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Impact of macroeconomic variables on foreign exchange reserves: A case from Pakistan

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Abstract

The study intends to investigate the impact of macroeconomic indicators on foreign reserves in the context of Pakistan. The Vector Autoregressive (VAR) model has been used to estimate Pakistan's foreign exchange reserves demand. It uses current account vulnerability, capital account vulnerability, exchange rate flexibility, and the opportunity cost of holding reserves as independent variables. **Findings/Originality:** The results indicate that macroeconomic variables such as remittances, exchange rate, the ratio of current account deficit to GDP, and interest rate differential (measure as opportunity cost) determine the country's long-run reserves demand function. Whereas, observed results show that demand for foreign reserves is highly sensitive to capital account vulnerability and less responsive to its opportunity cost. The Granger causality analysis probed that the various macroeconomic variables fail to cause reverse causality. It implies that in Pakistan, the demand for reserves is driven by macroeconomic stability. The study is helpful for the country's institutions to boost foreign reserves by controlling macroeconomics indicators.

Introduction

Foreign exchange reserves are the crucial assets that can easily manipulate the pace of a country's exchange rate through effective interventions in financial markets or proven to be an imperative tool for monetary authorities to crop external payment imbalances. Normally, a country embosses its reserves in the form of gold, foreign currencies, and special drawing rights (SDR). In the 1980's the topic of foreign exchange reserves was less clear, and countries were bound to follow fixed exchange rate regimes (Frenkel & Johnson, 1978). The Asian financial crises and the considerable demand for reserves acquisition were fueled by free-float exchange rate system. After the substantial turmoil of Asian financial crisis in the late nineties, the level of foreign exchange reserves held by the developing countries has risen from 30 percent of global reserves to almost 60 percent till the year 2005.

There is an ongoing debate about the need to hold such foreign reserves boot up after the afro-mentioned events. Foreign exchange reserve can be considered as a preventive step against a possible financial crisis accrues from an unexpected stop of funds inflow, such as capital and revenue. According to Mercantilist View, the way for a nation to become richer is to restrict imports and stimulate exports that were prevailed in the seventeenth and eighteenth centuries. However, one nation can win at the expense of others by acquiring more reserves.

There are different results presented by previous studies regarding the reserves accumulation. Moreover, formal one explained that holding large reserves is costly, whereas the opponents have proved that the opportunity cost of holding reserves as a defense shield is smaller

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than the possible cost of facing a crisis**.** According to forex market stakeholders, holding large reserves seems to be a convincing choice for operational smoothing. The insecure international monetary system is the more reserves are needed to manage the currency and to defend against a financial crisis. A country facing a crisis might be shut out of the international capital markets because of sovereign risk concerns. Foreign exchange reserves in Pakistan has grown from an average of US $1.5 billion in the late 1990s to the US $10 billion in 2003. Additionally, the extent of the current debate on the sustainability of this new stock compilation of reserves raised the more relevant questions of the factors which may affect the central bank's decision to hold on.

The history has witnessed a gradual build-up of foreign exchange reserves that may stand at $13.3 billion in June 2005. Let us have a glance at major flows of foreign funds in the local market, for example, a temporary inflow of $1.5billiontook place in 1994 in foreign direct investment that primarily constituted of proceeds from the Pakistan Telecommunication vouchers and HUBCO Power Company as well. Furthermore, during the same period, there was a substantial loss of remittances to the informal channel that ultimately, control the pace of the local foreign exchange market. The State Bank of Pakistan (SBP) also took various measures to switch worker's remittances towards the formal banking channel and particularly, its efforts were expedited after September 11, 2001 when the fear of possible association with terrorists prompted, and many expatriates use the official system to transfer their funds (Abdul & Bokhari, 2008). It is a widely accepted fact that the role of remittance in local reserves is very curtailed, and approximately more than $10 billion our country receives in this regard.

Here are two common opinions expressed in a discussion about the sources of reserve accumulation. The concern was that the SBP was purchasing dollars from the open market, and this was not the right way to build up foreign exchange reserves before Sep 11, 2001. After September 11, it is said that all this build-up has taken place due to political and non-economic factors as Pakistan had aligned itself with the U.S. in the fight against terrorism. The more critical factor in the case of Pakistan is workers' remittances. In 1999-00 and 2000-01 these remittances were channelized by SBP by using both the open market as well as the inter-bank market (Husain, 2002). However, the role of remittance in reserve accumulation has softened up because most of the worker remittances operate from the informal sector which away from formal counting. So, it has been observed that the dynamics of the local foreign exchange market are different and still most of these are not properly understood. Therefore, the present study intends to investigate the determinants of foreign exchange reserves in Pakistan. The local scenario demands a lot to know what are the key drivers which set the tune of our exchange rate. Particularly, in a country which is characterized by an unfavorable balance of payment most prominently due to heavy import bills and massive foreign debts that require positive movements of the exchange rate. The study has tried to enlighten the pros and corn of our local foreign market for a better understanding of stakeholders.

The study intends to investigate the impact of macroeconomic indicators on foreign reserves in the context of Pakistan by using data of thirty-two years (1982-2013). The Vector Autoregressive (VAR) model has been used to estimate Pakistan's foreign exchange reserves demand. In this regard, extensive literary evidence has been gathered to establish the base of our theory. There are few glimpses of the literature review as follows.

Prabheesh (2007) used a co-integration and vector error correction approach to estimate India's demand for foreign exchange reserves for the period of 1983:1 to 2005:1. The purpose of the study was to contribute to literature for India by using a broader set of explanatory variables. The results indicate that India's long-run reserves demand is a function of current account vulnerability, capital account vulnerability, exchange rate flexibility, and opportunity cost of holding reserves**.** Moreover, reserves accumulation in India is less sensitive to its opportunity cost. Khan and Ahmed (2005) analyzed Pakistan's reserve demand using the quarterly data from the period

1982 to 2003. The study used co-integration and error correction framework. They found that there is a stable long-run reserve demand function in case of Pakistan. Further this study also tried to analyze Pakistan's long run reserves policy, which appears to have been guided by the level of foreign trade (imports), uncertainty (variations in the balance of payments), and the opportunity cost of holding reserves (money market rate).

Ryang (2007) investigated the Korean reserve demand and examined its structural change after the financial crisis in 1997 in Asian countries. The dynamics of the reserve's demand during the pre- and post-crisis periods were reasonably specified by the error correction model and the cointegrating vectors. The result showed that there is a long-run relationship between the reserve demand and the variables that were incorporated in this study. Kılıç and Bayar (2014) examined the relationship between real effective exchange rate volatility, tourism receipts and expenditures in Turkey. The volatility in the real effective exchange rate was obtained with a generalized autoregressive conditional Heteroscedasticity (1,1) model. The study also applied co-integration approach to check the long-term relationship between the series was determined, and the direction of this relationship was determined using pairwise empirical. The results indicate that there is a positive long-term relationship between the REER (real effective exchange rate), tourism receipts and expenditures.

Furthermore, the short and long-term relationships among the variables were tested by causality analysis and the Vector Error Correction Model (VECM). The study found that there was a short-term relationship among the variables and equilibrium was achieved using both variables. Moreover, the model was significant.

The Causality Analysis also applied and found that tourism receipts relationship and expenditures were not the Granger Cause of REER in Turkey. Similarly, REER did not Granger cause tourism receipts and expenditures. Mukhtar and Rasheed (2010) investigated the long-run relationship between exports and imports of Pakistan by using the Johansen Maximum likelihood co-integration. They found the existence of co-integration vectors and long-run relationship among the variables. Further testing the stability of long-run relation and direction of causality, Granger causality procedure, and vector error correction model has been applied. Aqeel and Butt (2001) attempted to found the direction of the causal relationship between energy consumption and economic activity in Pakistan. More specifically investigated was the causal relationship between growth in energy consumption and growth in GDP. The methodology was based on the Granger causality test, which has been found appropriate by using the co-integration technique. The results indicate that there is no cointegration between the variables concerned. For selection of optimum lag length Hsiao's version of Granger causality tests was used. Okyere, Fosu, and Boakye (2013) examined the causal relation between some macroeconomic variables and stock prices in Ghana. The study used multivariate vector autoregressive (VAR) approach and Granger causality test. The results indicate that all the time series variables exhibit trends (non stationary). The difference series which are stationary are then included in the estimation of the VAR model. A VAR(1) model was used in the estimation of the relationship between stock prices and macroeconomic factors. Ali (2011) investigated the impact of changes in selected microeconomic and macroeconomic variables on stock returns at Dhaka Stock Exchange.

A Multivariate Regression Model computed on Standard OLS Formula has been used to estimate the relationship. Granger Causality Procedure is used to find out the direction of relationships between variables. Foresti (2007) focused on the relationship between the market price of stocks and growth. A Granger causality analysis has been carried out to assess whether there is any potential predictability power of one indicator for the other. Rossini and Kupke (2012) estimated to assess whether the theoretical Ricardian understanding of the relationship between house and land prices is valid in a dynamic urban land market by using Granger causality. The study compares a Site Adjusted Land Price Index with an equivalent Quality-Adjusted Housing Price

Index developed for Adelaide, the state capital of South Australia. The study identifies the increasing gap in the rate of growth between vacant land and detached house prices for a metropolitan area and concludes that house prices Granger-cause land prices but not that land prices Granger-cause house prices.

Research Method

The study intends to investigate the relationship between macroeconomic variables and foreign exchange reserves concerning Pakistan by using time series data from the period of 1984 to 2015. The data have been extracted from the Thomson Reuters, State Bank of Pakistan, Ministry of Finance Pakistan (MOF) and International Monetary Fund databases (IMF, 2010). The normality of data is the main concern for further analysis that has been probed with an Augmented Dickey-Fuller test (ADF) and Phillips Perron tests respectively. Additionally, the vector autoregressive (VAR) model has been established for demonstrating the dynamic behavior of economic & financial time series. Vector autoregressive model is a set of simultaneous equations of reduced form designed to probe long-run equilibrium between variables. In the study, two macroeconomic variables such as exchange rate and opportunity cost are assumed in the initial VAR model. Because these variables have some degree of hysteresis properties that can partly be explained by their past values which are given as: The reduced form equations are as follows:

$$\begin{pmatrix} X_t \\ Y_t \end{pmatrix} = \begin{pmatrix} \alpha_1 & \alpha_2 \\ \beta_1 & \beta_2 \end{pmatrix} \begin{pmatrix} X_{t-1} \\ Y_{t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix} \quad (1)$$

The equation is typically a VAR (1) system with

$$X_t = \alpha_1 X_{t-1} + \alpha_2 Y_{t-1} + \varepsilon_{1t} \quad (2)$$

$$Y_t = \beta_1 X_{t-1} + \beta_2 Y_{t-1} + \varepsilon_{2t} \quad (3)$$

$$Z_t = A\, Z_{t-1} + \varepsilon_t \quad (4)$$

The basic *p*-lag vector autoregressive (VAR (p)) model has the following form:

$$Z_t = A\, Z_{t-1} + A\, Z_{t-2} \ldots A\, Z_{t-p+}\, \varepsilon_t \quad (5)$$

where $\prod_i$ are n×n coefficient matrices and ε_t in an n×1 unobservable white noise vector process with zero mean and serially uncorrelated with time-invariant covariance matrix. Since the basic VAR(p) model may be too limited to represent sufficiently the main characteristic of the data so we include other deterministic terms such as (linear trend or seasonal variables) and exogenous variables to represent the data reasonably well. Equation modified as:

$$\Delta Z_t = \prod_1 \Delta\, Z_{t-1} + \prod_2 \Delta\, Z_{t-2} \ldots + \prod_p \Delta\, Z_{t-p} + \Gamma Z_t + \mathrm{D}_t \Psi + \varepsilon_t \quad (6)$$

where D_t represents deterministic components an n×n matrix, Z_t represents an m×1 matrix of exogenous variables and Ψ and Γ are parameter matrices. In the studies, the lag length for the VAR(p) is determined by the three most popular information criteria such as Akaike's (1974) information criterion (AIC), Schwarz's (1978), Bayesian information criterion (SBIC) and the Hannan-Quinn criterion (HQIC). These are expressed algebraically as:

$$\mathrm{AIC} = \ln\left(\hat{\sigma}^2\right) + \frac{2k}{T}$$

$$\mathrm{SBIC} = \ln\left(\hat{\sigma}^2\right) + \frac{k}{T}\ln \mathrm{T}$$

$$\mathrm{HQIC} = \ln\left(\hat{\sigma}^2\right) + \frac{2k}{T}\ln\left(\ln(\mathrm{T})\right)$$

Table 1: Empirical Determinants of Foreign Exchange Reserves

Determinants	Explanatory variables
Economic Size	Population and Per Capita GDP
Current Account Vulnerability	The ratio of import, trade and current account deficit to GDP
Capital Account Vulnerability	The ratio of capital account deficit to GDP and ratio of broad money to GDP
Exchange Rate Flexibility	Exchange rate
Opportunity Cost	Interest rate differential

However, Standard OLS method has been applied to investigate the relationship between *Ln-resv* with predictors such as; foreign remittance (REMT), exchange rate (EX), opportunity cost (OP-COST) variable is [(1+ Pak Call money rate)/(1+ US Fed rate)], characterization specified by current & capital account vulnerability and economic size(ECO-SIZE) (Aizenman & Marion, 1993). The data are transformed into log, and then the difference of logarithm was taken. The multivariate regression model is specified as:

$$LN\ (Resv) = \beta_0 + LN\ (\beta_1 POP + \beta_2 PCI) + LN(\beta_3 IM + \beta_4 TRADE + \beta_5 CAD) + LN(\beta_6\ CAC + \beta_7 STED + \beta_8 M) + \beta_9 ER + \beta_{10} OP\text{-}COST + \beta_{11} Remit + Ei \quad (7)$$

By using the standard regression technique, the equation (7) can be estimated when the variables are stationary; residual terms are *uncorrelated* and *Homoscedastic*. There should be cautious that if variables are non-stationary at levels then using standard regression may lead to misleading results (Granger & Newbold, 1974).

Results and Discussion

The statistics of the variables are given in Table 2. The table shows three variables of negatively skewed, while the rest are positively skewed. The Kurtosis values of all the variables also show that the data is not normally distributed.

Table 2: Result of Descriptive

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
CA-VULN	93.776	93.474	100.982	88.094	3.895	0.436	2.026
CAP-VULN	61.996	62.140	66.222	57.799	2.443	0.051	2.074
LN-CAPD	29.673	29.677	32.315	27.351	1.281	0.248	2.282
LN-ECOSIZ	15.031	15.216	16.970	13.030	1.192	-0.053	1.906
LN-EX	3.594	3.721	4.570	2.366	0.656	-0.253	1.771
LN-IMP	31.448	31.473	33.753	29.465	1.321	0.202	1.890
LN-M	32.323	32.431	34.386	30.213	1.297	-0.017	1.747
LN-REMT	11.576	10.877	14.125	10.225	1.266	0.766	2.075
LN-RESV	11.770	11.456	14.273	9.737	1.571	0.306	1.556
LN-TRAD	32.093	32.134	34.215	29.961	1.271	0.035	1.891
OP-COST	1.582	1.685	2.985	0.714	0.535	0.170	2.839

Additionally, the time series properties are verified by using sophisticated statistical techniques such as augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The unit root for all the series and the null hypothesis of stationary I(0) for all variables are rejected at level (at 95% confidence)

corresponding to I(l). To achieve the stationarity of data first differences are required for all the series like current and capital account vulnerability, exchange rate, remittances, reserves, opportunity-cost, and economy size. The results in Table 3 indicate that all series are normal at first difference.

Table 3: Result of Unit Root Tests

Variables	Augmented Dickey-Fuller (ADF) Test				Phillips-Perron (PP)			
	Level		At 1st difference		Level		At 1st difference	
	Test Statistic	p-value	Test Statistic	p-value	Test Statistic	p-value	Test Statistic	p-value
ln-resv	-0.316	0.916	-5.140	0.000	-0.317	0.911	-5.124	0.000
op-cost	-2.555	0.113	-5.454	0.000	-2.519	0.121	-9.520	0.000
ln-Ex	0.235	0.997	-4.780	0.004	-1.638	0.452	-5.001	0.000
ln-ecosize	-0.164	0.931	-3.719	0.010	-0.429	0.892	-4.150	0.003
ln-remt	1.011	0.996	-4.930	0.000	1.439	0.999	-4.930	0.000
ln-m	-0.398	0.898	-4.403	0.002	-0.398	0.898	-4.335	0.000
ln-trad	-0.199	0.929	-6.227	0.000	-0.185	0.930	-6.231	0.000
Ln-imp	0.764	0.992	-6.184	0.000	0.764	0.992	-6.142	0.000
ln-cad	0.272	0.973	-5.046	0.000	0.308	0.975	-5.048	0.000
ln-capd	-2.378	0.156	-6.843	0.000	-2.378	0.156	-9.879	0.000

The (ADF) and (PP) tests show that the data is non-stationary I(l) at the level, then Johansen procedure is used to establish either the data series are cointegrated or not. Johansen's co-integrated approach starts with the formulation of the unrestricted Vector Auto-Regressive Model (VAR). Normally, the co-integration procedure requires a time series non-stationary at level. All series in the cointegrating equations have the same order of integration. The co-integrating equation can be considered as a long-run equilibrium relationship between the variables, and Johansen test shows the eigenvalue and trace statistics are indicating there is evidence of two co-integrating vector relationships among the given variables. Co-integration is the statistical implication of the existence of a long-run relationship between economic variables.

Table 4: Results of Johansen Co-Integration Test

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	87.555	69.819	0.001	38.727	33.877	0.012
At most 1 *	48.828	47.856	0.040	19.114	27.584	0.406
At most 2	29.714	29.797	0.051	15.819	21.132	0.236
At most 3	13.895	15.495	0.086	9.585	14.265	0.241
At most 4 *	4.311	3.841	0.038	4.311	3.841	0.038

Note: Trace test indicates 2 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 5: Normalized co-integrating coefficients

Normalized Co-integrating Coefficients (standard error in parentheses)				
RES	REMT	EX-RATE	CA-D	OP-COST
1	1.165	-0.216	3.148	-1.760
	(-0.701)	(-0.054)	(-0.970)	(-0.548)

$$res = -1.166\ remt + 0.216\ ex - 3.148\ cud + 1.760 op\text{-}cost \quad (8)$$

The normalized co-integrating equation exhibits theoretically expected signs and the standard errors in the parentheses. The impact of current account vulnerability has a stronger influence on reserve demand. Whereas, the effect of remittances indicates that a one percent increase causes more than one percent decrease in demand for reserve holdings. The interest rate discrepancy **(op-cost)** enters the co-integrating vector significantly, but its impact is low as compared to other variables. It implies that the reserve accumulation by State bank of Pakistan (SBP) sensitive to the opportunity cost of reserves holding in Pakistan.

Test of Causality

In economics, determination and logical testing of causal relationships among the variables only became possible after an operational framework was developed by Granger (1969) and Sims (1972). Their approach is significantly based on the axiom that the present and past may cause the future but the future cannot cause the past (Granger, 1980). In econometrics the most widely used operational definition of causality is the Granger definition of causality, which is defined as follow: *"X is a Granger cause of Y (denoted as X→Y), if present Y can be predicted with better accuracy by using past values of X rather than by not doing so, other information being identical"* (Charemza & Deadman, 1995). While we are interested in testing the direction of causation between the variables which are related to our study reserve demand.

Table 6: Granger causality Wald tests

Equation	Excluded	Chi-sq	df	Prob.
LN-RESV	ECO-SIZE	2.867	1	0.090
LN-RESV	EX-Rate	8.167	1	0.004
LN-RESV	REMT	5.512	1	0.019
LN-RESV	OP-COST	6.357	1	0.012
LN-RESV	CAP-VULN	4.990	1	0.026
LN-RESV	CA-VULN	0.151	1	0.698
LN-RESV	All	31.321	6	0.000

The bivariate Granger causality test was conducted to find out the direction of causality and feasible response among the variables. The outcome is given in Table 5 and 5-a (appendix). It indicates a unidirectional causality is running from **Resv**to **Eco-Size**, **Ex-Rate**, **Remt**, **Op-Cost**, **Cap-Vulnerability**, **Current Account Vulnerability**whereas there found no causality between **Resv** and the macroeconomic variables. Similarly, we also run to accessing causality and analyze through the pair-wise Granger causality test to understand the direction of the causality between the macroeconomic variables outcome.

Conclusion

Macroeconomic variables and Foreign Reserves are not only considered important to maintain the exchange rate but also to avoid the currency crisis in a country. For a long time, Pakistan is facing severely bad macroeconomic variables; that is why the foreign reserves of Pakistan are going down day by day. The present study intends to investigate the impact of macroeconomic indicators on foreign reserves in the context of Pakistan by using a time series data of thirty-two years. In this study, the Vector Autoregressive (VAR), Johansen Co-integration and Granger Causality tests have been applied to estimate Pakistan's foreign exchange reserves demand. The study concludes that Pakistan's long-run reserves demand is a function of current account vulnerability, capital account vulnerability, exchange rate flexibility and the opportunity cost of holding reserves. These findings

are in line with the study of Khan and Ahmed (2005) that concluded that imbalance in balance of payments and opportunity cost guide the policy related to reserves long run.

Regarding the remittances from overseas, the study concludes the inverse relation between remittances and reserve holdings. This finding is similar to Elbadawi (1990) who also found a negative relationship between these variables. Facts address that Pakistan holds foreign reserves as a preventive measure against current account vulnerability. The reserve holding behavior by the monetary authorities is mainly influenced by the capital account vulnerability indicative that also sensitive in the second step to the remittances. The results also show that reserve accumulation is less sensitive to its opportunity cost as well. Moreover, the measure of exchange rate flexibility does not affect the reserve holdings significantly.

Being a small economy, Pakistan needs to maintain high reserves holdings for the overall macroeconomic policies, external debt, and currency fluctuation. The monetary authorities also need to reduce the current account deficit by discouraging imports and enhancing the exports by providing a friendly and suitable environment to the international and national businessmen. Moreover, Govt. of Pakistan should also encourage the expatriates of Pakistan to send their remittances through the legal banking system. Further, the monetary authorities should also need to restructure their system and eradicate the shortcomings in the present system.

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APPENDIX

Pair-wise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
REMT does not Granger Cause RES	30	11.899	0.000
RES does not Granger Cause REMT		23.894	0.000
OP does not Granger Cause RES	30	0.548	0.585
RES does not Granger Cause OP		0.535	0.592
EX does not Granger Cause RES	30	7.579	0.003
RES does not Granger Cause EX		0.939	0.405
CUD does not Granger Cause RES	30	12.370	0.000
RES does not Granger Cause CUD		5.307	0.012
CAPD does not Granger Cause RES	30	16.530	0.000
RES does not Granger Cause CAPD		1.901	0.170

Granger causality Wald tests

Equation	Excluded	Chi-sq	df	Prob.	Equation	Excluded	Chi-sq	df	Prob.
ECO-SIZE	EX-Rate	0.009	1	0.926	OP-COST	ECO-SIZE	4.396	1	0.036
ECO-SIZE	REMT	0.100	1	0.752	OP-COST	EX-Rate	1.042	1	0.307
ECO-SIZE	RESV	0.255	1	0.614	OP-COST	REMT	0.455	1	0.500
ECO-SIZE	OP-COST	0.223	1	0.637	OP-COST	RESV	1.540	1	0.215
ECO-SIZE	CAP-VULN	0.879	1	0.349	OP-COST	CAP-VULN	0.389	1	0.533
ECO-SIZE	CA-VULN	0.025	1	0.875	OP-COST	CA-VULN	2.191	1	0.139
ECO-SIZE	All	3.659	6	0.723	OP-COST	All	11.379	6	0.077
EX-Rate	ECO-SIZE	3.410	1	0.065	CAP-VULN	ECO-SIZE	0.715	1	0.398
EX-Rate	REMT	2.712	1	0.100	CAP-VULN	EX-Rate	0.224	1	0.636
EX-Rate	RESV	0.181	1	0.670	CAP-VULN	REMT	0.624	1	0.430
EX-Rate	OP-COST	0.218	1	0.640	CAP-VULN	LRESV	0.893	1	0.345
EX-Rate	CAP-VULN	0.520	1	0.471	CAP-VULN	OP-COST	0.320	1	0.572
EX-Rate	CA-VULN	0.434	1	0.510	CAP-VULN	CA-VULN	0.269	1	0.604
EX-Rate	All	21.785	6	0.001	CAP-VULN	All	17.085	6	0.009
REMT	ECO-SIZE	0.930	1	0.335	CA_VULN	ECO-SIZE	7.579	1	0.006
REMT	EX-Rate	1.373	1	0.241	CA_VULN	EX-Rate	7.886	1	0.005
REMT	RESV	0.669	1	0.413	CA_VULN	REMT	1.009	1	0.315
REMT	OP-COST	0.048	1	0.827	CA_VULN	RESV	1.323	1	0.250
REMT	CAP-VULN	0.855	1	0.355	CA_VULN	OP-COST	0.081	1	0.776
REMT	CA-VULN	1.991	1	0.158	CA_VULN	CAP-VULN	0.031	1	0.861
REMT	All	4.814	6	0.568	CA_VULN	All	17.489	6	0.008