An Empirical Investigation Of Relationship Between Industrial Structure And Exchange Rate Regime

Zhao Yu lin, Muhammad Mudassar

Abstract: The choice for the adoption of an exchange rate regime is considered very important in a globalized economy. This selection is affected with the evolution of industrial structure of the economy. The changes in exports and industrial base of the economy emphasize the need to redefine the parameters of international financial market. We have studied the relationship between the choice of an exchange rate regime and the development of industrial structure. In our analysis we have defined exchange rate regime as floating and fixed; and have used logistic regression analysis for a set of 33 countries in two time sets. The development of industrial base especially the tertiary industry has triggered the adoption of a liberal, floating exchange rate regime. The results support our hypothesis of a positive relationship between the evolution of industrial structure and movement towards a liberal exchange rate regime.

Index Terms: Industrial Structure, Exchange Rate Regime, Regression Analysis, Growth

————————————◆————————————

1 INTRODUCTION

The selection of an exchange rate regime is very fundamental for the macroeconomic financial setup of the economy. This choice is one of the considerable issues for macro level institutions in developing and developed economies. The industrial structure of any economy commands significant importance for setting the patterns of growth and development. This Industrial strength is used to meet the local demands of the economy and also for competing in the international frontiers with other countries. This strength is assumed to be affected by the choice of an exchange rate regime adopted by the financial institutions. The choice of an official (de jure) and the actual (de facto) exchange rate is identified as core element of change in the transition economies. The size and geographical concentration of trade are identified as important determinants of exchange rate regimes. The economies facing deficits in their budget allocation are also witnessing the inflation phenomenon and are opting for flexible regimes while the one with the strong and stable Governments are inclined to choose pegged regime structure. However, the economies with strong financial markets are intended to opt for a floating regime choice [1]. However there is no strong theoretical foundation about making country comparison based on exchange rate regime. It is identified that capital mobility is well defined in fixed exchange rate regime; while in floating exchange rate regime capital mobility is fluctuating. The consequences of chosen exchange rate regime have small impacts on inflation and growth [2]. Industrial structure is considered as a vital determinant of exchange rate exposure for industry portfolio returns, especially the industries in global competitive environment and consumer products are significantly impacted by the respective exchange rate regime choice [3]. Foreign Direct Investment (FDI) alone brings magnificent changes in the industrial structure and development of economies. The patterns identified as a result of increased FDI set foot steps for exchange rate liberalization in these economies. The same exchange rate liberalization arrangement is considered favorable for a country like Vietnam on its route to development [4]. The interrelationship between industrial structure and exchange rate regime and they found positive results for their study. However the real gains in the industrial structure are described as contributing to real changes in the exchange rate regime. It was also investigated

that countries with flexible exchange rate regimes tend to benefit and develop along with achieving tremendous growth [5]. For developing countries static exchange rate regime tend to keep durability and low level of inflation, however the flexible regime tends to develop the financial sector and make them more resistant to the crisis and shocks. Advanced countries have achieved more flexible exchange rate regime which makes their growth gains remarkable [6]. Meanwhile, the economies opting for a more flexible exchange rate regime are attributed with the strength to absorb and resist trade shocks, also such an economies show growth rate at a high speed as compared to those following the static exchange rate. This also effects the industrial production as well as the employment levels in the economy [7]. In general the countries with higher level of industrial structure are practicing flexible exchange rate regime and are recognized as advanced or developed countries while the developing one are operating in their financial market under fixed exchange rate regime. This relationship is very interesting and shows the internal strength of the economy with the evolution of its financial market. In this paper we are going to empirically examine the relationship between the choice of an exchange rate regime and industrial structure of the economy. Next part will explain the variables examined, followed by data description and results. Last part will present the conclusive remarks.

2 PRAGMATIC DESCRIPTION OF EXCHANGE RATE REGIME AND INDUSTRIAL STRUCTURE

Exchange rate regime cannot be specifically identified as to which phase of flexibility it is depicting. Researcher and academicians have developed a yardstick ranging from flexible to fix to describe the exchange rate regime in the economy. Industrial Structure for developing and developed economies is evolving in its hierarchy of industrial pyramid. So we have separately defined our variables to get the estimation feasible.

2.1 Variable used for Industrial Structure Definition

Industrial structure is usually described in three aspects. These aspects are evolutionary in nature. Industrial structure evolves with the different stages of development of the economy. The stages correspond to strata of industrial deepening and broadening over a period of time. This

historical and pattern oriented development of industry is seen as

a. Movement in industrial structure from Primary to Secondary and Tertiary industry resulting in reducing the apple share of Primary industry.
b. Movement from labor-intensive production frontier in Primary industry to Capital-intensive and knowledge-intensive industrial setup.
c. Movement from Primary industry raw material processing to Second stage manufacturing and ultimately to Hi-Tech products.

Above mentioned stages of development and evolution of industrial base in the country usually follows a trajectory. The use of primitive resource especially the labor force leads to labor intensive primary industry development. This is followed by capital intensive industrial growth involving more specialized skills and more sophistication in the production process which is seen as secondary industry development. With the advent of more educated workforce and technology based research and development we witness innovation driven or technology intensive industrial development. This pattern is depicted as:

Labor-Intensive Development
↓
Capital Intensive Development
↓
Technology Intensive Development
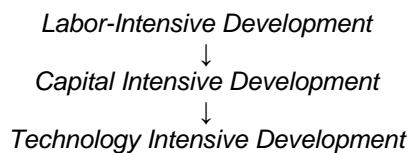
Along with this industrial structure development another change to witness is in the kurtosis of Value-added process of production. It evolves from raw material processing to value added manufacturing and from intermediate products to final products [8]. With the evolution of industrial structure to the third stage of technology impacted production, we can see more High-Tech products in the market. The peak of industrial structure will be defined by the percentage of tertiary industry. Usually the development of an economy is connected with the development of its tertiary or technology based industry. So if this contribution is more in the industrial output, it means we can measure the industrial structure by using such a percentage. Therefore for our research we will use the percentage of tertiary industry as a measure of industrial structure.

2.2 Variables used for Exchange Rate Regime Definition

Exchange rate regime for countries is defined with the choice of flexibility in the currency conversion pattern. It is a control on the financial system that an economy wants to hold for its goods and services exchange with other economies. With the financial market development in any economy it strides for a free floating regime which is vulnerable to risks and also gains from exchange rate changes. In our case we have defined exchange rate system as floating and fixed. Former is taken as Floating and Free-Floating exchange rate regime, numerically defined as "1" while the later is taken as any kind of peg, crawling or static exchange rate regime, and is numerically defined as "0" in our empirical analysis.

3 METHODOLOGY AND DATA DESCRIPTION

In our study the interest is to find out the regressive effect of one variable on the other Bernoulli encrypted variable across a set of various countries in two time blocks.

3.1 Methodology

Our empirical work involves one binary variable, so we have used Logistic Regression Technique or Logit. The discrete values of exchange rate regime are taken as "0" and "1". The continuous values of the share of tertiary industry are taken for respective years. EViews is used for data estimation and results.

3.2 Data Description

We have used secondary data collected through reliable international data sources. Our data set involves 33 countries across various regions and continents including both developing and developed countries. We have made this study for the same set of countries in 1996 and 2009. The data sources are

1) International Monetary Fund, IMF Annual Report, 2010 [9].
2) World Bank Statistical Year Book, WDI Database. 1995-2010 [10].
   - Data for some countries in the same year was not available or updated in the secondary sources, for that reason we have used the previous year values in our estimations.

Aftermath of the collapse of Bretton woods system make countries to opt for a fixed or floating exchange regime in a more vivid way. We will estimate our interest variables in two time durations against the same countries. The Asian currency crisis and financial bubble in advanced economies does have serious repercussions for the exchange rate regime volatility. This led to highlight the importance of a decision regarding the choice of an exchange rate regime.

4 Empirical Findings

Empirical analysis is performed for data set of year 1996 and for 2009; Logistic Regression results are presented through graphs, tables and estimated equation.

4.1 Logistic Regression Results for 1996

Estimation Command: BINARY(D=L) XR C TI

Estimation Equation: $XR = 1 - @LOGIT(-(C(1) + C(2)*TI))$

Substituted Coefficients: $XR = 1 - @LOGIT(-(-6.536982985 + 0.1145693285*TI))$ *(1)*
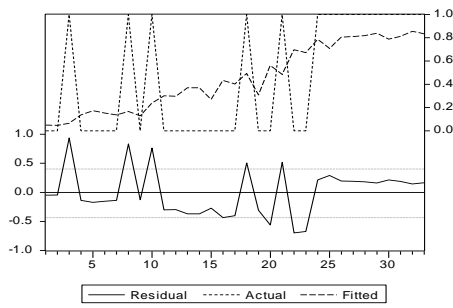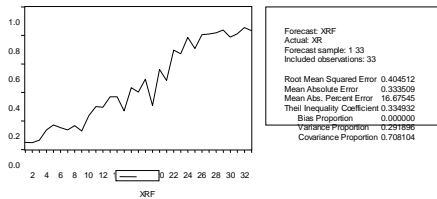
Fig. 1 (a) Graph of the actual, fitted, and residual series for Year 1996

(b) Graph of XR Forecast (XRF) pattern

± Previous Year data is used for analysis as recent figures were not available

4.2 Logistic Regression Results for 2009.
Estimation Command: BINARY(D=L) XR C TI

Estimation Equation: XR = 1-@LOGIT(-(C(1) + C(2)*TI))

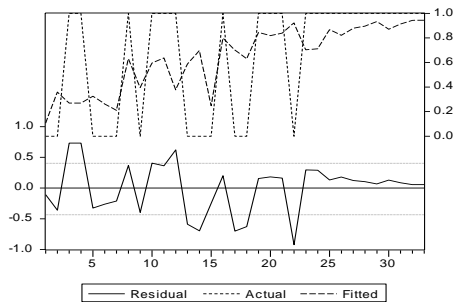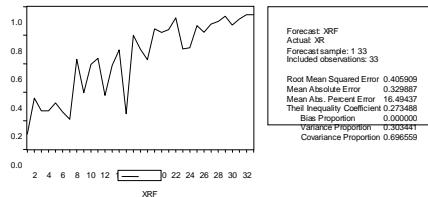Substituted Coefficients: XR = 1-@LOGIT(-(-9.164289296 + 0.2132992606*TI))   *(2)*

Fig. 2 (a) Graph of the actual, fitted, and residual series for Year 2009

| | | Exchange rate | |
Country	Proportion of Tertiary Industry	Regime Value	Estimated Probabilities
Nigeria	31.2	0	0.05915
China	30.8	0	0.05705
Mongolia	33.7±	1	0.08561
Indonesia	41.3	0	0.13709
Belarus	43.3	0	0.17134
Vietnam	42.1	0	0.18271
Malaysia	41.8	0	0.19709
India	43.3	1	0.23348
Iran	40.4	0	0.25916
Philippines	46.9	1	0.26214
Pakistan	49.7	0	0.30093
Thailand	49.5	0	0.31613
Bangladesh	52.4	0	0.33969
Sri lanka	52.4	0	0.36969
Ukraine	48.4	0	0.77055
Turkey	54.7	0	0.43291
Russia	53.6	0	0.44226
Kazakhstan	56.8	1	0.50736
Brazil	50.1	0	0.50821
Poland	59.2	0	0.56107
South Africa	56.5	1	0.58595
Singapore	64.3	0	0.69632
Argentina	63.3	0	0.70156
Mexico	68.4	1	0.71424
Spain	64.8±	1	0.79171
Canada	69.4	1	0.79558
Germany	69.7	1	0.79023
Italy	70.2	1	0.88156
United Kingdom	71.4	1	0.88202
Australia	68.5	1	0.91232
Netherlands	69.8	1	0.98847
United States of America	72.5	1	0.98563
France	71.1	1	0.99874

TABLE I.   DATA VALUES AND PROBABILITIES FOR YEAR 1996

(b) Graph of XR Forecast (XRF) pattern

TABLE II. Data Values and Probabilities for Year 2009

Country	Percentage of Tertiary Industry	Exchange rate Regime Value	Estimated Probabilities
Nigeria	27.9	0	0.08619
China	43.4	0	0.08695
Mongolia	39.2±	1	0.09235
Indonesia	39.2	1	0.10765
Belarus	44.3±	0	0.10852
Vietnam	38.8	0	0.10975
Malaysia	35.9	0	0.15901
India	54.6	1	0.16812
Iran	45.7	0	0.18008
Philippines	53.1	1	0.21354
Pakistan	54.9	1	0.25915
Thailand	44.2	1	0.2682
Bangladesh	52.8	0	0.32958
Sri lanka	57.6	0	0.44664
Ukraine	38.1	0	0.59721
Turkey	63.1	1	0.58756
Russia	57.8	0	0.55175
Kazakhstan	54.5	0	0.63053
Brazil	66.2	1	0.66243
Poland	64.4	1	0.61968
South Africa	65.8	1	0.74688
Singapore	74.0	0	0.81455
Argentina	57.9	1	0.85431
Mexico	58.3	1	0.83543
Spain	68.1	1	0.89517
Canada	64.5±	1	0.87789
Germany	69.8	1	0.87621
Italy	70.9	1	0.83873
United Kingdom	75.7	1	0.86037
Australia	68.4	1	0.88877
Netherlands	72.9	1	0.95323
United States of America	77.4	1	0.97811
France	77.5	1	0.98689

± Previous Year data is used for analysis as recent figures were not available

We can see in our estimation that both he variables for year 1996 and 2009 are positively related and the coefficient values have increased over the period of time describing the higher magnitude of relationship. The values of C (2) in the equation *(1)* and equation *(2)* have increased approximately from 0.11 to 0.21 in 2009 as compared to 1996. Industrial growth in terms of percentage of tertiary industry has regressive effects on the exchange rate. With an increase in the proportion of tertiary industry we see more responsiveness to liberalizing of exchange rate.

5 CONCLUSION
The relationship between exchange rate regime and tertiary industry percentage is integrated and positively correlated. Our results are supporting the hypothesis of same direction movement between the choices of an exchange rate regime being more liberalized along with the evolution of the industrial structure. Industrial structure of any economy shows positivity in its essence with exchange rate flexibility. We witness both evolving together with the growth of the economy. Especially, the development of tertiary industry; triggers the opening up of financial market. The odd ratios are favoring a liberal regime along with industrial structure evolution. However the real industrial strength and output gains in innovation capabilities of production and processes will determine the degree of competitiveness on international frontiers and will ultimately make the economy more stable and progressive in money and goods market. Over the decade this transformation can be seen with more countries opting for flexible exchange rate regime and moving upward in industrial structure pyramid. This choice can be considered critical with the changes in the industrial structure.

6 References
[1] Markiewicz, Agnieszka, 2006, Choice of exchange rate regime in transition economies: An empirical analysis, Journal of Comparative Economics 34, p 484–498

[2] Andrew K. Rose, 2011, *Exchange Rate Regimes in the Modern Era:* Fixed, Floating, and Flaky, Journal of Economic Literature, p 79-87

[3] Anand Krishnamoorthy, 2001,The impact of industrial structure and the exchange-rate exposure of industry portfolio returns, Global Finance Journal, Volume 12, Issue 2, p 285–297

[4] Nguyen Thu Kim, Junichi Hirata, 2010, Determinants of exchange rate arrangements in East Asia and lessons for Vietnam, Social Systems Research, No. 20

[5] Zhang Guang, Bin Deng Yan, 2009, Empirical Analysis about Exchange Rate Regime and Industrial Structure, ICIII '09 Proceedings of International Conference on Information Management, Innovation Management and Industrial Engineering - Volume 03

[6] Aasim M. Husain, Ashoka Mody, Kenneth S. Rogoff, 2005, Exchange rate regime durability and performance in developing versus advanced economies, Journal of Monetary Economics, Vol.52, Issue 1, p 35–64

[7] Sebastian Edwards, Eduardo Levy Yeyati, 2005, Flexible exchange rates as shock absorbers, European Economic Review, Vol. 49, Issue   8, p 2079–2105

[8] Liu Wei, Li Shaorong, 2002, Industrial Structure and Economic Growth. *China's Industrial Economy*, Vol: 5, p 14-21

[9] International Monetary Fund, IMF Annual Report, 2010

[10] World Bank Statistical Year Book, WDI Database. 1995-2010