	WB
Panel A. Parameter estimates								
Mean equation								
C	0.143*	0.140*	0.114**	0.094***	0.110*	0.109*	0.228*	0.226*
Ω_1	-0.011	-0.011	—	—	-1.219*	-1.285*	0.680*	0.683*
Ω_2	—	—	—	—	-0.660*	-0.707*	-0.808*	-0.813*
Φ_1	—	—	-0.033	-0.031	1.245*	1.318*	-0.733*	-0.733*
Φ_2	—	—	—	—	0.649*	0.706*	0.868*	0.866*
Variance equation								
ω	-0.073	0.081	0.001	0.509	0.049	0.182	0.235	0.187
α	0.035	0.064	-0.080	0.005	-0.078	-0.042	-0.104	-0.085
β	0.295**	0.232	-0.018	0.017	-0.098	-0.135	0.163	0.007
d	0.379*	0.284***	0.185**	0.093***	0.263	0.124***	0.472	0.270
φ	1.082*	1.045*	1.845*	1.868*	2.509	2.436**	1.761	1.979**
St	4.49*	4.50*	11.71*	12.77*	4.58*	5.36*	3.299*	3.35*
Panel B. Statistic tests								
LL	-1079.2	-1077.6	-1199.7	-1192.1	-1065.4	-1060.6	-1338.7	-1331.1
AIC	3.2214	3.2227	3.5784	3.5617	3.1894	3.1839	4.0777	4.0619
SIC	3.2749	3.2895	3.6319	3.6286	3.2629	3.2775	4.1524	4.1492
LB(Q)	58.10¶	57.10¶	30.09	25.56	15.35	13.18	12.53	12.52
LB(Q^2)	19.68	22.45	21.64	17.94	13.98	15.91	2.84	4.11
ARCH	0.934	1.065	1.315	1.045	0.849	0.993	0.195	0.339
P(60)	48.11	60.38	55.40	58.78	55.22	47.76	57.33	69.78
Skew.	-0.242	-0.323	-0.129	-0.221	-0.588	-0.634	-2.861	-3.035
Kurtosis	1.826	2.074	0.517	0.519	4.105	3.935	21.272	24.756
JB	100.37	132.76	9.38	13.02	513.00	480.72	13384	17921

Notes: WB and NB labels denote models with and without breaks, respectively. St stands for Student' tail parameter, and ν is a measure of asymmetry. LL stands for Log likelihood information criterion, AIK and SIC are Akaike and Schwarz information criteria. LB(Q) and LB(Q^2) are Ljung-Box Q-statistics for level and squared residuals with 20 degrees of freedom. ARCH denotes ARCH(LM) heteroscedasticity test with 10 lags. P(60) is the Pearson's goodness-of-fit statistic for 60 cells. *, **, *** indicate significance levels at the 1%, 5% and 10%, respectively. ¶ denote LB(Q) test for 50 lags.

Table VII Volatility Spillover Effect from Stock Market toward Currency Market (weekly data)

	Zloty (FIGARCH)		Forint (FIGARCH)		Koruna (FIGARCH)		Ruble (FIGARCH)	
	NB	WB	NB	WB	NB	WB	NB	WB
Panel A. Parameter estimates								
Mean equation								
C	-0.099*	-0.102*	-0.070*	-0.069*	-0.004	-0.007	-0.002	—
Θ_1	—	—	—	—	-0.844*	-0.844*	-0.818*	—
Θ_2	—	—	—	—	—	—		—
Ψ_1	-0.005	0.005	-0.091*	-0.091**	0.885*	0.883*	0.884*	—
Ψ_2	—	—	—	—	—	—		—
Variance equation								
ω	-0.019	0.005	-0.020***	-0.018	-0.004	-0.001	0.019	—
α	0.282	-0.234	0.251**	0.230**	0.381*	0.210*	-0.311	—
β	0.459	-0.159	0.285**	0.278**	0.721*	0.599*	0.852*	—
d	0.385*	0.262*	0.192*	0.190*	0.523*	0.210**	1.491*	—
φ	0.015	0.026*	0.028*	0.027*	0.005*	0.007*	0.001	—
St	7.04*	7.36*	7.13*	7.49*	4.68*	5.59*	3.69*	—
Panel B. Statistic tests								
LL	-480.6	-476.4	-473.4	-472.9	-164.1	-160.7	-243.53	—
AIC	1.4477	1.4412	1.4264	1.4311	0.5128	0.5088	1.4267	—
SIC	1.5012	1.5081	1.4799	1.4979	0.5729	0.5823	1.5251	—
LB(Q)	13.19	13.57	13.23	13.25	24.92	24.48	26.97	—
LB(Q^2)	22.11	14.86	18.79	17.89	10.77	10.94	12.58	—
ARCH	0.315	0.474	0.744	0.737	0.620	0.645	0.811	—
P(60)	59.84	58.07	76.55	70.33	63.93	52.20	65.32	—
Skew.	0.049	-0.113	0.335	0.337	-0.451	-0.267	0.187	—
Kurtosis	1.860	2.393	1.238	1.163	2.488	1.866	1.238	—
JB	97.59	162.51	55.68	50.82	197.00	105.95	24.65	—

Note: See table VI