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**THE IMPACT OF MACROECONOMIC FACTORS ON THE
EMERGING STOCK MARKETS PERFORMANCE: EVIDENCE
FROM SELECTED COUNTRIES**



Thesis submitted to
School of Economics, Finance and Banking
UNIVERSITI UTARA MALAYSIA
In Partial Fulfilment of the Requirement for the
Master of Science (Finance)

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ABSTRACT

The purpose of the study is to explore the relationship between macroeconomic factors (Interest rate, Exchange rate, Inflation, GDP and Money supply) and the emerging stock market through the evidence of selected 13 emerging stock markets over the past 20 years period from 1997 to 2016. The yearly data is collected from Thomson Data Stream. Through a series of regression analysis and diagnostic tests, the fixed effect model with robust standard error is found to be the most appropriate. The findings show that interest rate, exchange rate and money supply have significant relationship with the emerging stock markets. The increase of interest rate will inversely affect the change of stock market indices. The exchange rate and money supply move in the same direction with the emerging stock market indices. Meanwhile, consumer price index (CPI) and GDP have no significant relationship with the emerging stock market indices.

Key words: macroeconomic factors, interest rate, exchange rate, inflation, GDP, money supply, emerging stock market

ABSTRAK

Tujuan kajian ini ialah untuk meneroka hubungan antara faktor makroekonomi (kadar faedah, kadar tukaran, inflasi, KDNK dan penawaran wang) dan pasaran saham menimbul melalui bukti 13 pasaran saham menimbul yang dipilih bagi tempoh 20 tahun antara 1997 hingga 2016. Data tahunan diperolehi daripada pengkalan data Thomson Data Stream. Melalui beberapa siri analisis regresi dan ujian diagnostik, *fixed effect model with robust standard error* adalah merupakan model yang paling sesuai. Dapatan menunjukkan kadar faedah, kadar tukaran dan penawaran wang mempunyai hubungan yang signifikan dengan pasaran saham menimbul. Peningkatan dalam kadar faedah akan mempengaruhi secara songsang perubahan dalam indeks pasaran saham. Kadar tukaran dan penawaran wang berubah secara langsung dengan pasaran saham menimbul. Sementara itu, indeks harga pengguna (CPI) dan KDNK tidak mempunyai hubungan yang signifikan dengan pasaran saham menimbul.

Kata kunci: faktor makroekonomi, kadar faedah, kadar tukaran, inflasi, KDNK, penawaran wang, pasaran saham menimbul

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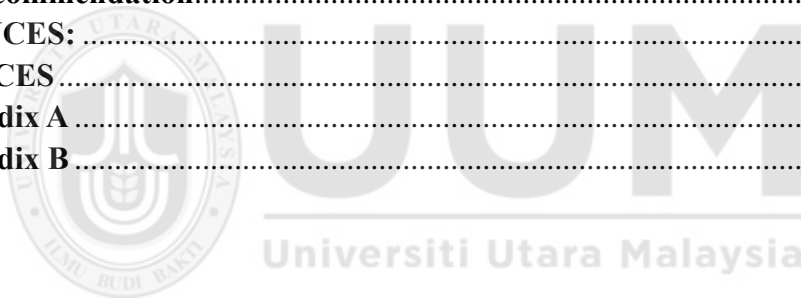
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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

As the significant part of the financial market, the stock market not only functions as a capital medium for financing and resource allocation, but also functions as a “barometer” of economic development (Zhao, 2011). Stock market has always been regarded as a “microcosm” of macroeconomic conditions in various countries, therefore, it is extremely significant (Li, 2015). The stock market is an important place for financing and investment, it can promote the transformation of business operation mechanism and optimize the allocation of resources (Zhao & Xue, 2004). Stock is a kind of valuable securities, which is issued by the joint-stock companies to the capital contributors either in public or private when they raise capital. It can represent the investor’s capital stock and power, which can enjoy the rights and interests according to the number of shares held by the holders.

Stock first appeared in capitalist countries. With the expansion of business scale and the lack of capital demand, enterprises need a way to get a lot of money, resulting in the emergence of joint-stock companies (Bai & Sun, 2013). The Eastern Indian Company was the earliest joint-stock company in the world, which was born in the Netherlands in 1602, and the Amsterdam Stock Exchange became the first stock market in the world. With the birth and development of joint-stock companies, the way to raise capital has

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APPENDICES

Appendix A

Raw Data

COUNTRY	TIME	INDEX	INR	EXR	CPI	GDP	MS
CHINA	1997	1246.03	5.67%	0.1201	82.6024	1.78E+12	90995.3
CHINA	1998	1286.08	3.78%	0.1208	81.9007	1.92E+12	104498.5
CHINA	1999	1184.4	2.25%	0.1208	80.788	2.06E+12	119897.9
CHINA	2000	1801.003	2.25%	0.1208	80.9953	2.24E+12	134610.3
CHINA	2001	2123.052	2.25%	0.120814	81.5783	2.42E+12	158301.9
CHINA	2002	1594.508	1.98%	0.120667	80.9528	2.64E+12	185007
CHINA	2003	1511.729	1.98%	0.120671	81.8955	2.91E+12	221222.8
CHINA	2004	1768.645	2.25%	0.120736	85.0803	3.2E+12	254107
CHINA	2005	1223.566	2.25%	0.120748	86.6236	3.57E+12	298755.7
CHINA	2006	1319.471	2.52%	0.124634	87.8936	4.02E+12	345577.9
CHINA	2007	3291.299	4.14%	0.129313	92.0837	4.6E+12	403442.2
CHINA	2008	3446.244	2.25%	0.142465	97.4641	5.04E+12	475166.6
CHINA	2009	2419.778	2.25%	0.146289	96.7813	5.51E+12	610224.5
CHINA	2010	3157.957	2.75%	0.14651	100	6.1E+12	725851.8
CHINA	2011	2967.41	3.5%	0.15272	105.4109	6.68E+12	851590.9
CHINA	2012	2262.788	3%	0.15878	108.197	7.21E+12	974148.8
CHINA	2013	2225.295	3%	0.16126	111.0405	7.77E+12	1106525
CHINA	2014	2043.702	2.75%	0.16101	113.2617	8.33E+12	1228375
CHINA	2015	3863.929	1.5%	0.16146	114.8893	8.91E+12	1392278
CHINA	2016	3009.53	1.5%	0.15435	117.1871	9.5E+12	1550067
BRAZIL	1997	9302	24.35%	0.94554	45.3606	1.47E+12	239777
BRAZIL	1998	11634	28%	0.8787	46.8115	1.47E+12	254965
BRAZIL	1999	10696	26.02%	0.57973	49.0856	1.48E+12	274770
BRAZIL	2000	17245	17.2%	0.57405	52.5436	1.54E+12	283785
BRAZIL	2001	13736	17.86%	0.45946	56.1364	1.56E+12	321612
BRAZIL	2002	13084	19.14%	0.43188	60.88	1.61E+12	397503
BRAZIL	2003	12006	21.97%	0.30656	69.8387	1.63E+12	412895
BRAZIL	2004	22948	15.42%	0.34554	74.4475	1.72E+12	493497
BRAZIL	2005	26773	17.63%	0.37611	79.56	1.77E+12	582464
BRAZIL	2006	38717	13.93%	0.46723	82.8886	1.85E+12	661500
BRAZIL	2007	46288	10.58%	0.49104	85.9033	1.96E+12	781280
BRAZIL	2008	64175	11.66%	0.581666	90.7681	2.06E+12	1072986
BRAZIL	2009	44390	9.28%	0.4527	95.2034	2.05E+12	1164855
BRAZIL	2010	71136	8.87%	0.56657	100	2.21E+12	1362389
BRAZIL	2011	69268.25	10.99%	0.61446	106.6362	2.3E+12	1617480
BRAZIL	2012	64284.26	7.91%	0.54782	112.3966	2.34E+12	1764611
BRAZIL	2013	55562.74	7.81%	0.49395	119.3674	2.41E+12	1956838

BRAZIL	2014	51408.21	10.02%	0.43873	126.9258	2.42E+12	2150684
BRAZIL	2015	53123.02	12.62%	0.32041	138.3842	2.33E+12	2285721
BRAZIL	2016	50561.52	12.45%	0.28139	150.4782	2.25E+12	2371655
INDONESIA	1997	641.621	16.28%	0.000416	22.2392	4.94E+11	3.56E+08
INDONESIA	1998	533.3	22.09%	0.000114	35.224	4.29E+11	5.77E+08
INDONESIA	1999	394.433	27.5%	0.000116	42.4411	4.32E+11	6.46E+08
INDONESIA	2000	570.901	15.07%	0.00013	44.02	4.53E+11	7.47E+08
INDONESIA	2001	372.653	13.96%	9.58E-05	49.0832	4.7E+11	8.44E+08
INDONESIA	2002	488.157	15.96%	0.000102	54.9136	4.91E+11	8.84E+08
INDONESIA	2003	400.757	12.78%	0.000112	58.5301	5.15E+11	9.56E+08
INDONESIA	2004	750.652	7.95%	0.000117	62.1844	5.4E+11	1.03E+09
INDONESIA	2005	1095.066	8.06%	0.000106	68.6839	5.71E+11	1.2E+09
INDONESIA	2006	1329.313	12.1%	0.000111	77.688	6.03E+11	1.38E+09
INDONESIA	2007	1894.576	9.49%	0.00011	82.6658	6.41E+11	1.65E+09
INDONESIA	2008	2237.971	8.59%	0.000109	90.7477	6.79E+11	1.9E+09
INDONESIA	2009	1500.361	10.93%	8.72E-05	95.1159	7.11E+11	2.14E+09
INDONESIA	2010	2829.996	8.04%	0.00011	100	7.55E+11	2.47E+09
INDONESIA	2011	3707.487	7.07%	0.000115	105.3553	8.02E+11	2.88E+09
INDONESIA	2012	4215.441	6.41%	0.00011	109.864	8.5E+11	3.31E+09
INDONESIA	2013	4981.465	6.13%	0.000103	116.91	8.97E+11	3.73E+09
INDONESIA	2014	4891.316	8.14%	8.83E-05	124.3863	9.42E+11	4.17E+09
INDONESIA	2015	5456.398	8.7%	7.69E-05	132.3012	9.88E+11	4.55E+09
INDONESIA	2016	4843.188	7.83%	7.6E-05	136.9659	1.04E+12	5E+09
MALAYSIA	1997	594.44	7.2%	0.403	73.2669	1.52E+11	292217
MALAYSIA	1998	586.13	9.6%	0.2658	77.1283	1.41E+11	296472
MALAYSIA	1999	812.33	5%	0.2632	79.2451	1.49E+11	337138
MALAYSIA	2000	679.64	4%	0.2632	80.4614	1.63E+11	354702
MALAYSIA	2001	696.09	4.25%	0.26319	81.6013	1.63E+11	362512
MALAYSIA	2002	646.32	4%	0.26319	83.0766	1.72E+11	383542
MALAYSIA	2003	793.94	4%	0.26316	83.9014	1.82E+11	426061
MALAYSIA	2004	907.43	4%	0.26281	85.1754	1.94E+11	534163
MALAYSIA	2005	899.79	3.7%	0.26316	87.6974	2.05E+11	616178
MALAYSIA	2006	1096.24	3.7%	0.27163	90.8626	2.16E+11	718216
MALAYSIA	2007	1445.03	3.7%	0.28906	92.7047	2.37E+11	796926
MALAYSIA	2008	876.75	3.7%	0.3137	97.7485	2.45E+11	903222
MALAYSIA	2009	1272.78	2.5	0.27739	98.3187	2.38E+11	989343
MALAYSIA	2010	1518.91	2.75%	0.30788	100	2.55E+11	1060154
MALAYSIA	2011	1530.73	2.5%	0.33043	103.2	2.69E+11	1214857
MALAYSIA	2012	1688.95	2.7%	0.32739	104.9	2.83E+11	1333388
MALAYSIA	2013	1866.96	2.7%	0.32384	107.1	2.97E+11	1444851
MALAYSIA	2014	1761.25	2.7%	0.30581	110.5	3.14E+11	1544657
MALAYSIA	2015	1692.51	2.9%	0.27244	112.8	3.3E+11	1588528
MALAYSIA	2016	1641.73	2.9%	0.25694	115.2	3.44E+11	1637733

MEXICO	1997	3741.3	7.57%	0.1257	42.7838	7.78E+11	1290063
MEXICO	1998	4927.91	6.38%	0.1172	49.5984	8.15E+11	1663220
MEXICO	1999	4930.37	5.85%	0.105	57.8246	8.37E+11	2030685
MEXICO	2000	7378.82	4.86%	0.1076	63.315	8.81E+11	2331055
MEXICO	2001	5575.05	3.26%	0.107177	67.3435	8.76E+11	2768943
MEXICO	2002	7191.94	2%	0.110465	70.7316	8.77E+11	3056567
MEXICO	2003	6034.74	1.72%	0.093445	73.9485	8.89E+11	3458401
MEXICO	2004	10713.54	1.42%	0.08955	77.4155	9.27E+11	3800700
MEXICO	2005	12714.19	0.93%	0.089485	80.5028	9.55E+11	4366056
MEXICO	2006	19634.21	0.93%	0.092164	83.4246	1E+12	4972338
MEXICO	2007	29348.09	1.11%	0.091088	86.734	1.03E+12	5384859
MEXICO	2008	31689.61	1.12%	0.094665	91.1791	1.05E+12	6269942
MEXICO	2009	20933.78	1.12%	0.073752	96.0092	1E+12	6672271
MEXICO	2010	33266.43	1.02%	0.08118	100	1.05E+12	7207837
MEXICO	2011	37775.07	0.66%	0.08448	103.4074	1.09E+12	8065740
MEXICO	2012	39924.93	1.55%	0.07817	107.659	1.14E+12	8740162
MEXICO	2013	43717.57	2.29%	0.08101	111.7569	1.15E+12	9507302
MEXICO	2014	40563.06	2.02%	0.07624	116.248	1.18E+12	10539707
MEXICO	2015	44202.94	1.78%	0.06752	119.4107	1.21E+12	11301899
MEXICO	2016	46062.92	2.64%	0.0577	122.7801	1.24E+12	12500796
PERU	1997	1664.9	10.55%	0.3788	68.7536	8.26E+10	12915
PERU	1998	1774.5	10.05%	0.3574	73.7368	8.23E+10	12604
PERU	1999	1470.28	13.55%	0.3	76.2952	8.35E+10	14069
PERU	2000	1654.62	10.07%	0.2877	79.1619	8.58E+10	14418
PERU	2001	1258.62	8.25%	0.2837	80.727	8.63E+10	16171
PERU	2002	1307.13	3.5%	0.2902	80.8829	9.1E+10	17907
PERU	2003	1611.33	3.33%	0.2882	82.7103	9.48E+10	19812
PERU	2004	3074.23	2.38%	0.2893	85.7396	9.95E+10	25437
PERU	2005	4135.06	2.56%	0.306824	87.1254	1.06E+11	30434
PERU	2006	5933.53	3.21%	0.298245	88.8699	1.14E+11	35918
PERU	2007	17911.83	3.09%	0.314317	90.4517	1.23E+11	48644
PERU	2008	17885.91	2.51%	0.365631	95.6851	1.35E+11	60207
PERU	2009	10163.44	3.79%	0.319356	98.4947	1.36E+11	66561
PERU	2010	15129	1.32%	0.35185	100	1.48E+11	89052
PERU	2011	21562.53	2.01%	0.3565	103.3707	1.57E+11	101248
PERU	2012	24035.61	2.39%	0.37505	107.1476	1.66E+11	126199
PERU	2013	19549.08	2.3%	0.38685	110.1654	1.76E+11	135555
PERU	2014	14282.55	2.23%	0.3555	113.7194	1.8E+11	145503
PERU	2015	12717.95	2.18%	0.32335	117.7625	1.86E+11	148399
PERU	2016	11890.43	2.648%	0.299	121.997	1.93E+11	165424
PHILIPPINES	1997	3104.77	10.194%	0.03793	52.8997	1.17E+11	1053949
PHILIPPINES	1998	2173.55	12.106%	0.02556	57.7849	1.16E+11	1138438
PHILIPPINES	1999	2028.21	8.167%	0.02578	61.2168	1.2E+11	1357905

PHILIPPINES	2000	1688.32	8.305%	0.02428	63.6515	1.25E+11	1423191
PHILIPPINES	2001	1452.26	8.744%	0.020141	67.0539	1.29E+11	1706926
PHILIPPINES	2002	1419.72	4.608%	0.01955	68.8797	1.34E+11	1879654
PHILIPPINES	2003	1062.49	5.221%	0.018748	70.4564	1.4E+11	1939503
PHILIPPINES	2004	1450.91	6.178%	0.017753	73.8589	1.5E+11	2011474
PHILIPPINES	2005	1966.29	5.556%	0.018255	78.6722	1.57E+11	2341867
PHILIPPINES	2006	2189.77	5.294%	0.019577	82.9876	1.65E+11	2865908
PHILIPPINES	2007	3248	3.696%	0.020771	85.3942	1.76E+11	3314032
PHILIPPINES	2008	3034.81	4.49%	0.024114	92.4481	1.83E+11	3539715
PHILIPPINES	2009	2028.59	2.741%	0.020942	96.3485	1.85E+11	3880968
PHILIPPINES	2010	3161.8	3.22%	0.02226	100	2E+11	4283922
PHILIPPINES	2011	4129.539	3.388%	0.02309	104.6473	2.07E+11	4582417
PHILIPPINES	2012	5056.477	3.156%	0.02342	107.9668	2.21E+11	5013336
PHILIPPINES	2013	6815.297	1.662%	0.02443	111.2033	2.36E+11	6693572
PHILIPPINES	2014	6587.078	1.229%	0.0222	115.7676	2.51E+11	7396350
PHILIPPINES	2015	7993.09	1.592%	0.02256	117.4274	2.66E+11	8067273
PHILIPPINES	2016	7245.129	1.596%	0.02169	119.5021	2.84E+11	9140446
SOUTH AFRICA	1997	4042.9	15.38%	0.2264	47.2354	2.49E+11	350700
SOUTH AFRICA	1998	3964.5	16.5%	0.1984	50.4854	2.5E+11	393806
SOUTH AFRICA	1999	4128.7	12.24%	0.1622	53.1013	2.56E+11	446935
SOUTH AFRICA	2000	4986	9.2%	0.1525	55.9364	2.67E+11	474848
SOUTH AFRICA	2001	5406.1	9.37%	0.122794	59.1258	2.74E+11	544056
SOUTH AFRICA	2002	6235.2	10.77%	0.089726	64.5442	2.84E+11	632621
SOUTH AFRICA	2003	5790.1	9.76%	0.125644	68.3258	2.93E+11	733453
SOUTH AFRICA	2004	7092	6.55%	0.15626	69.2724	3.06E+11	818740
SOUTH AFRICA	2005	9597.3	6.04%	0.161028	71.6271	3.22E+11	963515
SOUTH AFRICA	2006	13396.1	7.14%	0.163647	74.9518	3.4E+11	1156842
SOUTH AFRICA	2007	17384.8	9.15%	0.139273	80.2722	3.58E+11	1396325
SOUTH AFRICA	2008	16171.1	11.61%	0.128485	89.5328	3.7E+11	1562427
SOUTH AFRICA	2009	14126.6	8.54%	0.110406	95.9164	3.64E+11	1589340
SOUTH AFRICA	2010	17106.1	6.47%	0.138001	100	3.75E+11	1678417
SOUTH AFRICA	2011	18808.1	5.67%	0.149303	105.0005	3.88E+11	1798932
SOUTH AFRICA	2012	21082.6	5.44%	0.129157	110.9368	3.96E+11	1869050
SOUTH AFRICA	2013	23744.5	5.15%	0.108372	117.3173	4.06E+11	2049694
SOUTH AFRICA	2014	27691.9	5.8%	0.093976	124.4352	4.13E+11	2226544
SOUTH AFRICA	2015	30096.5	6.15%	0.08476	130.1446	4.18E+11	2441272
SOUTH AFRICA	2016	29532.1	7.17%	0.068064	138.3779	4.19E+11	2601201
SOUTH KOREA	1997	375.15	10.81%	0.00112	65.9641	6.2E+11	5.15E+08
SOUTH KOREA	1998	562.46	13.29%	0.00069	70.9194	5.86E+11	6.37E+08
SOUTH KOREA	1999	1028.07	7.95%	0.00082	71.4949	6.52E+11	6.7E+08
SOUTH KOREA	2000	504.62	7.94%	0.0009	73.1145	7.1E+11	7.04E+08
SOUTH KOREA	2001	693.7	5.79%	0.00074	76.0876	7.42E+11	7.64E+08
SOUTH KOREA	2002	627.55	4.95%	0.00075	78.1896	7.97E+11	8.72E+08

SOUTH KOREA	2003	810.71	4.25%	0.0008	80.9378	8.21E+11	8.96E+08
SOUTH KOREA	2004	895.92	3.87%	0.00088	83.844	8.61E+11	9.54E+08
SOUTH KOREA	2005	1379.37	3.72%	0.00099	86.1531	8.95E+11	1.02E+09
SOUTH KOREA	2006	1434.46	4.5%	0.00103	88.0845	9.41E+11	1.14E+09
SOUTH KOREA	2007	1897.13	5.17%	0.00107	90.3174	9.92E+11	1.28E+09
SOUTH KOREA	2008	1124.47	5.87%	0.00103	94.5386	1.02E+12	1.42E+09
SOUTH KOREA	2009	1682.77	3.48%	0.00075	97.1447	1.03E+12	1.56E+09
SOUTH KOREA	2010	2051	3.86%	0.00089	100	1.09E+12	1.65E+09
SOUTH KOREA	2011	1825.74	4.15%	0.00092	104.0258	1.13E+12	1.74E+09
SOUTH KOREA	2012	1997.05	3.7%	0.00089	106.3011	1.16E+12	1.83E+09
SOUTH KOREA	2013	2011.34	2.89%	0.00089	107.6845	1.19E+12	1.92E+09
SOUTH KOREA	2014	1915.59	2.54%	0.00095	109.0573	1.23E+12	2.07E+09
SOUTH KOREA	2015	1961.31	1.81%	0.00092	109.8283	1.27E+12	2.24E+09
SOUTH KOREA	2016	2026.46	1.56%	0.00087	110.8936	1.3E+12	2.4E+09
CZECH REPUBLIC	1997	495.3	7.71%	0.03472	66.2862	1.44E+11	1177800
CZECH REPUBLIC	1998	394.2	8.08%	0.0288	73.3302	1.44E+11	1241400
CZECH REPUBLIC	1999	489.7	4.48%	0.028	74.9018	1.46E+11	1337500
CZECH REPUBLIC	2000	478.5	3.42%	0.02641	77.8251	1.52E+11	1412300
CZECH REPUBLIC	2001	394.6	2.87%	0.025917	81.4874	1.56E+11	1596000
CZECH REPUBLIC	2002	460.7	2%	0.028989	82.942	1.59E+11	1651814
CZECH REPUBLIC	2003	659.1	1.33%	0.033779	83.0313	1.65E+11	1766054
CZECH REPUBLIC	2004	1032	1.28%	0.036922	85.3789	1.73E+11	1844111
CZECH REPUBLIC	2005	1473	1.17%	0.043074	86.9551	1.84E+11	1992132
CZECH REPUBLIC	2006	1588.9	1.19%	0.04264	89.1534	1.97E+11	2188657
CZECH REPUBLIC	2007	1815.1	1.32%	0.047646	91.7633	2.08E+11	2478336
CZECH REPUBLIC	2008	858.2	1.61%	0.062953	97.5912	2.13E+11	2641123
CZECH REPUBLIC	2009	1117.3	1.27%	0.050945	98.6109	2.03E+11	2753145
CZECH REPUBLIC	2010	1224.8	1.08%	0.05319	100	2.07E+11	2844952
CZECH REPUBLIC	2011	911.1	1.04%	0.05817	101.9364	2.11E+11	2994094
CZECH REPUBLIC	2012	1038.7	1.02%	0.05373	105.2993	2.09E+11	3129477
CZECH REPUBLIC	2013	989.04	0.86%	0.04969	106.8101	2.08E+11	3278655
CZECH REPUBLIC	2014	946.71	0.7%	0.05	107.1703	2.14E+11	3429895
CZECH REPUBLIC	2015	956.33	0.53%	0.03984	107.5398	2.25E+11	3667740
CZECH REPUBLIC	2016	921.61	0.37%	0.04215	108.2273	2.31E+11	3882787
HUNGARY	1997	7999.1	17.66%	0.005667	41.959	9.56E+10	3787.3
HUNGARY	1998	6307.67	15.41%	0.00469	47.9068	9.96E+10	4378.3
HUNGARY	1999	8819.45	12.65%	0.004228	52.7123	1.03E+11	5067.9
HUNGARY	2000	7849.75	9.19%	0.003708	57.8678	1.07E+11	5680.6
HUNGARY	2001	7131.13	8.98%	0.003378	63.1664	1.11E+11	6634.2
HUNGARY	2002	7798.29	7.32%	0.003618	66.4899	1.16E+11	7547
HUNGARY	2003	9379.99	7.08%	0.004374	69.5806	1.21E+11	8575.1
HUNGARY	2004	14742.57	10.5%	0.004909	74.2982	1.27E+11	9427.3

HUNGARY	2005	20784.74	6.41%	0.005216	76.9364	1.32E+11	10652.8
HUNGARY	2006	24844.32	6.03%	0.00455	79.9202	1.37E+11	11913.2
HUNGARY	2007	26235.63	7.23%	0.005436	86.2619	1.38E+11	12937
HUNGARY	2008	12241.69	8.06%	0.006137	91.4947	1.39E+11	14097
HUNGARY	2009	21227.01	8.14%	0.004534	95.3458	1.3E+11	14354.3
HUNGARY	2010	21327.07	4.93%	0.005061	100	1.31E+11	14350.8
HUNGARY	2011	16974.24	5.49%	0.005427	103.9207	1.33E+11	15368.5
HUNGARY	2012	18173.2	6.27%	0.004418	109.8106	1.31E+11	15178.8
HUNGARY	2013	18564.08	3.77%	0.004349	111.7005	1.34E+11	15844.9
HUNGARY	2014	16634	1.78%	0.004479	111.4522	1.39E+11	17264.4
HUNGARY	2015	23920.65	1.11%	0.003653	111.3739	1.44E+11	18556.9
HUNGARY	2016	32003.05	0.58%	0.00365	111.8202	1.47E+11	20389.2
COLOMBIA	1997	1415.13	24.13%	0.000941	40.5048	1.91E+11	43794.56
COLOMBIA	1998	1231.58	32.58%	0.000736	48.0696	1.92E+11	48558.07
COLOMBIA	1999	1099.44	21.33%	0.000653	53.297	1.84E+11	53670.53
COLOMBIA	2000	952.45	12.15%	0.000502	58.2116	1.92E+11	56663.65
COLOMBIA	2001	947.68	12.44%	0.000433	62.8502	1.96E+11	62158.43
COLOMBIA	2002	1249.43	8.94%	0.000442	66.8412	2.01E+11	66672.23
COLOMBIA	2003	1975.06	7.8%	0.00034	71.6078	2.08E+11	74323.38
COLOMBIA	2004	3367.3	7.8%	0.000376	75.836	2.2E+11	88342.38
COLOMBIA	2005	6231.81	7.01%	0.000424	79.6643	2.3E+11	104088.2
COLOMBIA	2006	10044.09	6.28%	0.000434	83.0869	2.45E+11	122183.5
COLOMBIA	2007	10661.35	8.01%	0.000461	87.6931	2.62E+11	144058.9
COLOMBIA	2008	8851.35	9.74%	0.00055	93.829	2.72E+11	168771.2
COLOMBIA	2009	9734.99	6.15%	0.000415	97.7725	2.76E+11	177816
COLOMBIA	2010	13418.72	3.66%	0.000522	100	2.87E+11	195878
COLOMBIA	2011	13903.92	4.26%	0.000547	103.4116	3.06E+11	232948.3
COLOMBIA	2012	14381.05	5.36%	0.000564	106.6969	3.18E+11	271354.2
COLOMBIA	2013	13760.22	4.17%	0.000549	108.8552	3.34E+11	311178.5
COLOMBIA	2014	13233.65	4.09%	0.000513	111.9878	3.48E+11	339464.7
COLOMBIA	2015	9778.4	4.58%	0.000395	117.5928	3.59E+11	381850.8
COLOMBIA	2016	9702.18	6.78%	0.000325	126.4328	3.66E+11	408241.8
POLAND	1997	14668	22.12%	0.3252	57.4305	2.85E+11	179378.1
POLAND	1998	12795.6	23.6%	0.2896	64.1643	2.98E+11	223678.1
POLAND	1999	18083.6	12.3%	0.2506	68.8322	3.12E+11	268700.5
POLAND	2000	17847.5	18%	0.2396	75.7566	3.26E+11	300424.1
POLAND	2001	13922.16	16.1%	0.249377	79.9166	3.3E+11	329469.1
POLAND	2002	14366.65	9.79%	0.244487	81.4351	3.37E+11	324346.4
POLAND	2003	20820.07	5.55%	0.245489	82.0768	3.49E+11	342860.2
POLAND	2004	26636.19	5.97%	0.256351	85.0123	3.67E+11	368714.1
POLAND	2005	35600.79	5.45%	0.312705	86.8036	3.8E+11	415163.5
POLAND	2006	50411.82	4.16%	0.307069	87.7714	4.03E+11	481210.5
POLAND	2007	55648.54	4.67%	0.348991	89.8674	4.32E+11	549344.3

POLAND	2008	27228.64	6.51%	0.452202	93.7761	4.5E+11	660239.9
POLAND	2009	39985.99	4.17%	0.30063	97.3639	4.63E+11	714757.8
POLAND	2010	47489.91	4.28%	0.3495	100	4.79E+11	774657.9
POLAND	2011	37595.44	4.52%	0.3608	104.2583	5.03E+11	863745.5
POLAND	2012	47460.59	4.85%	0.3148	107.9667	5.11E+11	900336.7
POLAND	2013	51284.25	3.27%	0.31235	109.0833	5.19E+11	960344.9
POLAND	2014	51416.08	2.95%	0.3292	109.2	5.36E+11	1044553
POLAND	2015	46467.38	1.57%	0.268	108.1175	5.56E+11	1145259
POLAND	2016	51754.03	1.6%	0.26715	107.4583	5.72E+11	1256212

Appendix B

Stata Output

```

. encode COUNTRY,gen(COUNTRY1)

. gen LNINDEX=log(INDEX)

. gen LNGDP=log(GDP)

. gen LNMS=log(MS)

. xtset COUNTRY1 TIME
    panel variable: COUNTRY1 (strongly balanced)
    time variable: TIME, 1997 to 2016
    delta: 1 unit

```



. xtsum LNINDEX INR EXR CPI LNGDP LNMS

Variable		Mean	Std. Dev.	Min	Max	Observations
LNINDEX	overall	8.455929	1.434204	5.920648	11.17235	N = 260
	between		1.290201	6.717017	10.31488	n = 13
	within		.717242	6.838358	9.886641	T = 20
INR	overall	.0668927	.0568022	.0037	.3258	N = 260
	between		.0392132	.021665	.151855	n = 13
	within		.0424454	-.0068623	.2940627	T = 20
EXR	overall	.142931	.1656406	.000076	.94554	N = 260
	between		.1634634	.0001202	.5076768	n = 13
	within		.0517368	-.0833558	.5807942	T = 20
CPI	overall	88.11306	21.95883	22.2392	150.4782	N = 260
	between		4.258528	80.46598	94.33131	n = 13
	within		21.57279	29.88628	151.4105	T = 20
LNGDP	overall	26.78496	1.084253	25.13384	29.88276	N = 260
	between		1.092466	25.51708	29.06354	n = 13
	within		.2639594	25.92678	27.60418	T = 20
LNMS	overall	14.2759	3.380537	8.239408	22.3337	N = 260
	between		3.440707	9.25031	21.16437	n = 13
	within		.6767733	12.80097	15.66613	T = 20

. sum LNINDEX INR EXR CPI LNGDP LNMS

Variable	Obs	Mean	Std. Dev.	Min	Max
LNINDEX	260	8.455929	1.434204	5.920648	11.17235
INR	260	.0668927	.0568022	.0037	.3258
EXR	260	.142931	.1656406	.000076	.94554
CPI	260	88.11306	21.95883	22.2392	150.4782
LNGDP	260	26.78496	1.084253	25.13384	29.88276
LNMS	260	14.2759	3.380537	8.239408	22.3337

. correlate INR EXR CPI LNGDP LNMS

(obs=260)

	INR	EXR	CPI	LNGDP	LNMS
INR	1.0000				
EXR	0.2271	1.0000			
CPI	-0.5992	0.0117	1.0000		
LNGDP	-0.0140	0.1824	0.2155	1.0000	
LNMS	-0.0556	-0.3157	0.1408	0.3907	1.0000

```
. reg LNINDEX INR EXR CPI LNGDP LNMS
```

Source	SS	df	MS	Number of obs	=	260
Model	213.341041	5	42.6682082	F(5, 254)	=	33.93
Residual	319.406544	254	1.25750608	Prob > F	=	0.0000
				R-squared	=	0.4005
				Adj R-squared	=	0.3887
Total	532.747586	259	2.05694049	Root MSE	=	1.1214

LNINDEX	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
INR	7.087645	1.620225	4.37	0.000	3.89686 10.27843
EXR	1.296913	.4948921	2.62	0.009	.3222982 2.271527
CPI	.0356399	.0041755	8.54	0.000	.0274168 .043863
LNGDP	.2223233	.0756309	2.94	0.004	.0733798 .3712669
LNMS	-.164328	.0249622	-6.58	0.000	-.2134872 -.1151688
_cons	1.047113	1.847401	0.57	0.571	-2.591061 4.685287

```
. vif
```

Variable	VIF	1/VIF
INR	1.74	0.573231
CPI	1.73	0.577522
LNMS	1.47	0.681827
LNGDP	1.38	0.722022
EXR	1.38	0.722530
Mean VIF	1.54	

```
. hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

H0: Constant variance

Variables: fitted values of LNINDEX

chi2(1) = 3.16

Prob > chi2 = 0.0755

```
. xtserial LNINDEX INR EXR CPI LNGDP LNMS
```

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 12) = 26.906

Prob > F = 0.0002

```
. xtreg LNINDEX INR EXR CPI LNGDP LNMS, fe
```

```
Fixed-effects (within) regression      Number of obs   =    260
Group variable: COUNTRY1              Number of groups =    13

R-sq:                                Obs per group:
  within = 0.7732                      min =          20
  between = 0.2707                     avg =         20.0
  overall = 0.1286                      max =          20

corr(u_i, Xb) = -0.9473                F(5,242)       =   164.99
                                           Prob > F       =    0.0000
```

LNINDEX	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
INR	-2.253583	.7502114	-3.00	0.003	-3.73136	-.7758049
EXR	1.170525	.4554201	2.57	0.011	.2734316	2.067618
CPI	.0035992	.0031489	1.14	0.254	-.0026035	.0098019
LNGDP	-.9835753	.2907521	-3.38	0.001	-1.556303	-.4108475
LNMS	1.075952	.1726862	6.23	0.000	.7357917	1.416111
_cons	19.10709	5.847785	3.27	0.001	7.588039	30.62615
sigma_u	4.1962059					
sigma_e	.35337875					
rho	.99295797	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(12, 242) = 192.98      Prob > F = 0.0000
```

```
. estimate store fe
```

```
. xtreg LNINDEX INR EXR CPI LNGDP LNMS, re
```

```
Random-effects GLS regression      Number of obs   =    260
Group variable: COUNTRY1          Number of groups =    13
```

```
R-sq:                                Obs per group:
  within = 0.7394                      min =          20
  between = 0.0018                     avg =         20.0
  overall = 0.0890                      max =          20

corr(u_i, X) = 0 (assumed)          Wald chi2(5)   =   641.10
                                           Prob > chi2    =    0.0000
```

LNINDEX	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
INR	-2.807579	.815587	-3.44	0.001	-4.4061	-1.209058
EXR	1.503684	.4824511	3.12	0.002	.5580977	2.449271
CPI	.0193159	.0023894	8.08	0.000	.0146327	.0239992
LNGDP	.3447484	.177737	1.94	0.052	-.0036098	.6931066
LNMS	.0576988	.0787754	0.73	0.464	-.0966981	.2120957
_cons	-3.330949	4.068159	-0.82	0.413	-11.30439	4.642496
sigma_u	.86904482					
sigma_e	.35337875					
rho	.85811345	(fraction of variance due to u_i)				

```
. estimate store re
```

```
. hausman fe re
```

	----- Coefficients -----			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
INR	-2.253583	-2.807579	.5539964	.
EXR	1.170525	1.503684	-.3331595	.
CPI	.0035992	.0193159	-.0157168	.0020509
LNIGDP	-.9835753	.3447484	-1.328324	.2301007
LNMS	1.075952	.0576988	1.018253	.1536716

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\chi^2(5) = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 53.24$$

$$\text{Prob} > \chi^2 = 0.0000$$

(V_b-V_B is not positive definite)

```
. xttest0
```

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{LNINDEX}[\text{COUNTRY1},t] = Xb + u[\text{COUNTRY1}] + e[\text{COUNTRY1},t]$$

Estimated results:

	Var	sd = sqrt(Var)
LNINDEX	2.05694	1.434204
e	.1248765	.3533788
u	.7552389	.8690448

Test: Var(u) = 0

$$\chi^2(0) = 1509.22$$

$$\text{Prob} > \chi^2 = 0.0000$$

```
. xtreg LNINDEX INR EXR CPI LNGDP LNMS, fe robust
```

```
Fixed-effects (within) regression      Number of obs   =    260
Group variable: COUNTRY1              Number of groups =    13
```

```
R-sq:                                Obs per group:
  within = 0.7732                      min =    20
  between = 0.2707                     avg =   20.0
  overall = 0.1286                     max =    20
```

```
F(5,12) = 89.95
corr(u_i, Xb) = -0.9473                Prob > F = 0.0000
```

(Std. Err. adjusted for 13 clusters in COUNTRY1)

LNINDEX	Robust					
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
INR	-2.253583	.8835342	-2.55	0.025	-4.178638	-.3285269
EXR	1.170525	.3633153	3.22	0.007	.378929	1.962121
CPI	.0035992	.0081727	0.44	0.667	-.0142075	.0214059
LNGDP	-.9835753	.8015919	-1.23	0.243	-2.730094	.7629433
LNMS	1.075952	.4837727	2.22	0.046	.0219013	2.130002
_cons	19.10709	15.97602	1.20	0.255	-15.70166	53.91585
sigma_u	4.1962059					
sigma_e	.35337875					
rho	.99295797	(fraction of variance due to u_i)				