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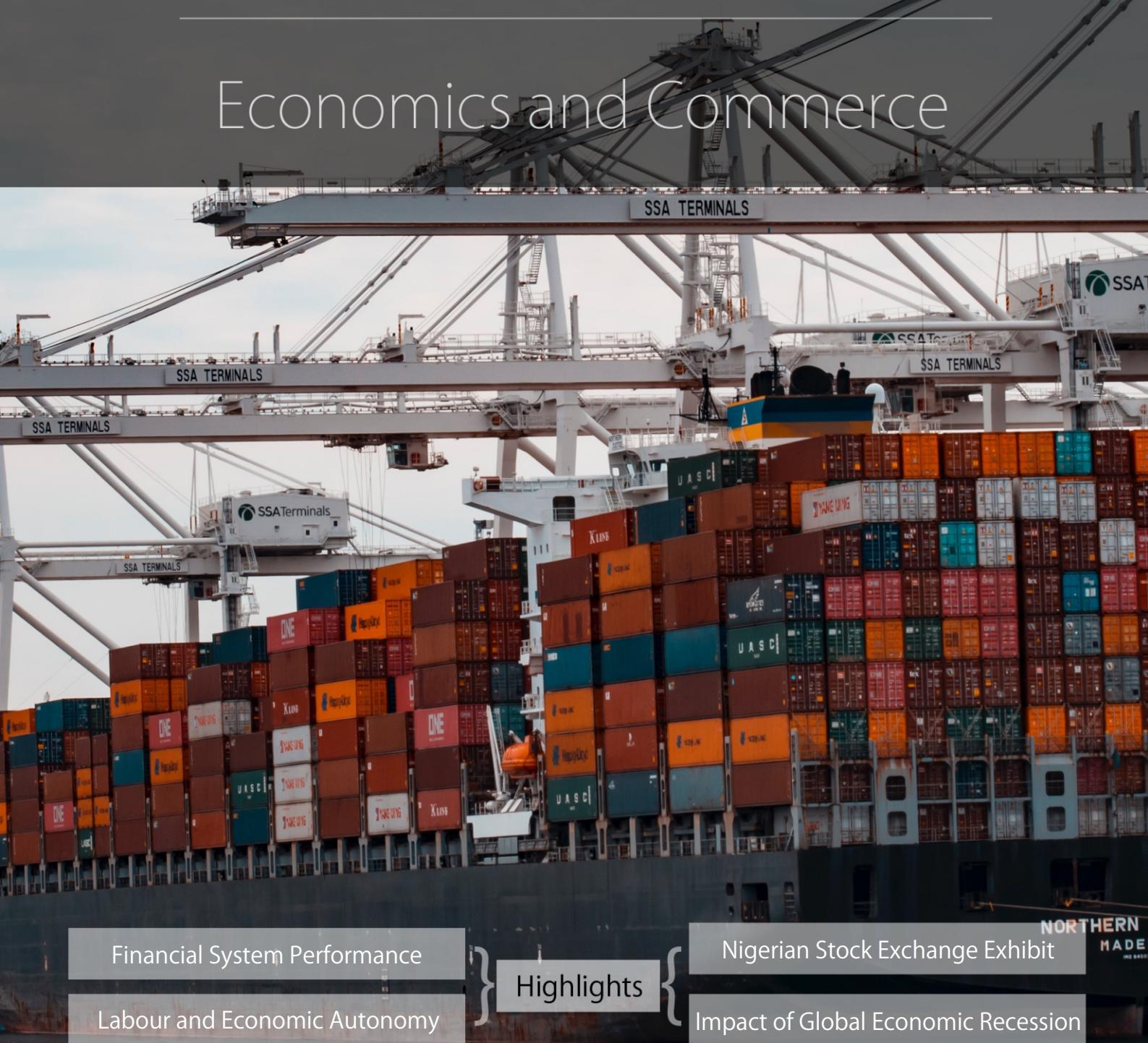
Financial System Performance

Nigerian Stock Exchange Exhibit

Highlights

Labour and Economic Autonomy

Impact of Global Economic Recession

Discovering Thoughts, Inventing Future

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Bitcoin Hedging and Diversification Capabilities: An International Evidence

By Hazgui Samah

University of Manouba

Abstract- Using daily data from 19 July 2010 to 11 July 2018, we find that the Bitcoin market can be regarded as a hedge on the one hand for the American dollar currency fluctuations and on the other hand for some stock index changes. Our overall results suggest that Bitcoin is the digital gold. Hence, it can be a useful tool for portfolio management and our results can help investors to make more informed decisions.

Keywords: bitcoin, hedging performance, univariate and multivariate garch models.

GJMBR-B Classification: JEL Code: F6, G1

BITCOINHEDGINGANDDIVERSIFICATIONCAPABILITIESANINTERNATIONALEVIDENCE

Strictly as per the compliance and regulations of:

Bitcoin Hedging and Diversification Capabilities: An International Evidence

Hazgui Samah

Abstract- Using daily data from 19 July 2010 to 11 July 2018, we find that the Bitcoin market can be regarded as a hedge on the one hand for the American dollar currency fluctuations and on the other hand for some stock index changes. Our overall results suggest that Bitcoin is the digital gold. Hence, it can be a useful tool for portfolio management and our results can help investors to make more informed decisions.

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I. Introduction

Looking back in history from the internet and e-commerce to the virtual currencies we have enjoyed amazing advantages which changed our lives. Bitcoin, the famous crypto-currency since its launch after the financial crisis of 2008, has evolved the way we look at finance and our previous concepts to issue, store or transfer money. Despite the huge interest in Bitcoin as a digital asset, the current finance literature is still lacking empirical evidence on its hedging properties against other assets, in particular against major world equities. Indeed, this analysis will give detailed sight of the interaction of this new financial asset in the market and what place is has comparably to other assets. Bitcoin *«... is a peer-to-peer digital currency that trades on public exchanges and can be instantly transferred between any two people or more anywhere in the world with the speed of an email and at far lower cost than for transactions processed through the traditional financial system. The bitcoin launching was based on a nine-page "Bitcoin: A Peer-to-Peer Electronic Cash System" unleashing the bitcoin software, all of it public, in January 2009. The system allowed for the creation of 21 million bitcoins, total, with the last ones to be released in 2140»* (Debrova 2016). In this review, we will check Bitcoin from an economic view point. In this context, we note that this crypto-currency has compared to gold as they have many similarities: their primary values are given by their scarcity of supply, their supply is not controlled by any government, the both have high price volatility and their total supply is finite (Popper 2015, Dyhrberg 2016). Likewise, the gold has known by its hedging capabilities against stocks, bonds and American dollar, to this, Bitcoin might exhibit similar correlations. This paper addresses two questions: first, we examine whether Bitcoin acts as a hedge against the American dollar, to see how well Bitcoin protected against currency fluctuations and second, if Bitcoin can acts as a hedge for major world stock index. Consequently, this paper will thereby be modeled after previous researches of gold using the same methodology and our findings can be compared to get a sense of the comparable hedging capabilities of gold and «digital gold» (Dyhrberg 2016). The rest of the paper is organized as follow. Section 2 presents the relevant literature. Section 3 introduces the data and the methodology. Section 4 discusses the empirical results. Section 5 concludes.

II. Relevant Literature

When we talk about the literature related to the hedging capabilities of a financial asset, we refer to the one linked to gold. Many studies have examined the dynamic relationship between gold, American dollar and stocks such as the first study which officially tests if gold is a hedge or safe heaven was done by Baur and Lucey 2010. They investigate that gold is a hedge against stocks from 1995 to 2005. Another study on this specific topic was done by Baur and McDermott 2010, who confirm that gold is a hedge for the American and major European stock markets but not for emerging stock markets from 3/2/1979 to 3/2/2009. Joy 2011 proves that the gold was a hedge against the American dollar during 23 years using 16 US dollar exchange rates from 01/10/1986 to 08/29/2008. Wang and al 2011 find the gold's ability to act like a hedge against yen/dollar exchange rate from April 1986 to March 2007 and investing in gold avert any possible loss. Ciner and al 2013, Arouri and al 2015, Choudhry and al 2015, Bredin and al 2015, Huang and al 2016 show that the gold can be regarded as an effectiveness hedge against the bond prices and equity index in China, German, UK and US markets changes. Mensi and al 2015, Ghazali and al 2015 show that the gold account in Malaysia and in the GCC (Gulf Cooperation Council: United Arab Emirates, Bahrain, Saudi Arabia, Qatar, Kuwait and Oman), provided a hedge competence to shariaa compliant markets. Jain and Biswal 2016 prove a strong relationship between gold and Indian stock, suggesting the importance of gold to limit stock market volatility confirmed by Bouri and al 2017 who show that there is a positive nonlinear relationship between gold and Indian stock market. Gürgün and Ünalmıs 2014, Nguyen and al 2016, Basher and Sadorsky 2016 and Iqbal 2017 prove the hedging ability of gold for many developing and

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emerging countries like Pakistan, Indian and European stock markets. Studies on the Bitcoin price formation became more relevant as well as their supply, demand and values increasing their impact on financial markets. Therefore there is an area of research which has received some attention in the literature is the relationship between Bitcoin and other financial assets, and determining whether Bitcoin can be classified as a diversifier or a hedge against other financial assets. Halaburda and Gandal 2014, Molnár and al 2015 and Eisl and al 2015 indicate the inclusion of highly volatile Bitcoin into a diversified portfolio is highly profitable and they predicate if some investors lose trust to the entire economy, they might resort to Bitcoin. This is one of the reasons why Bitcoin has sometimes been called digital gold (Popper 2015). Arguing 2015 show that Bitcoin is a hedge against UK equities and American dollar. Baur and al 2015 conclude that crypto-currencies and traditional asset classes are uncorrelated, making Bitcoin a useful diversification instrument in an investment portfolio. Brière and al 2015 found that the low correlation between Bitcoin and a diversified portfolio of assets can be useful as an investment strategy. Dyhrberg 2016a shows that Bitcoin can acts as a hedge, sharing similar hedging capabilities to gold, against the American dollar and the UK stock market. Dyhrberg 2016b compares asset capabilities and behavior of Bitcoin to those of gold and USD. She explains that Bitcoin is similar to gold in the way it reacts to news. Bouri and al 2017a prove that Bitcoin can be used as a hedge or a diversifier owing to the lowest connectedness between Bitcoin and other financial markets. Corbet and al 2017 find that Bitcoin, Ripple and Litecoin are not affected by external market shocks, thus, they are useful as a diversification and safe haven during the short run as they generate an increase in portfolio return. Added to this, there are a various ways used to discover the hedging capabilities of a financial asset against currency risk. To study the hedging capabilities of oil and gasoline spot prices against their futures prices, Chang and al 2010 use an OLS, a multivariate GARCH, an error correction and a state space models. Chang and al 2011 investigate the hedge ability of crude oil spot prices against their future prices by BEKK, CCC, DCC and VARMAGARCH models. Arouri and al 2011a, 2011b estimate a multivariate GARCH model to investigate first of all the volatility spillovers between oil, US and Europe stock markets over the period 1998 to 2009 and secondly between oil prices and stock markets in the Gulf Cooperation Council countries from 2005 to 2010. From January 1998 to December 2009, Arouri and al 2012 use a VAR-GARCH to model volatility dynamics between oil and European equity markets. Moreover, from January 2001 to December 2010, Sadorsky 2012 uses a multivariate GARCH model to investigate the volatility dynamics between the stock prices of technology companies, clean energy companies and oil prices. To study the hedging effectiveness between crude oil and related petroleum products, Pan and al 2014 estimate a regime switching asymmetric DCC (RS-ADCC) model. Lin and al 2014 model a VAR-GARCH and DCC-GARCH models to investigate the volatility dynamics between equity prices and oil prices in Ghana and Nigeria. To study the volatility transmission between emerging market stock, copper, oil and wheat prices over the period 2000 to 2012. Sadorsky 2014a estimates a multivariate GARCH models. Sadorsky 2014b estimates a DCC and CCC-GARCH models to model volatility and conditional correlations between the Dow Jones equity, gold and oil prices. Bredin and al 2015 employ a wavelet analysis and show that gold can be a hedge up to a year. Dyhrberg 2016a investigates the hedging properties of Bitcoin against stocks and American dollar by a GJR-GARCH and concludes that Bitcoin can reduce specific market risks and it is uncorrelated to stocks. To analyze the relationship between gold and global uncertainty Bouri and al 2017a apply a quantile regression approach and found that Bitcoin can hedge against global uncertainty at short investment horizons. Bouri and al 2017b employ a DCC-model and show the evidence of the limited hedging and safe properties of Bitcoin, although it can still be an effective diversifier.

III. Data and Econometric Modeling

We used for this study a daily data series from 19/07/2010 to 11/07/2018. The closing prices for the Bitcoin coindesk index are sourced from coindesk.com. USD/EUR, USD/GBP, USD/CNY and USD/JPY exchange rates are from Federal Reserve economic data, as well as the five most famous market indexes: FTSE100, SP500, DAX30, HSI and CAC40 are sourced from yahoo-finance. We filter out Bitcoin prices during periods when the currency markets are closed, since Bitcoin trades 24-hours a day, 7-days a week. We employ logarithmic returns for Bitcoin and other series such that: $r_t = \log P_t - \log P_{t-1}$ (1)

Where r_t are the returns, P_t is the price at time t and P_{t-1} is the price at time t-1.The descriptive statistics of the returns are reported in table 1. Where we can see the Bitcoin has the largest return and all the other series have a positive ones, except that of Chinese Yuan. In panel A, the variable with the smallest mean return is HSI while the SP500 has the highest mean return. In panel B, USD/EUR exchange rate has the smallest mean return while the USD/JPY exchange rate has the highest one. According to the standard deviation values, the Ret-BTC in panel A and in panel B is the most volatile series. In addition, we observe that RET-BTC and RET-CNY in panel A and B respectively has the highest level of kurtosis, indicating that extreme changes tend to occur more frequently for stock prices and the Jarque- Bera statistics reject normality for all our

variables. Following Baur and McDermott 2010, Hood and Malik 2013, Ratner and Chiu 2013 we differentiate between a diversifier and a hedge as follow: « *a diversifier is an asset that has a weak positive correlation with another asset on average. A weak (strong) hedge is an asset that is uncorrelated (negatively correlated) with another asset on average*». Furthermore, our methodology is based to some extent on Dyhrberg 2016 who estimates a univariate GARCH model (T-GARCH) to investigate the hedging effectiveness of Bitcoin against the American dollar and FTSE index, on Chen and Wang 2017 paper which examines the dynamic relationship between gold and stock market in China using a multivariate model (DCC-GARCH) and on Bhatia and al 2018 who apply a DCC-GARCH and to check the robustness of the relationship, they estimate an ADCC-GARCH model between crude oil and precious metals.

Table 1: Summary statistics

Variables	Mean	S.D	Min	Max	Skewness	Kurtosis	J.B	Ob
Panel A								
Ret_ BTC	0.005475	0.070969	-0.619039	0.467597	-0.565764	17.29827	17563.42	2049
Ret_SP500	0.000462	0.008960	-0.068958	0.046317	-0.546761	8.231341	2438.542	2049
Ret_FTSE	0.000197	0.009310	-0.061994	0.039429	-0.314212	6.256756	939.2423	2049
Ret_DAX30	0.000365	0.012173	-0.070673	0.052104	-0.278632	5.783196	687.8427	2049
Ret_CAC40	0.000222	0.012289	-0.083844	0.068910	-0.263486	6.405952	1014.102	2049
Ret_HSI	0.000169	0.011149	-0.060183	0.055187	-0.357904	5.953191	788.3287	2049
Panel B								
Ret_ BTC	0.0059340	0.064762	-0.470040	0.499663	-0.029344	12.79516	8335.542	2085
Ret_EUR	0.0000073	0.005689	-0.029953	0.026398	0.018167	4.697595	250.4735	2085
Ret_GBP	0.0000252	0.005455	-0.029962	0.084006	1.782737	31.04006	69409.46	2085
Ret_JPY	0.0001170	0.005891	-0.037722	0.034639	-0.076096	7.505543	1765.568	2085
Ret_CNY	-0.0000096	0.001719	-0.010278	0.026954	1.841306	36.26811	97328.54	2085

Note: S.D: Standard Deviation, J.B: Jarque- Berra, OB: observations

This section describes the econometric modeling procedure we use to assess the hedge properties of Bitcoin. First, we apply the threshold Garch (T-GARCH) or named also the Glosten-Jagannathan-Runkle (GJR-GARCH) introduced by Glotsen and al 1993, and as suggested by Engle and Ndong 1993, this model is the best ARCH model which check the asymmetric impact of new information on two return volatility. Then, to estimate the volatility dynamics and conditional correlations between the return series, we use the DCC model of Engle 2002 and the ADCC-GARCH model of Cappiello and al 2006. Firstly, all variables have been including in a cross-correlogram to investigate the Bitcoin hedging capabilities then we will confirm the dynamic relationship with a T-GARCH model. The mean equation (2) and the variance equation (3) are shown below as:

$$\Delta lnBTC_t = \beta_0 + \beta_1 \Delta ln\text{BTC}_{t-1} + \beta_2 \Delta \ln exchange\ rate_t + \beta_3 \Delta lnexchange\ rate_{t-1} + \varepsilon_t \quad (2)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \lambda\ d_{t-1} \varepsilon_{t-1}^2 + \beta_0 \sigma_{t-1}^2 \quad (3)$$

Secondly, we will analyze the relationship between the return on Bitcoin and each index and identify if this crypto-currency can be used as a hedge. The mean equation (4) and the variance equation (5) are shown below as:

$$\Delta lnBTC_t = \beta_0 + \beta_1 \Delta lnBTC_{t-1} + \beta_2 \Delta ln\ index_t + \beta_3 \Delta ln\ index_{t-1} + \varepsilon_t \quad (4)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \lambda\ d_{t-1} \varepsilon_{t-1}^2 + \beta_0 \sigma_{t-1}^2 \quad (5)$$

Unlike Baba-Engle-Kraft-Kroner (BEKK) and constant conditional correlation (CCC) models, which may have unreasonable parameter estimates and convergence problems, the model of Engle 2002 has the ability to check the dynamic relationship across return series with fewer computational complications (Parhizgari and Cho 2008). A DCC model is estimated in two steps: in the first step, a univariate GARCH (1, 1)

model is estimated. In the second step, a time-varying correlation matrix is computed using the standardized residuals from the first-step estimation. However, for the purpose of this study the model is estimated separately for pairs of return series. In doing so, the minor

The residuals are modeled as:

Where H_t is the conditional covariance matrix of r_t, Z_t is a n×1 i.i.d random vector of errors. All DCC class models (including the conditional correlation GARCH (CCC)) use the fact that H_t can be decomposed as follow: $H_t = D_t R_t D_t$ (8)

Where the expressions of h are the GARCH (1,1). For the univariate GARCH model the elements of

H_t are written as:

The symmetric positive definite matrix is modeled as:

Where Q is the n×n unconditional correlation matrix of the standardized residuals $Z_{i,t} = \varepsilon_{i,t} / \sqrt{h_{i,t}}$
The DCC model is mean reverting as long as $\theta_1 + \theta_2 < 1$. For the purposes of this paper, the focus of interest is the conditional correlations between the return of Bitcoin and return of each other series pair are calculated by:

$$\rho_{i,j,t} = q_{i,j,t}/\sqrt{q_{i,i,t+q_{j,j,t}}} \qquad (13)$$

Capiello and al 2006 estimate the asymmetric DCC (ADCC) - GARCH model and the dynamic regression is given by:

possibility of getting biased estimates of parameters in higher dimensions is prevented (Hafner and Reznikova 2012). The mean equation of the DCC model is specified as:

$$r_t = \mu + a r_{t-1} + \varepsilon_t \qquad (6)$$

$$\varepsilon_t = H_t^{1\backslash 2} Z_t \qquad (7)$$

Where; H_t is an n×n conditional covariance matrix, R_t is the conditional correlation matrix, D_t is the diagonal matrix with time varying standard deviations on the diagonal.

$$D_t = \text{diag}(\, h_{1.t}^{1\backslash 2}, \dots , h_{n.t}^{1\backslash 2}) \quad R \qquad (9)$$

$$R_t = \text{diag}(\, q_{1.t}^{1\backslash 2}, \dots , q_{n.t}^{1\backslash 2}) Q_t (\, q_{1.t}^{-1\backslash 2}, \dots , q_{n.t}^{-1\backslash 2}) \qquad (10)$$

$$h_{i,t} = \omega_i + \alpha_i \varepsilon_{i,t-1} + \beta_i h_{i,t-1} \qquad (11)$$

$$Q_t = (1 - \theta_1 - \theta_2)\bar{Q} + \theta_1 Z_t Z_t' + \theta_2 Q_{t-1}) \qquad (12)$$

$$h_{i,t} = \omega_i + \alpha_i h_{i,t-1} + d_i \varepsilon_{t-1}^2 \, I(\varepsilon_{i,t-1}) \qquad (14)$$

Where $I(\varepsilon_{i,t-1})$ equal to 1 if $\varepsilon_{i,t} < 0$ and equal to 0 otherwise. The asymmetric effect is designed to capture an often observed characteristics of financial assets that an expected fall in prices tend to increase volatility more than an expected increase in asset prices of the same magnitude meaning that bad news increases volatility more than good news and the dynamic of Q in this case are given by:

$$Q_t = (\bar{Q} - A'\bar{Q}A - B'\bar{Q}B - G'\overline{Q^-}G) + A'Z_{t-1}Z_{t-1}'A + B'Q_{t-1}B + G'Z_t^- Z_t'^- G \qquad (15)$$

Where A, B, G are n×n parameters matrix. Z_t^- , $Z_t'^-$ are zero threshold standardized errors which are Z_t equal to when less than 1 and 0 otherwise. $\bar{Q}$, $\overline{Q^-}$ are the unconditional matrix of Z_t, Z_t^- .

IV. Empirical Results

Table 2 reports the cross-correlations between Ret-BTC/Ret-variables for up to four lags. The most of coefficients are negative suggesting that Bitcoin can be

used as a hedge against these assets. However, these correlations are very smalls, thus suggesting, that any dynamic relationship, if it exists, will be short lived. Capie and al 2005 found similar small negative values of correlations between the return on the yen dollar and sterling dollar exchange rates and the return on gold, proving the gold as the «anti-dollar». Next, by estimating the TGARCH we can verify in more details this relationship.

Table 2: Cross-correlogram between Ret_Bitcoin and Ret_variables

	BTC/SP500	BTC/DAX	BTC/FTSE	BTC/HSI	BTC/CAC		BTC/EUR	BTC/GBP	BTC/JPY	BTC/CNY
k=-4	-0.0104	0.0034	0.0092	0.0200	-0.0023		0.0028	-0.0010	-0.0224	-0.0186
k=-3	0.0488	0.0226	0.0105	-0.0154	0.0060		0.0013	-0.0055	-0.0042	-0.0393

k=-2	-0.0136	0.0271	0.0305	0.0121	0.0348	-0.0287	-0.0298	0.0136	-0.0231
k=-1	-0.0138	0.0006	-0.0370	0.0010	-0.0091	-0.0083	-0.0020	0.0132	0.0003
k=0	0.0382	0.0110	0.0157	-0.0197	-0.0061	-0.0012	0.0182	0.0130	-0.0080
k=1	0.0519	0.0462	0.0406	0.0117	0.0583	0.0083	-0.0110	-0.0012	0.0255
k=2	-0.0260	-0.0013	0.0051	0.0418	-0.0021	0.0297	-0.0113	0.0296	-0.0292
k=3	0.0356	0.0145	0.0004	-0.0287	-0.0035	-0.0134	-0.0045	0.0005	-0.0215
k=4	0.0243	0.0462	0.0384	0.0343	0.0518	0.0021	-0.0086	0.0037	0.0248

Table 3 suggests that Bitcoin has hedge ability against US dollar fluctuations as the contemporaneous effects and their lagged coefficients are insignificant, implying that these variables are uncorrelated on average, thus, the BTC is a weak hedge and has long-term hedge capabilities. The return on BTC is not affected by changes in the exchange rates which creates a possibility for investors to hedge some of the market risks. These results are similar to those of Capie and al 2005 though they get insignificant contemporaneous and lagged values, indicating that Bitcoin and gold have similar hedging capabilities against the American dollar.

Table 3: T-GARCH (1,1) with exchange rates and dependent variable return on BTC

Variables	Mean equation	Variance equation
Ln$(USD/EUR)_t$	0.038549 (0.100448)	
Ln$(USD/EUR)_{t-1}$	-0.032254 (0.094166)	
L.ar	0.032183** (0.012898)	
L.arch α		2.756021 (4.761759)
L.tarch λ		-1.082271 (1.911593)
L.garch β		0.771238*** (0.018386)
constant	0.002164*** (0.000518)	0.000204 (0.000346)
Ln$(USD/GBP)_t$	0.061959 (0..099371)	
Ln$(USD/GBP)_{t-1}$	0.017411 (0.094132)	
L.ar	0.031805** (0.01287)	
L.arch α		2.875871 (5.194654)
L.tarch λ		-1.134033 (2.090081)
L.garch β		0.771414*** (0.018336)
Constant	0.002136*** (0.000518)	0.000210 (0.000373)
Ln$(USD/Yen)_t$	-0.001978 (0.086476)	
Ln$(USD/Yen)_{t-1}$	-0.005824 (0.084318)	
L.ar	0.031913** (0.012896)	
L.arch α		2.718128 (4.638141)
L.tarch λ		-1.063486 (1.856400)
L.garch β		0.771309*** (0.018390)
constant	0.002161*** (0.000519)	0.000202 (0.000339)
Ln$(USD/Yuan)_t$	-0.165045 (0.290384)	
Ln$(USD/Yuan)_{t-1}$	0.168793 (0.294288)	
L.ar	0.032138** (0.012886)	
L.arch α		2.770164 (4.794982)
L.tarch λ		-1.087227 (1.923993)
L.garch β		0.770648*** (0.018416)
constant	0.002159*** (0.000518)	0.000203 (0.000346)

*Note: * $p<0.1$, ** $p<0.05$, *** $p<0$, standard errors in parentheses*

Table 4 summarizes the results of the estimated models 4 and 5. In the mean equations, the contemporaneous effects of SP500, FTSE100, CAC40 and HSI and their lagged coefficients are insignificant; thus, these variables are uncorrelated on average implying that the BTC is a weak hedge against their fluctuations in long term. In addition, the contemporaneous effect is significant and positive between BTC/DAX30 which means that they are correlated on average and the BTC is not a means of hedging against its fluctuations.

Table 4: T-GARCH (1, 1) with index and dependent variable return on BTC

Variables	Mean equation	Variance equation
Ln$(USD/SP500)_t$	0.039024 (0.061333)	
Ln$(USD/SP500)_{t-1}$	0.077658 (0.061824)	
L.ar	-0.032209 (0.020087)	
L.arch α		109.3581 (7843.090)
L.tarch λ		-22.95347 (1646.668)
L.garch β		0.758723*** (0.017959)
Constant	0.001749*** (0.000504)	0.007576 (0.542918)
Ln$(USD/FTSE)_t$	0.062362 (0.054574)	
Ln$(USD/FTSE)_{t-1}$	0.037520 (0.054633)	
L.ar	-0.031468 (0.020118)	
L.arch α		105.1226 (7587.824)
L.tarch λ		-21.96385 (1570.824)
L.garch β		0.757413*** (0.018077)
Constant	0.001765*** (0.000505)	0.007702 (0.550265)
Ln$(USD/DAX30)_t$	0.088492** (0.042350)	
Ln$(USD/DAX30)_{t-1}$	0.047706 (0.042035)	
L.ar	-0.032028 (0.020062)	
L.arch α		110.6413 (7930.781)
L.tarch λ		-23.62137 (1693.653)
L.garch β		0.758519*** (0.017926)
Constant	0.001781*** (0.000502)	0.007556 (0.541204)
Ln$(USD/CAC40)_t$	0.036586 (0.041018)	
Ln$(USD/CAC40)_{t-1}$	0.044229 (0.040756)	
L.ar	-0.032029 (0.020112)	
L.arch α		108.4442 (7778.453)
L.tarch λ		-22.64406 (1624.669)
L.garch β		0.758416*** (0.017934)
Constant	0.001774*** (0.000502)	0.007393 (0.529896)
Ln$(USD/HSI)_t$	-0.015261 (0.044896)	
Ln$(USD/HSI)_{t-1}$	0.072571 (0.045860)	
L.ar	-0.031630 (0.020084)	
L.arch α		107.4556 (7709.482)
L.tarch λ		-21.90181 (1571.842)
L.garch β		0.758041*** (0.018007)
Constant	0.001776*** (0.000503)	0.007775 (0.557419)

*Note: * $p<0.1$, ** $p<0.05$, *** $p< 0$, standard errors in parentheses*

Next, we estimate the multivariate GARCH model of dynamic conditional correlations using maximum likelihood. Since the series in our dataset show some evidence of non-normality, the remedy here is to use the quasi maximum likelihood method (Bollerslev and al 1988) in order to generate consistent standard errors that are robust to non-normality. However, to account for non-normality in the distribution of returns the DCC-GARCH and ADCCGARCH was estimated with a multivariate t-student distribution. Table

5 reports DCC and ADCC-GARCH parameter estimates. For the DCC model the estimated coefficients θ_1 and θ_2 sum is less than one, indicating that the dynamic conditional correlations are mean reverting. Thus, in panel A, the dynamic correlation between BTC and USD/GBP (0,977) was the strongest, while the dynamic correlation between BTC and USD/CNY (0.883) was the weakest. In panel B, the dynamic correlation between BTC and FTSE100 (0,326) was the weakest, while dynamic correlation between BTC and HSI (0,985) was the strongest. In the case of the ADCC model, the dynamic conditional correlations are also mean reverting. ADCC parameter estimate (θ_3) for asymmetric relationship is not statistically significant and suggests that volatility estimates between Bitcoin and the other financial assets are not influenced by negative shocks or sharp increase in returns. To provide more information about the correlation dynamics, the summary statistics for the derived correlations are presented in Table 7.

Table 5: DCC-GARCH/ADCC-GARCH models of each crypto-currency Bitcoin/Asset pair

Variables	Symmetric DCC-GARCH		Asymmetric DCC-GARCH		
	θ_1	θ_2	θ_1	θ_2	θ_3
PANEL A					
BTC/JPY	-0.014096	0.954584	-0.015519	0.833332	0.007817
	(0.023423)	(0.093241)	(0.009104)	(2.528956)	(0.054071)
BTC/GBP	-0.005187	0.982619	-0.007451	0.793580	0.032418
	(0.004492)	(0.041953)	(/)	(/)	(/)
BTC/EUR	-0.022613	0.913685	-0.019531	0.948916	0.015861
	(0.030966)	(0.140065)	(0.037174)	(0.102658)	(0.030263)
BTC/CNY	0.022927	0.860495	-0.002572	0.758424	0.075901
PANEL B	(0.040692)	(0.184504)	(0.005166)	(0.270693)	(0.102756)
BTC/SP500			0.076272	0.709112	-0.056543
	0.039013	0.749828	(0.236363)	(0.876427)	(0.284955)
BTC/DAX30	(0.150259)	(1.009953)	0.001298	0.813735	0.013693
	0.009321	0.822222	(0.295177)	(2.730911)	(0.405286)
BTC/FTSE	(/)	(/)	-0.042036	0.783839	0.060379
	-0.038767	0.365096	(0.016214)	(0.528017)	(0.178285)
	(0.149989)	(2.853451)			
BTC/CAC40	0,034543	0,790155	-0.004175	0.891528	-0.002758
	(0,286954)	(59,56839)	(0.114745)	(1.369894)	(0.030671)
BTC/HSI	-0.01606	1.001130	-0.025027	0.993308	-0.014010
	(0.292666)	(0.007693)	(/)	(/)	(/)

Note: Standard errors in parentheses, (/) indicates it could not be estimated

The magnitude of mean dynamic conditional correlation coefficients varied between -1 and 1. If the coefficient was closer to -1, the negative correlation between Bitcoin and financial assets was stronger. In contrast, when the coefficient was closer to 1, the positive correlation between Bitcoin and other series was stronger. If the coefficient was equal to 0, Bitcoin had no relationship with them. The mean dynamic conditional correlations between stock index, American dollar and Bitcoin are presented in Table 6. Since our results are almost similar1 in the two multivariate frameworks, we refer to the results obtained by DCC-GARCH in the following tables. The mean of dynamic conditional correlation between BTC/SP500, BTC/FTSE100 and BTC/DAX30 were all positive. This finding indicates that our crypto currency did not act as a hedge for American, German and U.K stock index. The mean of the other dynamic conditional correlation pairs varied between -0.01074421 and -0.00044505. Among them, in panel A the mean dynamic conditional correlation coefficient of BTC/CNY was the largest at -0.00158053 and the minimum mean dynamic conditional correlation coefficient was BTC/JPY, which was -0.00044505. In panel B, the coefficient of BTC/HIS was the largest at -0.01074421, and the minimum coefficient was BTC/CAC40, which was -0.00158689. This showed that Bitcoin could act as a hedge against their fluctuations.

Table 6: The dynamic conditional correlations between American dollar, stock index and BTC

Variables	The mean of dynamic conditional correlation
PANEL A	
BTC/JPY	-0.00044505
BTC/GBP	-0.00567043
BTC/EUR	-0.00324883
BTC/CNY	-0.00158053
PANEL B	
BTC/SP500	0.00012597
BTC/FTSE100	0.00438880
BTC/DAX30	0.00365595
BTC/CAC40	-0.00158689
BTC/HSI	-0.01074421

Note: These estimation results are based on the DCC model. For these convenient observations, the dynamic conditional correlation coefficients (ρ) are shown by means of arithmetic average.

The descriptive statistics of dynamic correlation coefficients (DCC) of each BTC-asset pairs are presented in Table 7. The statistics show that Bitcoin is 0.000778 positively correlated with DAX30 and on the other hand, it is slightly negatively correlated with all the other asset series. Nevertheless, the mean of the time-varying correlation coefficients for each pair is small, ranging only from mean -1.152154 to 0.000778, indicating that this crypto-currency can be used as a hedge in portfolios. T

Table 7: Summary statistics of conditional correlation estimated using a DCC-GARCH model

VARIABLES	MIN	MAX	MEAN	ST.DEV
Panel A				
BTC/JPY	-0.072223	0.083779	-0.000445	0.014736
BTC/GBP	-0.079340	0.019023	-0.005670	0.010929
BTC/EUR	-0.081673	0.105899	-0.003249	0.017733
BTC/CNY	-0.032101	0.168465	-0.001581	0.015056
Panel B				
BTC/SP500	-0.116920	0.087358	0.000126	0.008405
BTC/FTSE	-0.035031	0.202373	0.004389	0.006985
BTC/DAX30	0.000778	0.033337	0.003656	0.001611
BTC/CAC40	-0.011213	0.003085	-0.001587	0.001509
BTC/HSI	-1.152154	0.087793	-0.010744	0.027388

Note: This table shows the descriptive statistics of dynamic correlation coefficients (DCC) of each cryptocurrency- asset combinations.

V. CONCLUSION

Motivated by the Dyhrberg 2016 and Chen and Wang 2017 methodologies our objective was to examine variations in conditional correlations to determine when the Bitcoin acts as a hedge firstly against the American dollar and secondly against the stock markets using a univariate and a multivariate GARCH models. First of all, the GJR-GARCH model results for daily Bitcoin prices, exchange rates and stocks data during our sample period showed that: (1) BTC serves as a weak hedge for the stock market index changes in long term, with the exception of DAX30, during the period under study (2) BTC is a weak hedge against US dollar fluctuations in long term. Then, for the multivariate GARCH model results: (1) the mean of dynamic conditional correlation showed that the BTC can be considered as a diversifier more than a means of hedging against SP500, FTSE100 and DAX30 fluctuations and for all the other asset our crypto-hedging against SP500, FTSE100 and DAX30 fluctuations and for all the other asset our crypto-currency is regarded as a hedge in portfolios (2) the

summary statistics of conditional correlations between the Ret_BTC and Ret_of each other series pair showed that this crypto-currency is a hedge against all financial assets changes except DAX30, confirming our first result (the univariate GARCH result). A noteworthy finding of our study is that Bitcoin is the digital gold and can be regarded like gold to eliminate or minimize specific market risks as a hedge highlighting its monetary asset role. Otherwise, it can be added in the variety of possible tools to market analysts to hedge market risks. Even more, Bitcoin creates a new opportunity for investors in terms of risk management, portfolio analysis and the stockholders sentiment in the financial market (Dyhrberg 2016). In light of these results, more researches should be done in order to uncover the financial aspect of this phenomenon.

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The Empirical Investigation of Why Stock Prices on the Nigerian Stock Exchange Exhibit Random Walk

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Abstract- This study empirically investigated whether stock prices on the Nigerian stock exchange exhibit a random walk. Using monthly data from the Central Bank of Nigeria all share index from 1985-2011, the study employed a stepwise approach where the standard linear GARCH (1.1) is applied to capture randomness in terms of volatility clustering. The result proved that the Nigerian stock market is weakly stationary, meaning stock prices on the Nigerian stock market follows a random walk, which is an indication of weak-form efficiency. Therefore, the Nigerian stock market displays a random walk process. Nevertheless, the years 1987, 1991, 1995, 1997, 2001, 2002, 2008, and 2011 demonstrated negative skewness, which is a signification of non-randomness of the market for these years. Besides these years, other years were significantly proven to follow a random walk. Therefore, the Nigerian stock market exhibits a random walk process. Accordingly, investors can obtain a more excellent perception and understanding of the stock market to improve their portfolio performance.

Keywords: random walk hypothesis, weak-form efficiency, volatility clustering, stock market, GARCH model ARCH, non-linearity.

GJMBR-B Classification: JEL Code: M29

THEEMPIRICALINVESTIGATIONOFWHYSTOCKPRICESONTHENIGERIANSTOCKEXCHANGEEXHIBITRANDOMWALK

Strictly as per the compliance and regulations of:

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Past. Prof. Abomaye-Nimenibo, Williams Aminadokiari Samuel [α] & Dr. Amachree, Queen Ori-Ibim [σ]

Abstract- This study empirically investigated whether stock prices on the Nigerian stock exchange exhibit a random walk. Using monthly data from the Central Bank of Nigeria all share index from 1985-2011, the study employed a stepwise approach where the standard linear GARCH (1.1) is applied to capture randomness in terms of volatility clustering. The result proved that the Nigerian stock market is weakly stationary, meaning stock prices on the Nigerian stock market follows a random walk, which is an indication of weak-form efficiency. Therefore, the Nigerian stock market displays a random walk process. Nevertheless, the years 1987, 1991, 1995, 1997, 2001, 2002, 2008, and 2011 demonstrated negative skewness, which is a signification of non-randomness of the market for these years. Besides these years, other years were significantly proven to follow a random walk. Therefore, the Nigerian stock market exhibits a random walk process. Accordingly, investors can obtain a more excellent perception and understanding of the stock market to improve their portfolio performance. It is recommended investors should not trust confidently any privileged information to bit the market and make an abnormal profit; which is a futile effort.

Keywords: *random walk hypothesis, weak-form efficiency, volatility clustering, stock market, GARCH model ARCH, non-linearity.*

I. Introduction

a) Background of the Study

The randomness of stock prices was the result of an efficient market, concluded by more curious among the academic researchers when asked the economic process that produces a random walk. (Chandra, 2004). The efficient market hypothesis assumes that information travels in a random, independent fashion and that prices are an unbiased reflection of all currently available information this means that there is little or nothing to be gained from studying past prices. The weak-form efficient market hypothesis —the random walk hypothesis suggests there is no relationship between past and future prices of securities.

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They are presumed to be independent over time because the random walk hypothesis maintains that current prices reflect all available information and information travels randomly, stock prices exhibit random movements, this is what the study is intended to investigate if the prices of 258 securities listed, about 200 companies with a total market capitalization of about 8.9 trillion ($57 billion) on the Nigerian stock exchange as at December 31, 2012, follows a random walk process.

Do stock price changes independently over time? That past trend in stock prices does not help predict the future price of stock? Do securities prices change independently overtime on the Nigeria stock exchange or more specifically, move in the pattern of a random walk? Past prices cannot be used to easily predict the future, and that charting and technical analysis may have limited value (Geoffrey A.H, & Standy B. Block, 2006). These are my worries.

Louis Bachellier in 1900 was the first to point out that security prices and prices of other speculative commodities follow a random walk. In 1934, Holbrook working confirmed the same result. Cowls and Jones, (1937) also produced the same result. Since then, the random walk hypothesis has been tested in hundreds of studies. Recently in Nigeria, Samuel and Yacout (1981) conducted a study on the Nigeria data; they tested for several correlations at the weekly prices of shares in 21 companies quoted on the Nigeria stock exchange in July 1999. The results of these tests support the theory that prices follow a random walk. Ayadi (1983) used non-parametric tests in the testing of the hypothesis that successive weekly price changes are independent. Olowe, (1999) using data consisting of an end of month quoted stock price of 59 randomly periods January 1981 to December 1992 on the Nigerian stock exchange and employing a sample auto-correlation test concluded that the Nigeria stock market appeared to be efficient in the weak form. Olowe's sample population though fair could be said to cover half of the quoted companies over the years; yet we will increase the sample size to cover entire sample from 1985 — 2011, using monthly data of all-share index.

Data were taken from the statistical bulletin of the central bank of Nigeria, employing GARCH (1.1) model to investigate if stock prices on the Nigeria stock

exchange move in a random pattern. Does price change independently? If information travels randomly; there would not be undervalued or overvalued securities on the Nigeria stock exchange. The market price of a security does not reflect the intrinsic value at every point in time i.e. the errors in the market prices are unbiased. This brings to our knowledge that the price can deviate from the intrinsic value but the deviations are random and uncorrelated with any observable variable. We worry that if the deviations are random, there would not be over or undervalued security. This is what the study is intended to investigate and the findings will put to rest every worry and add knowledge to existing knowledge about the behaviour of stock prices. And also give a deep insight into a large number of profit-maximizing participants who are concerned with the analysis and valuation of securities on the Nigerian stock exchange.

To put this paper into proper perceptive, it is organized into five sections. This section introduced the study while section two reviews previous literature. Section three considered the method of Study and section four highlighted and discussed the results while section five concludes the paper.

II. Literature Review

Literature related to this study is reviewed under the following subheadings: The Evolution and Operation of the Nigerian Stock Exchange, the concept of random walk hypothesis, the theoretical foundation and the empirical basis of the study.

a) Evolution of the Nigerian Stock Exchange

According to Abomaye-Nimenibo (2015), the Nigerian Stock Exchange (NSE) was established in 1960 and as of March 9, 2007, it has 283 listed companies with a total market capitalization of about N15 trillion ($125 billion). All listings are included in the only index, the Nigerian Stock Exchange All Shares Index. The Nigerian stock exchange was established in 1960 as the Lagos stock exchange. In December 1977 it became the Nigerian Stock Exchange, with branches established in some of the major commercial cities of the country. At present, there are six branches of the Nigerian Stock Exchange. Each branch has a trading floor. The branch in Lagos was opened in 1961, Kaduna 1978, Port Harcourt 1980, Kano 1989, Onitsha February 1990 and Ibadan August 1990, Abuja Area Office, October 1999, Yola, April 2002 and Benin, 2005. Lagos is the head Office of the exchange. An office has just been opened in Abuja. The exchange started operations in 1961 with 19 securities listed for trading. As of recent, there are 262 securities listed on the exchange, made up of 17 Government stocks, 50 industrial loans (Debenture/Preference) stocks and 209 equity/ordinary shares of companies, all with a total market capitalization of approximately N 2.23 trillion as at

August 31, 1999. As of December 31, 2012, it has a total market capitalization of about N8.9 trillion ($57 billion).

The NSE continues to evolve to meet the needs of its valued customers and to achieve the highest level of competitiveness. The Nigerian stock exchange is poised to champion the acceleration of Africa's economic development and to become "the Gateway to African Markets." Many of the listed companies have foreign/multinational affiliations and represent a cross-section of the economy, ranging from agriculture through manufacturing to services.

i. Operation of the Nigerian Stock Exchange

The NSE is regulated by the Securities and Exchange Commission which has the mandate of surveillance over the exchange to forestall breaches of market rules and to deter and detect unfair manipulations and trading practices. The exchange has an automated trading system. Data on listed companies' performances are published daily, weekly, monthly, quarterly and annually.

The Nigerian stock exchange has been operating an automated system (ATS) since April 27, 1999, with dealers trading through a network of computers connected to a server. The ATS has the facility for remote trading and surveillance. Consequently, many of our dealing members trade online from their offices in Lagos and all the thirteen branches across the country. The exchange is in the process of establishing more branches for online real-time trading. Trading on the exchange starts at 9:30 am every business day and closes at 2: 30 pm.

To encourage foreign investment into Nigeria, the government has abolished legislation preventing the flow of foreign capital into the country. This has allowed foreign brokers to enlist as dealers on the Nigerian stock exchange, and investors of any nationality are free to invest. Nigerian companies are also allowed multiple and cross border listings on foreign markets.

ii. The Role of the Nigerian Stock Exchange

The Nigerian exchange exists for the same reason that every other country's stock exchange does: To encourage and oversee the flow of income into Nigeria. The Nigerian Stock Exchange provides a stable platform for individuals and organizations that trade and invest their savings by purchasing shares. This controls the ebb and flow of money into the system by people investing to make a profit and therefore helping to beat inflation.

The Nigerian stock exchange also helps to increase the market capitalization of companies. This increases economic growth and also helps to make the companies grow stronger, all of which contributes towards a better economy.

The main goal of a stock exchange is to assist traders in trading company stocks and any other securities. It can also allow issuing and redeeming

different securities. Therefore, any stock exchange is extremely important for their particular company because they hold a lot of responsibility when it comes to the country's economy. As well as being responsible for the redistribution of wealth and corporate governance.

The stock exchange also provides valuable investment opportunities for small companies from a variety of areas.

It provides a platform to the individuals and the organizations for trading and investing their savings through the purchase of shares. It moves money into the system. People invest to make a profit and to beat inflation. Increase in the market capitalization of the companies make them strong and help in the economic growth by providing employment and by production etc. if the circulation of money will stop then the money will be plunged in the hands of the people, the growth will be stopped, so the stock exchange plays an important role in the development of the Nigerian economy.

The stock exchange plays an important role in the economy by moving money into the system. People invest their savings through the purchase of securities for making a profit and to beat inflation. This makes a flow of fund into the economy. Increase in the market capitalization of the companies make them strong and help in the economic growth by providing employment and by increasing production etc. if the circulation of money will stop then the money will be plunged in the hands of the people, the growth will be stopped, so the stock exchange is very important in any economy.

iv. The Concept Of Random Walk Hypothesis

The randomness of stock prices was the result of an efficient market, concluded by more curious among the academic researcher's when asked about the economic process that produces a random walk. Stated below are the key links in the arguments.

i. Information is freely and instantaneously available to all market participants.
ii. Intense competition among market participants more or less ensures that market prices will reflect intrinsic values.
iii. Prices change only in response to new information; it is unrelated to previous information.
iv. New information cannot be predicted in advance of price changes which cannot be forecast therefore; prices behave like a random walk.

An understanding of the efficient market hypothesis introduced by Eugene Fama in mid-1960s will help us to have an adequate understanding of the random walk theory. The idea is that the intense competition in the capital market leads to fair pricing of debt and equity securities. This simply means that the market price of a security is an unbiased estimate of its intrinsic value. It is important to note that market efficiency does not mean that, the market price of

security equals its intrinsic value at every point in time. All that it says is that the errors in the market prices are unbiased. This brings to our knowledge that the price can deviate from the intrinsic value but the deviations are random and uncorrelated with any observable variable. The question that comes to mind is that, if the deviations are random there would not be over or undervalued security. The efficiency or inefficiency of securities has generated a lot of controversies over a couple of decades in finance and economics discussions. The fundamental analysis tries to study the company's business by publishing various historical financial statements and hence uncovering information about its profitability that will shed light on the value of the stock. An efficient market hypothesis is an express tool that supports the assertion that the stock market leads economic activities since market efficiency ensures that past and available current information are fully reflected in current stock prices, and so, investors cannot usurp any privileged information as to beat the market and make an abnormal return.

b) The Theoretical Foundation

Eugene Fama, in the mid-1960s, introduced the idea of an "efficient" capital market to the literature of financial economics. He suggested that it is useful to categorize three levels of market efficient as weak-form, semi-strong form and strong form efficiency if prices reflect all information found in the record of past prices and volumes, all publicly available information and even private information.

The random walk hypothesis otherwise called the weak form of the efficient market hypothesis which this study is aimed to investigate states that current market prices reflect all the information contained in the record of past prices. In other words, all information conveyed in past patterns of a stock's price is impounded into the current price of the stock based on information about recent trends in stock prices the fact that the price of a stock has risen for the past two or four days will give no useful information as what today's or tomorrows.

The strong form of the efficient market hypothesis states that current market price reflects all pertinent information including everything that is known whether it is public or private. In other words, the security prices reflect everything knowable, anything that a host of investment analysts could uncover using all their talent and all the tools at their disposal. No group of investors has monopolistic access to information relevant to forming an opinion about prices as to make an abnormal profit. Under such circumstance, it would be impossible to search out any information that is not already discounted in the market price of a security (French 1986) thus, an investor cannot make a supernormal return regularly for over a long run since information will be equally available to all at the same

time. The implication is that tape watching, charting and professional investment analysis are insignificant, it cannot add any positive superior performance.

Encircled in the strong form hypothesis are both the weak and semi-strong forms. The semi-strong form hypothesis states that the price of any security reflects not only past prices of the security but also all available public information i.e. this includes information about the economy, political news or individual security and any publicly available analyses or estimates of future situations based on the raw data. This form asserts that all information, news release, economic data and so forth are fully reflected by each security price in the company's financial statements.

The effect is that investors will have no other available source of information that could lead to beat the market. Therefore, it is of no significance to study closely annual reports or other published data because the market prices adjust instantly to any sort of news carried by such reports or data.

c) The Empirical Literature

The original and analytical empirical work on the random walk theory was done by Louis Bachellier (1900). He was the first to point out that security prices and prices of other speculative commodities follow a random walk that is each price change, is independent of the previous price changes, therefore price movement is said to behave randomly. His study was not recognized until Holbrook working (1934) confirmed the same result. Cowls and Jones (1937) also produced the same result. Since then, the weak form hypothesis has been tested in hundreds of studies.

In 1953, Kendall examined the behaviour of weekly changes in 19 indices of British industrial share prices, spot prices for cotton in New York and wheat in Chicago. He found a successive arithmetic difference in British stock price averages to be largely uncorrelated.

Other studies in support of random walk theory include Roberts (1959), Osborne (1950), Alexander (1961), Moore (1962), Mandelbrot (1964), Fama (1965), Samuelson (1965), Mandlebrot (1966). Fama and Blume, (1966), Niedethoffer and Osborne (1966), Van Home and Parker (1967), Shelton (1967), Kemp and Reid (1971), Black and Scholes (1973). Jennergsen and Korsuoid (1975), Wan (1980).

Recently in Nigeria Samuels and Yacout (1981) conducted a study on the Nigeria data, they tested for several correlations at the weekly prices of shares in 21 companies quoted on the Nigerian stock exchange between July 1979. They found a trace of dependence with a one-week lag in only seven shares and a two-week lag in four shares. The absolute mean serial correlation coefficient was 0.146 with one-week lag and 0.086 with a two weeks lag.

The results of these tests support the theory that prices follow a random walk, which was the result of an efficient market. It is however unfortunate that their sample population represented only about 2/10 of the entire listed companies and as such their results were likely to be biased. The primary data for their study consisting of Monday closing prices of thirty shares recorded in the daily official list of the Nigeria stock exchange using both non-parametric test (waldwolfowitz test and the number of runs test) and parametric estimation test they concluded that prices of shares quoted in the Nigeria stock exchange follow a random movement.

Ayadi (1983) used non-parametric tests in testing the hypothesis that successive weekly price changes are independent. In a sample of 30 quoted companies on the Nigerian stock exchange over the period January 1997 to December 1980. His result also supported the random walk hypothesis. Ayadi's sample population seems encouraging, yet we will increase the sample to cover the entire sample from 1985-2009. Olowe (1999) using data consisting of an end of the month quoted stock price of 59 randomly period January 1981 to December 1992 on the Nigerian stock exchange and employing a sample auto-correlation test concluded that the Nigerian stock market appeared to be efficient in the weak form. Olowe's sample population though fair could be said to cover half of the quoted companies over the years and not the entire market or approximately the entire market.

Kukah, Amoo and Raji (2006) to represent the whole market, focused their study on market indices in local currencies rather than prices of individual stocks. In other words, they used the capitalization-weighted index of all listed stock, thereby using both parametric and non-parametric test in determining the efficiency of the Nigerian stock market. According to Kukah, Amoo and Raji, the results of the parametric test showed that prices of the stock on the Nigeria capital market follow a random walk while the non-parametric test showed prices of the stock on the Nigerian stock market do not follow a random walk. (I.e. there is a regular pattern). Discrepancies in their answers have left a researcher with little or no knowledge with an inconclusive result.

Okpara (2006) also carried out a study on stock market prices and the random walk hypothesis, he employed run test and the correlogram/ partial autocorrelation function, and the result showed that the Nigerian stock market is efficient in the weak form. For time lag and a different Instrument GARCH (1.1) that can handle volatility clustering, give a significant reason for recon ducting this study, taking a detailed empirical examination of the randomness of stock prices on the Nigerian stock exchange (1985- 2011).

III. Method of Study

a) An Overview

To model the conditional mean of a random variable, conditional variance, or volatility of a variable, ARCH model introduced by Engle (1982) and GARCH (generalized ARCH) by Bollerslev (1986) and Taylor (1986). These are widely used in various branches of econometrics, especially in financial time series analysis, which will be employed to investigate the randomness of stock prices on the Nigerian stock exchange. Using monthly data from CBN statistical bulletin on all share index from Nigerian stock exchange from 1985-2011.

The beauty of the standard GARCH (1.1) is that it captures the stylized fate of stock market volatility clustering, time-variant and nonlinear- ties in generating mechanism. There are several reasons to model and forecast volatility. First, to analyse the risk of holding an asset, or the value of an option. Second, to forecast confidence intervals, this may be time-vary mg, so that more accurate intervals can be obtained by modelling the variance of the errors. Third, more efficient estimators can be obtained if heteroskedasticity in the errors is handled properly.

However, the standard GARCH (1.1) model does not allow for assessment of asymmetric shock in the conditional variance. Engle (2001) argues that market declines forecast higher volatility than comparable market increases do. Autoregressive conditional heteroskedasticity (ARCH) models are specifically designed to model and forecast conditional variance. The variance of the dependent variable is modelled as a function of past values of the dependent variable and independent, or exogenous variables.

b) Models Specification

Basic Arch Specification: This entails three distinct specifications- one for the conditional mean equation, one for the conditional variance and one for the conditional error distribution.

The GARCH (1.1) model specification:

$$Y_t = X_t0 + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\text{equation (1)}$$

$$\delta_t2 = \omega_t + a\varepsilon2_{t-i} + \beta\delta2_{t-1} \dots\dots\dots \quad \text{equation (2)}$$

Equation (1) is the mean equation which is written as a function of exogenous variables with an error term. Since 8t is the one-period ahead forecast variance based on past information, it is called on conditional variance. The conditional variance equation specified in equation (2) is a function of three terms:

i. A constant term: ω
ii. News about volatility from the previous period, measured as the lag of the squared residual from the mean equation: $\varepsilon2_{t-i}$ (the ARCH term).
iii. Last period's forecast variance: $\delta2_{t-1}$ (the GARCH term).

The (1.1) in GARCH (1.1) refers to the presence of a first-order autoregressive GARCH term (the first term in parentheses) and a first-order moving average ARCH term (the second term in parentheses).

The distribution of series in this study are stated as non-linear (see table 1), the paper employed a stepwise approach, where the standard linear GARCH (1.1) is applied to capture randomness in terms of volatility clustering. The paper estimates this model using monthly date from the Nigerian stock exchange (NSE) from 1985-2011. The standard GARCH (1.1) model defines information set Ω_t of monthly price index to be (rp rt-q..,…. R1), which is:

$$r_t = \mu + \varepsilon_t$$

Where: $\varepsilon_t = \delta_t Z_t$, and Z 1.1.d (0, 1) ……… .. (1)

$$\delta2 = \omega + \delta\varepsilon2_{t-1} + \beta\delta2_{t-1}\dots\dots\dots\dots\dots\dots . (2)$$

is measurable concerning Ω_t, which is the monthly price index. $\omega > 0$, $\alpha > 0$, $\beta \geq 0$, and $\alpha + \beta < 1$, such that the model is covariance- stationary, that is, first two moments of the unconditional distribution of the return series is time-invariant.

IV. Results and Discussion

We present the results of our empirical analysis. Monthly data from the CBN statistical bulletin were obtained. Table 1 reports the monthly mean returns, Standard deviation, Skewness, Kurtosis, and Jacque-Bera statistics for the entire sample from 1985-2011. An examination of characteristics displayed in the table shows that the time series is highly volatile judging by the upward trend of the standard deviation computed. The data also exhibit asymmetrical characteristic, evidenced by fat tails, since the Kurtosis lie between 0 and 4, and in most cases exceeds 3 which is the normal value. Evidence of negative Skewness in some years, 1987, 1991, 1995, 1997, 2001, 2002, 2008, 2010, 2011. Other years have positive Skewness as proved by the study. The Jacque-Bera normality tests refute the normality of returns series throughout the periods of study. Hence the market exhibit strong autocorrelation and heteroskedasticity which is an indication of ARCH effects in the series. Persistence parameter for ASI $\alpha + \beta < 1$ shows that the GARCH is weakly stationary in other words, the mean is reverting, that is, no matter how much time it takes, volatility process does return to its mean. This demonstrates that past volatility does not explain current volatility, thus, the series exhibit a random walk process even though the volatility not highly explosive since the wald test $\alpha + \beta$ is less than one throughout the iteration.

This result, irrespective of its difference in a time lag, the volume of data and analytical approach, the result approve as correct the finding of Samuels and Yacout (1981), who employed non-parametric test on

weekly price changes, Olowe (1999) used sample autocorrelations on monthly stock prices, the parametric test of Kukah, Amoo, and Raji (2006), and Okpara (2006), employed the run test and the correlogram/partial autocorrelation function on market return to investors.

Table 1: Descriptive Statistics For Nominal Stock Prices In Nigeria (1985 - 2011)

VARIABLE	1985	1986	1987	1988	1989	1990	1991	1992
Mean	117.283	149.810	176.910	210.808	273.860	423.658	671.61	931.0167
Median	116.700	149.150	178.900	208.750	264.200	431.400	669.90	875.2500
Standard Deviation	4.65673	9.51208	17.8833	15.8503	26.0982	63.0883	83.7277	116.9601
Skewness	0.93303	0.12783	-0.1144	0.16590	0.71771	0.00663	-0.259	0.450855
Kurtosis	3.19082	1.92613	1.18040	1.5237	2.39923	1.45922	1.8957	1.591983
Jarque-Bera	1.75930	0.60927	1.6816	1.14467	1.21068	1.18709	0.7444	1.397796
Probability	0.41492	0.73739	0.43133	0.56420	0.54588	0.55230	0.6891	0.497133

VARIABLE	1993	1994	1995	1996	1997	1998	1999	2000
Mean	1229.025	1913.225	3815.117	5955.142	7638.592	5961.875	5264.192	6701.175
Median	1187.200	1916.600	3950.400	5859.050	7690.650	5854.550	5291.050	6683.700
Standard deviation	131.0577	154.4547	1148.862	651.8877	875.9848	293.5700	304.3034	778.106
Skewness	1.411915	0.260024	-0.125592	0.215286	-0.205598	0.573276	0.871851	0.28065
Kurtosis	3.871910	2.559352	1.322787	1.670799	1.583678	1.817277	3.524562	1.783007
Jarque-Bera	4.367124	0.232311	1.438069	0.976084	1.087526	1.356707	1.657829	0.898076
Probability	0.112640	0.890337	0.487222	0.613827	0.580560	0.507452	0.436523	0.638248

VARIABLE	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	10185.08	11631.87	15559.89	24738.65	22876.72	28101.58	48773.31	50424.71	23091.55	24735.02	23358.61
Median	10301.60	11554.70	14325.90	23809.40	22448.55	27098.30	50215.40	53650.41	21939.38	24906.35	24224.10
Standard	825.2689	636.6326	2501.964	2131.409	1563.053	4366.830	5924.436	11607.71	2854.859	1264.023	2483.831
Skewness	-0.394006	-0.232777	0.835207	0.803457	0.482077	0.120087	-0.617296	-0.478172	1.178488	-0.545592	-0.114061
Kurtosis	1.777707	2.037601	2.089403	2.214968	2.150245	1.207526	2.746030	1.928637	3.435323	1.909389	1.425923
Jarque-Bera	1.057482	0.571477	1.810070	1.599224	0.825838	1.635323	0.794358	1.031206	2.872419	1.190057	1.264879
Probability	0.589347	0.751459	0.404528	0.449503	0.661716	0.441463	0.672214	0.597140	0.237828	0.55147	0.531294

Garc 1.1: Volatility Coefficients For Return Series In Nigeria 1985-2011

MODEL	ARCH (1) (α)	GARCH (1) (β)	Wald $\alpha + \beta = 1$	ARCH (1) S. E	GARCH (l) S. E	Constant (ω) S. E	Constant (ω) Coefficient
1985	-0.089794	0.453434	0.363640	88.26376	562.7998	7014595	8953.913
1986	0.778548	-0.424924	0.353624	218.6557	291.1253	268077	1463.17
1987	0.243824	0.114047	0.357871	18.12019	65.40660	1841195	20535.22
1988	0.999048	-0.649485	0.349563	156.1162	161.7540	3880892	29035.79
1989	0.917783	-0.556419	0.359364	87.41596	88.44171	3316776	49157.75
1990	1271350	-0.510329	0.761021	107.7281	108.0729	7590227	47571.63
1991	0.996213	-0.606817	0.389396	71.75627	79.32382	15208405	278478.50
1992	1.027817	-0.676905	0.350912	67.16299	56.32632	28325404	571565.60
1993	1.705446	-1.522897	0.182549	61.41688	161.1630	2.18E+08	992060.7
1994	0.981883	-0.629840	0.352043	136.6063	184.4843	2.83E+08	2392434
1995	1.082651	-0.733248	0.349403	12.01195	7.525037	1.01E+08	10231917
1996	1.119459	-0.776488	0.342962	78.80864	81.40518	1.53E+09	23304617
1997	1.391017	-1.125328	0.265689	41.64561	17.68128	2.19E+09	38383466
1998	-0.100442	0.444839	0.344497	41.70405	145.6334	4.64E+09	23154921
1999	0.217033	0.130686	0.347719	42.92792	274.0507	7.83E+09	15067789
2000	0.834213	-0.460701	0.373512	76.97345	55.04424	21.60E+09	29549482
2001	0.749550	-0.397630	0.35192	146.1227	137.1219	7.18E+09	67834043
2002	-0.090444	0.446627	0.356183	49.56997	119.3448	1.33E+10	88186701
2003	0.934925	-0.564957	0.369968	41.54342	34.92298	4.77E+09	1.61E+08
2004	0.5927237	-0.254302	0.3384217	31.77094	54.62152	3.75E+10	4.01E+08
2005	0.929083	-0.569897	0.359186	90.67400	110.1302	6.01E+10	3.42E+08
2006	0.939776	-0.579942	0.359834	43.48525	29.82792	1.85E+10	5.25E+08
2007	0.791837	-0.431033	0.360804	48.39355	59.19201	7.31E+10	1.57E+09
2008	1.401078	-1.336196	0.064882	13.51903	12.52613	1.87E+10	1.73E+09
2009	0.569021	-0.320967	0.338054	40.81266	26.46616	1.99E+10	3.51E+08
2010	1.001098	-0.533519	0.054882	12.51903	11.43513	1.78E+10	1.63E+09
2011	0.541067	-0.230956	0.337044	32.66084	53.52152	3.76E+10	4.02E+08

V. CONCLUSION/RECOMMENDATION

a) Conclusion

In this paper, we have estimated a nonlinear GARCH model for monthly stock prices volatility in Nigeria. Data for the estimation of GARCH (1.1) model was obtained from the Central Bank of Nigeria statistical bulletin on Nigeria all-share index. The preliminary investigation into the nature of the data reveals that the data is characterized by a non-normal distribution with comparatively high standard deviation; one would expect high conditional stock market volatility.

Results show evidence of time-varying volatility a clustering which is an indication that the market is weakly stationary. We, therefore, accept the weakness from the efficient market hypothesis, in other words, the market exhibits a random walk process.

b) Recommendations

We recommend that:

i. Financial managers, investors, and other market operators can obtain greater insight into the management of their portfolios with the aid of this result.

ii. Investors should obtain more excellent perception and understanding of the stock market to improve their portfolio performance.

iii. Investors should not put absolute trust in any privileged information to bit the market and think of making an abnormal profit, which is a futile effort .

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Gender Division of Labour and Economic Autonomy of Women in the State of Minas Gerais and Brazil

By Dr. Denise Helena Fran a Marques

Abstract- The gender division of labour still remains today a disadvantage for women to achieve their economic autonomy. Responsibility for care giving tasks and the values associated with what is feminine and masculine build distinct places for men and women in society which, despite all the advances and achievements of recent decades, seem immutable. The aim of this work is to draw a picture of women's economic autonomy in Brazil and Minas Gera is from the relationship established between paid and unpaid work, based on the National Continuous Household Sample Surveys (PNADc) of the Brazilian Institute of Geography and Statistics (IBGE). The results show that the disadvantages faced by Brazilian women in relation to men persist in most inequality metrics and show that the possibilities of career progression and unrestricted access to the world of work remain associated with cultural values, discrimination and strategies of subordination.

GJMBR-B Classification: JEL Code: O10

GENDERDIVISIONOFLABOURANDECONOMICAUTONOMYOFWOMENINTHESTATEOFMINASGERAISANDBRAZIL

Strictly as per the compliance and regulations of:

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I. Introduction

In Brazil, since the 1970s, the pace of women's entry into the labour market has risen significantly. The capitalist restructuring in the post-war period and the Brazilian economic miracle (1968-1973), characterized by increased industrialization and urbanization, were important engines for the expansion of the labor force in the country, especially female labor. Guedes and Alves (2004) show the growing evolution of the participation rate of women above 10 years of age in the Brazilian labour market, based on the demographic censuses from 1970 to 2000. According to these authors, female participation increased from 18.5% in 1970 to 44.1% in 2000 - an increase of 138.3% over 30 years - while male participation declined from 71.8% to 69.6% over the same period.

This change in the composition of the Brazilian workforce can be explained by several factors: i) by the productive restructuring initiated in the 1990s that affected industrial employment with massive dismissal of men and, to a much lesser degree, of women, already little represented; ii) by the increase of the services sector, traditionally employer of female labor; iii) by the substitution of men for women, in works commonly thought for them; and iv) by the process of flexibilization of the labor market and precariousness of the labor relations, with increase of informality (Lavinas, 2001; Guedes and Alves, 2004).

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In fact, women have consolidated their participation in the Brazilian labour market by overcoming several formal barriers. Nevertheless, in the 21st century they still remain invisible walls, which are at the same time resultant and responsible for the gender division of labour and, consequently, for the horizontal and vertical occupational segregation of gender.

The gender division of labour leaves women with low-paid and less prestigious tasks and services, based on gender stereotypes that are further reinforced by responsibility for immediate and extended family care. According to Soares (2011), for business ideology, women's responsibility is still to help the family and not to provide it, that is, women's participation in the productive sphere remains secondary nowadays and their primary responsibility is with the care of the home and children.

This division constitutes a disadvantage for women to achieve economic autonomy as there is an overload of activities that directly affects their participation in the labour market and the way this participation occurs. Women's responsibility for caregiving tasks together with the values associated with what is feminine and masculine builds distinct places for men and women in society. In this sense, they are less available for the labour market and in many cases are more likely to have their careers interrupted by marriage, pregnancy, family illnesses etc. It is also important to stress that there is an interrelationship between gender, class and race in the configuration of these spaces.

The necessity to reconcile paid work in the market with unpaid work at home often obliges them to accept positions that require little or no training and/or professional qualification, but which because they allow such arrangements become the most appropriate, such as those with low pay, short working hours, which allow flexible hours and do not require overtime.

According to Soares (2011), autonomy can be physical, economic and decision making. For the author, economic autonomy, which is the object of this paper, is characterized by the capacity to generate one's own income, to control economic resources and to decide on material goods and family assets. It is a condition for the exercise of her power to make decisions about their lives.

The aim of this work is therefore to draw a picture of women's economic autonomy in Brazil and Minas Gerais, based on the relationship between paid and unpaid work, i.e. the relationship between work in the public (labour market) and private spheres (domestic chores and caring for relatives, the elderly and children, the disabled). To this purpose, the National Continuous Household Sample Surveys (PNADc) of the Brazilian Institute of Geography and Statistics (IBGE) will be used.

The article is divided into five sections, including this introduction. In the second, the structure of the labor market is analyzed, focusing on the evolution of participation rates, occupation and unemployment. The third section presents the characteristics and evolution of the population without income in Brazil and Minas Gerais between 2012 and 2019. The fourth section discusses the interfaces between women's economic autonomy and their relationship to unpaid work and care giving tasks. This is followed by a summary of the results.

II. Methodology

To analyze the autonomy of women in the labor market in Brazil and Minas Gerais, the Continuous National Household Sample Survey (PNADc) for the years 2012, 2014, 2017 and 2019 will be used. The evolution of the main indicators of women's economic autonomy and their interconnection with care activities and domestic tasks will be interpreted in the light of the results obtained annually. The indicators calculated include: i) characterization of the population without income; ii) participation rate; iii) type of insertion in the labour market; iv) working hours; v) care tasks; vi) unpaid work; and vii) income.

III. Preliminar Results and Discussion

The results show that the disadvantages of Brazilian women in relation to men continue in most inequality metrics. Despite women's achievements and advances in the productive sectors, still in the second half of the 21st century, their chances of career progression and unrestricted access to the world of work remain associated with cultural values, discrimination and strategies of subordination. In addition, there are difficulties in sharing family and caregiving responsibilities, i.e. women continue to be primarily responsible for domestic tasks.

According to PNADc, in 2019, 41 million women were employed in Brazil, 4% of whom held some leadership position, while among men the percentage was 4.5%. In Minas Gerais, there were 4.5 million women working and of this total 3.4% were in higher positions in the hierarchy of the labour market, while among men the percentage was 4%.

At first sight there seems to be a small difference in these occupational groups, but inequality is greater at the top than at the bottom of the social stratification. By way of illustration, on the whole, in 2019 women earned on average 21% less than men in the country, and in Minas Gerais, 27%. In the occupational group of directors and managers, they earned income equivalent to 68% of the usual monthly income of men in Brazil and 64% in Minas Gerais. In the group of elementary occupations, women's income was 93% of that of men in Brazil and 91% in Minas Gerais.

The data also reveal that, in addition to women being the majority of those without monetary income, in the country and the state there is a point of resistance in the social redistribution of care tasks over time. The proportion of women performing domestic or care giving tasks is considerably higher than that of men, and the intensity of these tasks is also higher for women. It was also found that women on some income devoted fewer hours to domestic chores or care giving, but the intensity of men's care giving doesn't change. The average weekly hours devoted to domestic and care giving work by women with some income was higher than that of men, even when they had no income. One of the most important highlights is that this structure changes little over time.

Finally, it is important to raise some points of reflection, even if preliminary, on the impacts of covid-19 on these dimensions of interest in the study. In principle, the restrictions imposed on the movement of people, goods and merchandise have a direct impact on the value of neglected jobs such as cleaning women, nannies, caregivers, social workers, nurses and primary school teachers, all of whom are mainly women. Some scholars are already calling for a new, more integrated, high-coverage care economy. But at the same time, the impact of the economic downturn may be greater or at least different for women as they are over-represented in more precarious and informal occupations.

On the one hand, women are essential in the fight against the pandemic because they are highly expressive in these occupations listed above, but on the other, they are disproportionately affected by the crisis (UN, 2020) since they have a more fragile and precarious insertion in the labour market; families headed by them tend to be poorer; there is still a high concentration of women in domestic employment; they are more affected by unemployment; they have less union presence and are concentrated in less organized segments of economic activity (Melo, 2005).

More than half of the people without monetary income in the country were women, especially black. At the same time, it should be noted that most of these women were fully dedicated to domestic or care tasks, but even those who are inserted in the labour market see their participation always negotiated with domestic responsibilities.

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Financial System Performance and Economic Dynamics

By Indrajit Mallick

Abstract- The firm is the driving force of the economy since the activities of the firms boost aggregate demand as well as aggregate supply but it is the performance of the financial system which facilitates or restricts the activities of the firms. Financial systems allocate resources from savers to investors and since these two groups have different liquidity-risk-return characteristics, financial institutions and financial markets have to issue securities and innovate to bridge the gap. The demand multiplier (together with the investment accelerator) and the credit cycle create a cyclic growth process which needs to be stabilized from context to context through rule based activist monetary policy and regulation when there are fiscal constraints. Inequality and imperfections of financial markets reinforce each other making policy innovations necessary but liberalization of the economy may go a long way in reducing inequality and poverty.

Keywords: firm, multiplier, credit cycle, financial system, growth, business cycle, inequality.

GJMBR-B Classification: JEL Code: D21, D31, D53, E32, E40

FINANCIALSYSTEMPERFORMANCEANDECONOMICDYNAMICS

Strictly as per the compliance and regulations of:

Financial System Performance and Economic Dynamics

Indrajit Mallick

Abstract- The firm is the driving force of the economy since the activities of the firms boost aggregate demand as well as aggregate supply but it is the performance of the financial system which facilitates or restricts the activities of the firms. Financial systems allocate resources from savers to investors and since these two groups have different liquidity-risk-return characteristics, financial institutions and financial markets have to issue securities and innovate to bridge the gap. The demand multiplier (together with the investment accelerator) and the credit cycle create a cyclic growth process which needs to be stabilized from context to context through rule based activist monetary policy and regulation when there are fiscal constraints. Inequality and imperfections of financial markets reinforce each other making policy innovations necessary but liberalization of the economy may go a long way in reducing inequality and poverty.

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I. Introduction

The basic question that a theorist of economic dynamics is confronted with is the following: what constellation of forces drive economic system dynamics? The next question is whether the same set of forces drives economic growth, business cycles and dynamics of inequality (and poverty). If that be the case, then how should one build a theoretical framework which can be analyzed such that questions about growth, cycles and inequality are addressed together? So far, theorists have mostly treated these phenomena separately for the sake of analytical tractability and only in recent times has the concern arisen as to their inter-linkages and possibilities of their integrated analysis.

As I will suggest in this paper, the theory of finance plays a key role in answering these queries since finance facilitates inter-temporal trade under uncertainty, information costs and transaction costs which leads to capital accumulation via contracts, institutions and markets. Second, given incomplete markets for risk sharing, money and other financial assets partially integrate the budget constraints of an economic entity which increases the scope for welfare or value maximization under inter-temporal tradeoffs. Third, finance determines the allocation of risk through dynamic trading in financial markets and dynamic portfolio management by financial intermediaries. All of these factors create a rich and influential structure of financial markets, financial institutions and financial instruments. The inter-temporal issues faced due to the role of time, uncertainty and transaction costs lead to a reliance on the principles of finance and their refinements. A method of analyzing institutions and markets which are constrained by information costs, transaction costs and policy is developed. These theoretical refinements critically examine issues not only pertinent to economic growth, but also allow explorations in the theory of business cycles and answer many queries on the dynamics of inequality and poverty.

This paper considers the relation between financial system performance and economic dynamics. This is a research report on theory. A good theory learns from the past, lives the present and influences the future reasonably well, and that is my purpose here. The kind of theory that the book builds up is a dynamic theory of the economy where finance, in a broad sense as the analysis of inter-temporal trade, plays a big part (see Smith (1776), Ricardo (1846), Mill (1848), Marx (1867), Jevons (1884), Fisher (1930), Wicksell (1936), Pigou (1912), Marshall (1923), Hayek (1935), Hawtrey (1927), Keynes (1936), Hicks (1939), Samuelson (1947), Friedman (1956), Hahn (1965), Solow (1970), Tobin (1980), Gale (1983), Romer (1986), Lucas (1987), Dornbusch and Fischer (1987), Cooper and John (1988), Banerjee and Newman (1993), Piketty (1997), Allen and Gale (2000), Lucas (2003), Tirole (2006), Allen and Gale (2007), Altug and Labadie (2008), Mishkin (2010), Modigliani (2011) and Woodford (2016)).

The economic system consists of families which may consist of working members, firm entrepreneurs, bank entrepreneurs and politicians in and out of the government apparatus. The economic system consists of networks aiding transactions in goods and factor markets. Markets in goods and labour clear by rationing while markets for financial assets clear by price adjustments in general. Fiscal policy, monetary policy and regulation improve welfare.

The economic system performance is judged by analyzing aggregate welfare which is a weighted sum of utilities levels of different individuals over time (where low utility levels receive higher weights and future utilities are moderately discounted). Since literally summing up utilities of different individuals over time is operationally not possible, some criteria should be used to evaluate aggregate welfare. First, poverty should be tolerably low and diminishing. Second, asset and income distribution should not be too skewed. The third criterion is that per

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capita standard of living should be high, not fluctuating too much and rising adequately fast over time.

The financial system determines how much spending can be done through firms and households which affect aggregate demand. The financial system also affects aggregate supply by influencing spending on capital accumulation and R&D by firms. The performance of the financial system determines how efficiently funds can be raised when the representative firm expects a high, durable and growing demand for its products. The performance of the financial system in turn, is determined by efficiencies in risk taking, risk sharing and risk management and efficiencies in liquidity provision by financial intermediaries and financial markets. An efficient financial system aided by suitable policy (see Tinbergen (1952), Friedman (1956) and Auerbach and Kotlikoff (1995)), generates robust growth, relatively low degree of fluctuations and promotes reduction in economic inequality. The firm is the basic driver of economic dynamics since investment spending and R&D boost growth on the supply side and employment generation boosts growth on the demand side. Fluctuations in spending drive business cycles. Employment potential created and lower entry barriers for entrepreneurs and workers in the industries reduce inequality in the long run. I assume it is possible to talk about a representative firm in an approximate sense. Then it becomes clear how economic growth, business cycles and changes in asset and income distribution manifests. The firm hires production labour, R&D staff and management staff, and it buys capital goods and other goods from other firms producing them. Thus more is spent on wages and investment goods. This raises incomes of individuals and institutions and these entities further spend on other firms. Thus a demand externality mechanism creates a multiplier (in cohesion with the investment accelerator) to the initial surge in spending and depending on the nature of performance of the financial system, it permits rational expansion or contraction in economic activity most of the times (see Lucas (1987)) but warrant policy interventions at other times.

An important question which arises when one confronts aggregate economic data and panel data is essentially the following: what are the disturbances or shocks that hit an economy at any date and how are the shocks propagated or transmitted throughout the economy (see Frisch (1933))? It is easy to see that some shocks are real shocks like those affecting productivity (caused by an endemic or a pandemic or a resource constraint or affecting ease of factor market transactions), tastes and transaction and information cost parameters. Other types of shocks are nominal in nature and manifest through unanticipated money supply growth, changes in interest rates, debt defaults, unanticipated changes in fiscal policy parameters etc. The transmission mechanism can vary like an effect of a

money shock taking place via changes in interest rates which in turn change investment spending, interest rate changes causing wealth effects and affecting consumer spending, technology shocks which changes the capital accumulation and employment plans of firms and so on.

II. THE FINANCIAL SYSTEM

a) Finance in a Dynamic Economy

Let me begin by defining a dynamic economy. A dynamic economy is one where different kinds of capital accumulation take place in different firms. By capital I mean physical capital, human resources and financial securities. By physical capital, I mean non-human produced means of production. By human resources I mean human capabilities of survival, production, saving, trading and consumption of individuals endowed with health and education services (see Sen (1985)). By financial securities, I refer to financial assets accumulated by financial intermediaries, households and firms which are claims within the economic system. These claims always cancel out in aggregate in the accounting sense except for outside money (currency in circulation), central bank bonds and government bonds (though some would not consider government bonds as net wealth). However, the distribution of the financial claims do not fully cancel in the contractual sense since there are always some debt defaults, bankruptcies and equity washouts and non-exercise of derivatives like options. The sequence of the financial claims generated as the combination of unrealized and realized claims in the contractual sense does matter for allocation properties of the dynamic economy. The government and central bank securities generated through objectives and budget constraints of governments and monetary authorities also matter.

Some may object to this definition of dynamic economy. Critics may argue that finance is just a veil even though a little complicated and mysterious veil. They can and do argue that the veil can be lifted by focusing on real variables in dynamic models insightfully. The critics of finance are satisfied with analysis of dynamic efficiency in the context of real growth models (see Azariadis (1993), Cass (1972), Burmeister (1980), Mas-Colell, Whinston and Green (1995) and Stokey and Lucas with Prescott (1989)). According to the critics, the fluctuations in aggregate activity like employment, income, wages and the real interest rates can be studied through the real business cycle models (see Brock and Mirman (1972), Kydland and Prescott (1982) and Lucas (1987)) and by dynamic stability analysis in real economic models (see Azariadis (1993)). Equity or fairness in distribution can be satisfactorily studied from social choice models without any financial parameters or variables (see Sen (1982)). According to the critics, finance is a theoretical nuisance in understanding dynamics because its use distorts

pure analysis and prevents reaching perfect conclusions.

I do not share the views of the critics. Finance would not have existed without a reason in our daily lives. Financial markets, financial institutions and financial innovations create value and that is why they exist and fetch positive prices. Monetary, banking and financial theorists of different schools have characterized this value generation process (see Fisher (1907), Keynes (1936), Patinkin (1965), Hahn (1984), Gale (1982), Freixas and Rochet (1997), Allen and Gale (1994) and Mishkin (2010)). One can also refer to the literature on risk sharing through financial innovations, the optimality of term structure of interest rates, dynamic portfolio theory, value maximizing financial structure, growth inducing financial asset accumulation, efficient nature of banking, value addition by financial intermediation, relative efficiency in fund management, optimal spanning under uncertainty, rational asset pricing, inter-temporal risk sharing through social security and bank reserves and informational efficiency of financial markets (see Eatwell, Milgate and Newman (1987), Huang and Litzenberger (1988), Allen and Gale (2000), Ross (2003), Duffie (2005) and Danthine and Donaldson (2005)).

However, the value generating process may display bubbles which creates financial as well as real instability, distort the allocative and informational efficiency of the growth process apart from creating inequitable redistribution of financial resources (see Geisst (1997), Michie (1999) and Hunter, Kaufman and Pomerleano ed. (2003)). Further, risky liquidity and credit management may create financial fragility and crises (see Allen and Gale (2007) and Bernanke and Gertler (1990)), and the general properties of financial market processes may be skewed for a long time over the time series and cross section leading to widening and persistent inequality (see Kuznets (1955), Stiglitz (1969), Greenwood and Jovanovic (1990) and Piketty (2014)).

There are three reasons why the dynamics of a financial system displays the undesirable properties described above. The first is "incomplete markets" or lack of full insurance in inter-temporal contracting and lending-borrowing programs over time. Many efficient projects cannot be undertaken due to incomplete markets and many inefficient projects get green signals. The second reason is "incomplete participation" or lack of ability to participate in important decision makings in institutions and lack of ability to play the financial markets game as a "privileged member". This causes "outsiders" not to participate in the financial markets, which keeps the market thin and volatile and inequality increasing in nature. The third reason is "contracting related problems" which increases the possibility of pervasive coordination failures creating aggregate instability (see Cooper and John (1988)).

Due to these potential inefficiencies there lies a positive value of liberalizing, stabilizing, redistributive and regulatory policies which are also basically financial in nature. The monetary, fiscal and regulatory policies can to some extent improve upon some outcomes some of the times (see Keynes (1936), Samuelson (1958), Tobin (1965), Diamond (1965), Blinder and Solow (1974), Blanchard and Fischer (1989), Dewatripont and Tirole (1994) and Viscusi, Harrington, Jr. and Vernon (2005)) but otherwise they do remain circumscribed and ineffective and even distortionary (Friedman and Schwartz (1963), Sidrauski (1967), Gale (1983), Lucas (1987), Barro (1974), Wallace (1981) and Sargent (1987)). Policies like pro-growth liberalization, balancing fiscal intervention, stability augmenting and investor protecting financial regulation, monetary stabilization of asset prices and aggregate fluctuations, and equity preserving policies of redistribution do have their flaws and demerits and cannot attain dynamic efficiency, stability and equity in the dynamic economy satisfactorily. Thus, the world of finance is admittedly a second best world, but no better alternative paradigm exists without fundamental changes in human nature, society and politics. Having made a first pass at the necessity of a paradigm of financial systems, I now proceed to logically explain the essential nature of finance and how the financial system works

b) The Nature of Finance

Economic events can be understood as allocation of savings, trade, finance and production inputs across agents like households, financial institutions, governments and the producers. Economic history of nations (at any point of time) can be understood as the sequence of a date-event pairs that reflects a social mechanism for allocating resources over space and time. The fundamental driving forces of such an allocation mechanism are the heterogeneity of individual circumstances like differences in preferences, endowments, information, technology, and capital across individuals over time and space and motives for maximizing wealth accumulation and lifetime utility of consumption. Taken together, all this implies a need for resource transfer across space as well time. Trade across time is essentially a contract involving the future resource flows in exchange for current and past resource flows. The theory of finance or financial economics studies this phenomenon and further refines it in a behavioural context. Finance itself is a discipline that studies the allocation of economic resources under uncertainty. This uncertainty can be symmetric in the sense that neither the borrower nor the lender knows whether the borrower will be able and willing to repay the same debt or it may be that the borrower knows the risk element better than the lender. Borrowing and lending is studied at the individual level, at the level of a particular market or at the societal level as a whole. The

role of finance in this sequence called economic history is called weakly essential if, there is some minimal heterogeneity among individuals across time that leads to atleast one type of financial asset (like money) being traded at all dates and having positive value. Clearly, very little heterogeneity is required to satisfy the essentiality of finance, posed in this way. In fact real world data would show much more variations in individual circumstances than that and would at every date generate many types of financial assets being traded, which leads to finance being strongly essential. Indeed when we look at the history of economic transactions, except those of the most primitive barter societies, there was always an element of contract for the future. And if we start from the ancient times of city-states, we certainly see the unbroken sequence of various types of contracts that are financial in nature.

Financial instruments, institutions and markets generate value adding activities like information production, screening, monitoring, risk sharing, diversification and inter-temporal smoothing. Without the support of financial contracts, financial intermediaries and financial markets there would be far less activity and much more inefficiency in savings, trade and production. Incentives for trading between economic agents some of whom are risk averse and the decentralized distribution of information and knowledge create the financial structure given the intrinsic uncertainty about borrower ability or incentive to repay and the transaction costs and benefits associated with such trades. Generally, risk neutral institutions insure risk averse individuals through risk sharing schemes embedded in financial contracts. However, as all futures markets cannot open to fully insure risk averse agents given information problems and transaction costs, the financial markets are imperfect. We briefly mentioned three problems in finance which cause misallocation of resources in financial markets and contracts. Now I turn to their causes and consequences.

Incomplete markets or less than full insurance for risk-averse agents entering into financial contracts arise due to moral hazard, adverse selection and transaction costs. Incomplete markets lead to financial market imperfections. These lead to strategic portfolio management, strategic trading of financial assets and strategic negotiations of financial aspects of contracts which affect the budget constraints of decision makers at every date. The economy is thus characterized by wealth accumulation through portfolio management, financial asset trading and financial contracting by strategic individuals and institutions. Borrowing constraints and liquidity constraints imply that the economic growth process is slowed down and the distribution of assets and income become more unequal over time.

Incomplete participation in financial markets implies that only a small fraction of the population holds assets traded in financial markets. This keeps markets thin and volatile. Liquidity provided by the financial markets is low and potential traders cannot be sure that if they want to liquidate assets in financial markets, they will be able to do so without a significant fall in the value of assets. Since thin markets react to asset trading significantly and with considerable uncertainty, financial markets are thus very volatile. Incomplete participation causes market thinness and volatility and in turn, these features of financial markets discourage new investors and traders from entering these markets thus reinforcing market thinness and volatility. Incomplete participation in financial markets leads to a high required return on an asset thus increasing the cost of capital for companies intending to issue securities in order to finance fixed capital acquisition. Those not participating in financial markets do not get a high return on their savings while those participating get a high risk adjusted expected return provided they diversify and choose portfolios prudently. This implies that the degree of wealth inequality increases considerably over time.

Contracting related problems arise due to moral hazard, adverse selection and due to unforeseen contingencies during contract formation stage (see Hart (1995) and Laffont and Martimort (2006)). These information problems lead to important role for the net worth and balance sheets of borrowing firms and individuals during credit contracts formation or renegotiation. A sharp drop in stock market leads to lower valuation of net worth and balance sheets together with the lower value of securities pledged by firms to banks while entering into credit contracts which can serve as collateral. As a result lenders become unwilling to lend. Further, firms and individuals are inclined to pursue risky strategies to recoup losses due to stock market losses and losses in operations and this makes lenders further disinclined to lend. A lower value of net worth thus leads to credit rationing, lower level of investment, a fall in economic activity and further fall in the value of assets leading to a further fall in net worth and thus creates a cyclical downturn in aggregate economic activity. The opposite happens when the value of net worth of firms and individuals rise.

c) Financial System Performance

The performance of the financial system can be judged by the efficiency in allocation generated by the transfer of funds from savers to investors with different risk-return-liquidity characteristics (see Mishkin (2010), Cottrell (1979), Kindleberger (1993) and Cameron (1972)). The financial system consists of financial assets or securities, financial institutions and financial markets. The financial system is heavily regulated to protect the investors and the institutions. How does the financial system work and how far does it achieve the targets of high level and rate of inclusive growth of output (with concomitant benefits for employment), price stability

(low rate of inflation) and rational asset valuation over time (with reduction of inefficient asset price bubbles)? In this subsection, I characterize the value generation properties of the financial system with respect to its components.

In the financial system, money plays an essential role and has positive value. This is because dynamic economies involve inter-temporal resource transfers like property transfer, goods transfer, renting and leasing, lending and borrowing and savings and investment, all of which needs a cash in advance or a deferred unit of payment acting as a medium of exchange and store of value while providing the socially useful role as an unit of account. This is the essential role of time in generating a demand for money in dynamic economies. But why is money demanded when other assets can be held which give higher return? There are three main reasons: the inconvenience of barter (see Robertson (1922)), possible illiquidity of other assets in a dynamic economy (see Hicks (1989)), and the fact that money is a relatively safe asset than others (see Tobin (1958)). How does money work in affecting output and prices? In the short run, increased money supply causes interest rates to fall, asset prices to rise and thus stimulate investment in all kinds of assets (in particular physical capital and real estate). This increases the nominal as well as the real value of national income in a generally recursively demand determined system with slow reaction of nominal contracts to increased money supply or increased money growth. However, in the long run (which maybe two to three years), increased monetary growth translates into a slightly lower rate of inflation than the money growth through a cyclic propagation mechanism (see Dornbusch and Fischer (1987)) with a much less impact on output and employment (this effect is still positive since higher money growth increases the investment spending and spending on R&D which positively affect aggregate supply).

It is also important to understand the role of financial intermediaries and financial markets in facilitating inter-temporal trade and in particular, that of capital accumulation. Investors generally entrust their funds to financial institutions and delegate the financial intermediaries to observe and regulate the value of their investments under conditions of asymmetric information and transaction costs. Financial intermediaries in turn, contract with firms to enter into credit contracts (commercial banks) or buy stocks in the financial markets (mutual funds, pension funds and insurance companies). Credit contracts boost demand as well supply and make for economic growth. At the same time, the deposit contracts insure investors against liquidity uncertainty and enhance savings and increases the money multiplier through a lower currency-deposit ratio. However, banks have to use their funds prudently since under a fractional reserve system (where reserves

are less than deposits), bank runs and failures can occur. Funds available to firms are used to buy labour and capital which in turn means that wages will be spent to boost aggregate demand while investment expenditure will promote growth through capital accumulation on the supply side and add to aggregate demand on the demand side. Expenditure on R&D implies further boost for aggregate supply and medium run and long run growth. Investor funds routed to financial markets through financial intermediaries like mutual funds, insurance companies and pension funds create a higher risk adjusted return on savings (through the expertise of the financial intermediaries in choosing value adding shares and in diversification of the portfolio of the investors) and lower cost of capital for firms which want to make value adding investments from time to time. Banks and other financial institutions and the financial markets ensure production of useful information and the necessary actions contingent on those information structures which lead to necessary and incentive compatible credit contracts and incentives embedded in delegated financial intermediation activity like liquidity provision, screening and monitoring and restrictions on activities due to risk management. However, as and when cost of funds increase and/or the information problems increase acutely, inefficient liquidity provision, credit rationing and fall in asset prices arises to a significant degree. To some extent this can lead to welfare losses and output loss.

It is important to understand the nature of financial markets and the costs and benefits of dynamic portfolio management and dynamic trading in financial markets and financial innovations in general equilibrium and disequilibrium under transaction costs and complex risks. Individuals and financial institutions try to maximize expected portfolio value at any point of time and if selling an asset from the portfolio or buying a new asset increases portfolio value, then selling or buying occur. In a market with heterogeneous traders, continuous buying and selling occur and prices of traded assets keep moving up and down. Markets are information-efficient if all kinds of relevant information are taken into consideration in financial asset portfolio construction at every date by every trader. The inverse of the gross rate of interest is used as the discount factor when the present discounted value of an asset is computed. When expansionary monetary policy reduces the interest rate, higher cash flows are generally anticipated and the value of an asset increases and cost of financing the asset purchase declines which leads to a higher demand for many types of assets. The converse happens when contraction in monetary supply takes place. Thus credit driven bubbles are possible under uncertainty. When the economic growth process is stagnating, easy money policy can generally ensure that credit driven bubbles are created (through increase in the value of collateral and expected increase in cash

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flows from different assets directly affected by easy money policy) and sustained, until economic recovery occurs sufficiently. However, excessive reliance on such bubbles to promote economic growth can be costly as the bubbles can burst and reduce investment spending and cause illiquidity and insolvency to many important participating institutions and individuals.

In dynamic economies, different kinds of financial innovations are needed in order to optimize the efficiency of production, facilitate trade and smooth consumption paths. Risk taking for high growth activities need to be protected by risk sharing arrangements and capital cushioning. Stability in the small and large contexts needs to be addressed through provision of reserves and stabilizing instruments. Inequality in different forms needs to be anticipated and tackled by risk sharing contracts which may be completely financial or also complemented by social risk sharing devices or political alliances for lobbying over resources. There are many impediments to forging such contracts like the costs of proper assessment of risks and the costs of information on the variance and covariance of risks of securities in different portfolios, cost of getting together and search for the ideal contractual partner, costs of making markets, costs of trading, bargaining costs over the terms of the contracts under different imperfections (like incomplete information, behavioural inconsistencies), costs of commitment, costs of information acquisition, cost of credible information transfers, costs of contract drafting and understanding costs, costs of verifying to courts and so on. So first, we need to understand such contracts from the perspective of transaction cost economics. Debt contracts together with periodic auditing arise due to verification costs, commitment costs, signalling costs and costs of transfer of control. Equity contracts exist because of costs of risks which need sharing, costs of issuing debt like bankruptcy costs, costs of not sharing control rights etc. Financial derivatives like options and futures are used for hedging risks and can promote the growth process under conditions of severe uncertainty. Rental contracts are partially financial due to cost of monitoring, enforcement costs, eviction costs etc. Employment contracts are financial because of credit rationing phenomena in the generation of wage bill, structural properties of the economy and contractual incompleteness and limited participation.

Financial innovations by governments through the issue of securities and taxation should also be considered as part of the financial system. Public debt and taxation are part of the financial system because of the need for government expenditure for stabilization, growth and equitable transfer system. Apart from these normal functions in public finance, there are also additional contingent functions like strategies for resource mobilization during war or other kinds of emergency, post-war or post-emergency reconstruction and for maintaining peace through expenditure on various items externally and internally.

Financial regulation is aimed at negotiable instruments, financial institutions and financial markets. The law relating to negotiable instruments indicate which types of promissory notes, cheques and drafts are valid for issuance and the transfer of possession. Banks are regulated through capital requirements, liquidity requirements, deposit insurance, asset restrictions and information disclosure requirements. These raise the cost of operating a financial intermediation business and raise the lending rates thus increasing the already existing problems of adverse selection and moral hazard. Thus, there are tradeoffs in regulation of banks and other financial institutions. Financial markets are regulated through restrictions on transactions, restrictions on assets and information disclosure requirements. These are meant to protect the investors who do not have the time or the expertise to monitor their financial market transactions in detail.

In dynamic economies, contractual structures, profits, incomes of different segments of society are generally changing due to real as well as financial reasons and changes manifest in forms of real as well as financial changes. The causes are not well understood. In this paper I shall characterize a paradigm where these causes-consequences chains can be understood better. This will lead us to a better discussion about positive and normative analysis. This will lead to a more refined understanding of economic dynamics in a complex world and shed new light on dynamic efficiency, stability and distributive fairness.

III. THE THEORETICAL FRAMEWORK

The financial system is the core of the economy as it generates inter-temporal contracting over different kinds of resources. A Financial System is a system of borrowing and lending and repayment and renegotiation of debts of different kinds. It is a structure that generates financial transactions represented by debts (in various forms) and credits between participating individuals and institutions in an economy that is revised at the end of every period by means of new payments and new explicit and implicit financial contracts. It represents on one hand the financial structure of the components like households, firms, financial intermediaries and governance cum regulatory frameworks and, on the other hand, the contractual relations and markets between the components in various manifestations. In general it is suitable to classify financial systems as bank oriented or market oriented (see Boot and Thakor (1997), Fabozzi, Modigliani and Ferri (1998), Clark (2000) and Allen and Gale (2000)).

A financial system has two pillars: the law and the accounting framework. Law defines and protects the system of property rights which is the basis of private

ownership economy. It also regulates the contractual structure of the economy and defines what debts are binding, in what form, and between which parties. The accounting system provides the guidelines for evaluating economic transactions, measures debts and defines the viability of financial claims by recording the assets and liabilities in balance sheets and by recording income in profit and loss accounts of economic agents and institutions.

The financial system comprising of families, networks, institutions and markets generates the structure of trade, production and consumption. Savings are allocated through intermediated structures like financial institutions and markets. Financial system allows risk taking, risk sharing, diversification (through portfolio management), risk management and inter-temporal smoothing of income and consumption. The risk-return-liquidity characteristics of financial claims determine the performance of financial systems.

There are several actors belonging to different families in the stage and they interact within a financial system where they take decisions given economic system history and rules for formation of reasonable expectations. History creates and recreates date-event pairs in many guises. Individuality of families is preserved through recurrent attempts to advance in terms of lifetime utility maximization in each family. Competitive process leads to innovations in markets and institutions and paths are created for self-selection in different contracts offered by different institutions to individual members of different families.

There are many families at each foreseeable date. Some families are political in nature, some are in control of financial intermediaries, some are those of entrepreneurs who manage firms, while the rest remain simple households whose starting earning members are workers. All families face simple and complex constraints and try to maximize family welfare over time. The household supplies labour services. There is incomplete participation in the sense that a worker who is a household member may have little influence on financial markets and decisions in institutions like firms, financial institutions and other government and non-governmental organizations. The entrepreneur is constrained in his decision making by market circumstances, corporate mission, the board of directors and the labour union. The banker is regulated by the monetary and fiscal authority and has limited decision making power. The average worker earns a limited income and invests little in financial markets where he is constrained by information and trading strategies of insiders. The entrepreneur tries to raise money from banks and the financial markets and normally does not invest in his professional capacity. The banker may invest in the financial market if not restricted in different ways and even if not restricted, may invest only a modest amount because of the lack of

liquidity and lack of "normal" high in the financial market. Only those individuals having a wealth above a threshold invest heavily in financial markets because they become privileged members or insiders and earn high returns due to the presence of increasing returns like fixed costs of acquiring information on assets. However, there is increasing though structurally determined cycles of socio-economic mobility of economic agents between these families and institutions and I shall discuss them in detail below. Political families play the financial market games as per political motives and under ideological and democratic constraints.

Before discussing the different types of families, I shall describe the "social network" in a financial system. Each of the household members are either unconnected or connected to some members of political, entrepreneur and banking families and this increases their relative chance of getting an government or institutional job or getting bank loans for different investment or consumption purposes. Entrepreneurs in firms are connected to different financial institutions which increases their ability to tap financial resources for their businesses. Political family members are connected to all other families though relative strength of social relationships varies. Note that connections may vary in social quality with reciprocal likings, bondages and distances between any pair of members from different types of families. Also note that initial connections and social networking may lead to a more dense set of connections resulting in complex social relationships. All these affect the search costs and information about jobs, access to funding in financial markets, business opportunities and the relative influence of individuals, families and institutions. The social network is especially important for the members of political parties who search for prospective voters, potential party members and supporters, and try to influence voters with party positions on different social, economic and political issues.

There are a certain number of families whose members are mostly devoted exclusively to political work and related to the different political parties. I shall call them "political families". Political parties define themselves on the basis of ideology, certain traditions and visions consistent with ideology and traditions. Political families engage in political arguments in the public sphere, lobbying, periodic political campaigns (especially prior to elections), and campaign fund raising activities. Members of political parties search for influence opportunities and resource raising activities in social networks.

There are a certain number of households or working families to start with, and each household has some initial old (retired) members, some working members and a number of children. Household members provide work effort, earn wages, consume commodity bundles at each date, and save a part of

their wealth in the form of various financial assets like money, stocks, bonds, mutual fund units etc. Households can also borrow against uncertain future income and wealth subject to debt constraints imposed by banks. At each date, a household member is already employed or not employed in any previously chosen job and he either gets no job offer or a single offer (without loss of generality, since multiple offers could be ranked uniquely) of a contractual job at each time t where the contract offered by a firm consists of a starting wage, job description, an implicit promotion profile and the duration of the job. If there are high switching costs in transition between states like unemployment to new job or existing job to new job, then a job offer may not be taken. Note that a household member, after working some time as a worker in a firm or in a financial intermediary, can decide to become an entrepreneur in a firm or a financial institution if she has the expertise and can mobilize the resources to start the business and if she earns a greater lifetime income that way. Poor members of the household are either unemployed with insufficient assets to tide them over the medium and the short term, or workers who earn very low wages as in the informal urban sector or in farm employment in less developed rural neighbourhoods.

Firms are value maximizing or discounted profit maximizing over the entire life span of the firm (I omit not-for-profit institutions for simplicity and without much loss of generality). In order to avoid myopic decisions and waste, an entrepreneur of a firm is allowed a fairly long and sometimes an open horizon contract. While the management of a firm is in the hands of the entrepreneur so long as she is in the firm (though she may also indirectly contribute to the future of the firm even after departing by virtue of setting of the firm at a good or adverse path), she is subject to constraints influenced by different kinds of stakeholders like the government, board of directors, shareholders, labour unions, non-union workers, buyers, suppliers etc. Subject to all the different constraints, the entrepreneur maximizes firm value. She decides on the buying and selling of securities, on the employment of production workers, R&D workers and managers and she sets wages, prices, R&D determined qualities and product differentiation and decides on the quantities of raw materials, consumption goods and investment goods to be purchased. At each date, the firm faces three budget constraints. The first budget constraint states that the value of the wage bill (of all types of workers) plus the value of all non-investment goods purchased must be less than or equal to the amount of bank borrowing plus available internal funds earmarked for such expenditure. The second constraint states that the amount of bank borrowing is less than or equal to the value of securities pledged as collateral. The third constraint states that the value of investment expenditure is less than or equal to value of net issue of securities plus the availability of

internal funds earmarked for investment expenditure. There is a pecking order: internal funds being cheaper (due to agency costs of external financing) are used up first in each budget constraint. Now I briefly describe the technology of the firm. There are diminishing returns to factors with (stochastic) constant returns to scale and increasing marginal cost and a fixed cost. Production and R&D takes one period. R&D stochastically increases worker productivity (of all types of workers but differently), improves quality of the finished product produced by the firm and sharpens product differentiation. The firm has a conjectured demand function based on past experience and given the cost structure, it determines a price which is an optimal mark-up over the cost (expected marginal revenue being equated to current marginal cost with maximum value added to lifetime operations) and attempts to produce an output which is expected to be demanded at that price. It also determines an inventory policy based on the marginal cost of accumulating inventory relative to the marginal cost of production. It is important to note that management is not only mechanical optimization routines but also proper planning of strategy and control, communication and coordination, supervision and general human resource management practices. Management vision, motivation and ability to seek rents and skills (see Milgrom and Roberts (1992), Hart (1995) and Allen and Gale (2000) may vary from one entrepreneur to another. If there is an entrepreneur with better vision and management skills in the same type of industry, and if the market for corporate control works well, then entrepreneurship can pass over to the new entrepreneur. Otherwise, the incumbent entrepreneur enjoys some rent in the form of cash flow diversion and perks which she can maximize without being subject to exit induced by firm stakeholders. When an entrepreneur exits her job due to insolvency, takeover or a better opportunity somewhere, I assume that she either joins the workforce as a senior manager given such an opportunity, or starts a new enterprise if she has the relevant vision and can mobilize resources. Which option she takes depends on different feasibility constraints and relative monetary and non-monetary payoffs.

Financial intermediaries mobilize savings from households and other units in the economy with financial surplus and invest the funds generated in financial assets of different kinds. There are different kinds of financial intermediaries like commercial banks, investment banks, mutual funds, pension funds and insurance companies (see Sayers (1967), Carosso (1970), Freixas and Rochet (1997), Bhattacharya, Boot and Thakor (2004), Thakor and Boot. (2008)). Commercial banks mobilize savings as deposits which are partly set aside internally as reserves. Some of the deposits are lent to firms for funding the wage bill of the firms and for funding the non-investment goods

expenditure of firms. The rest of the bank deposits are invested in different financial assets within the regulated permissible limits. Investment banks generate fee income from underwriting of securities and earn profits from financial asset trading, securitization, financial engineering and takeovers and mergers financing. Mutual funds issue claims to fund profits in different kinds of portfolios and fund managers engage in continuous active portfolio management to increase fund value and management returns. Pension funds use funds generated periodically from lifetime savings for generating retirement income by investing in different financial assets and engaging in active portfolio management in a conservative way. Insurance companies collect insurance premiums periodically and manage portfolios of financial assets so that they can maximize value subject to be able to meet the insurance claims.

A commercial bank manager collects savings and provides liquidity through deposit contracts. He usually tries to maximize deposits while at the same time ensuring that there are enough as reserves to meet uncertain liquidity demand under various contingencies (an extreme example would be a bank run). Investors want to lend for a relatively short term in safe assets while firms usually want to borrow for long terms for risky undertakings. This mismatch is avoided by the commercial bank which borrows short and lends long and absorbs and manages risks. This value addition by the bank is known as term transformation, and the resulting risk due to asset-liability term and interest rates mismatch is taken care of through suitable reserves management, market risk management and liquidity management policy contingent on information on depositors, firms and economy. There are other instruments as well which give flexibility in bank liquidity management policy (the call feature of bank loans is one example). A bank generally has a historically acquired comparative advantage in some lines of financing (tea, auto, chemicals, construction, utilities, hotel chains etc) and focuses on the areas of comparative advantage but also engages in other areas for the purpose of portfolio diversification. Credit risk management requires charging high rates of interest apart from requiring high value collateral and covenants. But high interest rate also attracts borrowers with low ability (adverse selection) and little intention to repay (moral hazard) which requires the optimal interest rate to be "not too high". There are also other risks like interest rate risk, default risk, operational risk and insolvency risk that a commercial bank faces and tries to manage through keeping loan rates indexed, requiring high value collateral, having proper control, communication and supervision along the bank management hierarchy and by screening borrowers and buying "bankruptcy insurance". Investment bankers process information about clients and financial markets and provide advice

and fee based services on evaluation based on such information processing. They also produce value adding financial products and services and engage in securitization and trade of stocks, bonds, options and futures. Asset management companies take risks according to returns associated with such risks and subject to constraints on risks demanded by their very nature. Generally speaking, insurance companies and pension fund companies take less risk than mutual funds relative to volumes traded and portfolio size. Risk taking increases with signals about good prospects of financial markets and the economy, the skills of the management team in charge of active portfolio management and with the increase in the quantity of reliable information prior to trades.

At the end of each government election period, political power is allocated among political parties in the executive office and the parliament. One member from a political party is elected for a fixed term as the chief executive in government and with the help of a selected team, has to take political, economic and fiscal decisions under some budget constraints. The chief executive in government also chooses the executive of the central bank of the economy. The central banker is responsible for monetary policy. Apart from taking political, economic and fiscal decisions, the government also has regulatory institutions for different industries. The judiciary and legislature also regulates economic and political activity by interpreting and making laws.

Government manages fiscal policy, financial restructuring and regulation subject to budget constraints. Governments try to maximize social welfare using subsidized short run welfare programs for unemployment insurance and poverty alleviation and for reliefs in emergencies, running long lived welfare programs like social security, by managing strategic public sector assets and by regulating industries. Welfare programs are targeted to individuals as well as groups and ensure approximate optimal accumulation of different types of capital. For example, optimally designed social security programs prevent over-accumulation of capital in developed economies while deregulation and liberalization policies ensure that under-accumulation of capital in less developed economies is countered. Government expenditures on such programs are financed by surplus from management of public sector, systems of direct and indirect taxation, public debt and monetization of deficits. Public debt is a burden imposed by the current generation on the future generations (see Auerbach and Kotlikoff (1995)). However, repayment of the debt can only be done through taxation on the future generations which cancels out the welfare gains as ingeniously argued by Ricardo (1846) (and later formalized by Barro (1974)). Recourse to future monetization to meet the debt does not cancel the debt but only changes the composition of the debt by generating what is known as

an inflation tax. However, public debt can lead to better risk sharing among generations since unlike private securities, it is a safe asset (see Allen and Gale (1994)). Historically, financial revolutions led by public debt issues were successful because they introduced a safe asset in a risky market environment with incomplete opportunities for risk sharing. This aspect of the financial revolution continues to be perfected in developed as well as developing parts of the world to raise intergenerational welfare by management of debt through optimal timing of retirement and reissue of debt keeping in view the different considerations like minimizing the cost of capital, implications on economic growth and stability and the mobilizing of public savings.

The monetary authority manages liquidity injections and withdrawals through debt repurchase contracts. Monetary authorities generally operate through reserve requirements, discount window lending based on mechanisms to maximize revenue subject to welfare maximization and open market operations altering the composition of money and bonds in the financial asset base. While fiscal policy is supposed to take care of concerns about growth and equity, monetary policy is supposed to take care of stabilization of the economy along the warranted growth path and generate the optimal combination of inflation and unemployment rate. Nowadays the monetary authorities are also entrusted with regulating asset bubbles. The monetary authority has to maintain a diversified portfolio of important currencies including a sizeable portion of reserves of the home country to counter exchange rate risks and possible runs on currency.

Regulation takes the most obvious shape in fiscal and monetary policy. Fiscal policy manoeuvres affect growth and redistribution and sometimes the stability. Monetary policy tries to regulate the inflation and asset prices around the natural rate of unemployment. Regulation of households takes the form of tax and social security benefits (broadly defined). Firms are regulated by license requirements, information disclosure requirements, and by regulation of prices, quantities and qualities. Financial intermediaries are primarily regulated through liquidity, capital and information requirements. Financial markets are also subject to various information and transaction related requirements.

Next I describe the markets in a financial system. The goods market is characterized by imperfect competition. At any date in any industry, depending on the difference between expectation of quantity demanded and actual demand, the consumption goods markets clear through rationing based on the minimum of quantity demanded and the available stock of goods (inventories accumulate at a certain rate relative to optimum prompting changes in production and inventory policy). The capital goods allocation is determined through demand from the consumption goods sector and determined by bilateral bargaining and contractual negotiations. The labour market at any date in any industry, is characterized by the minimum of the net demand for labour (determined by both new hiring and retrenchment) as a function of demand expectations in the goods markets and on the supply side, by the segment of the labour force searching for jobs and willing to work only at the wage schedules offered through contracts. Thus, there is a combination of search unemployment and involuntary unemployment. Now I come to financial markets. There are four main types of such markets: the market for bank credit, the (short term) money market, the primary market and the secondary or stock market (where stocks, bonds, futures and options trade). Bank credit contracts are determined by commercial bank risk management, bank competition, competition for funds among borrowers and the macroeconomic environment. Given client differentiation and discretion in decision making, one finds a host of phenomena like pro-cyclical credit, credit rationing, preferential loan commitments, retail market loan pushing and interest rates indexed to key market rates. The money market allocates short term funds or liquidity as per financial institutional needs and various "short term papers" are traded in exchange. Given different information structures and individual circumstances, repeated trading of financial assets determines asset prices over time. In primary markets, stocks of securities made available for sale (through underwriting by investment banks) are greater than demand in low phases of the secondary market and exceeds demand during high phases. The quasi-walrasian secondary market provides liquidity for investors and determines the wealth of a nation through allocation of savings in different types of financial assets. The secondary market performance depends on the changing structure of information about fundamentals of risks and returns and is influenced by traders who affect the liquidity of the market significantly.

IV. FINANCIAL SYSTEM PERFORMANCE AND ECONOMIC DYNAMICS

I am interested in the laws of economic dynamics and the origin and distribution of individual welfare in dynamic economies. Prudential regulation is of great importance due to many reasons. First, there are departures from dynamic efficiency due to incomplete participation, contracting related problems and incomplete markets for risk sharing. Second, the economies are financially fragile and unstable. Third, inequality persists (and sometimes increases) in the dynamic economies. Fourth, social justice and individual welfare usually remain far below the maximum, being subject to different kinds of welfare distortions and various other market and institutional constraints. Financial system performance and policy measures

required are central to all these problems. I shall present the most important issues to be examined and deal with positive and normative questions (see Gale (1983), Mishkin (2010) and Mallick (2020)).

a) *Dynamics of Families and Institutions*

Given the governance mechanism, the basic components of the financial system are households, firms and financial intermediaries. I give a preview of the dynamics of families and other institutions. Poor families in poverty traps struggle to provide basic consumption and investment goods including health and education to family members and especially children. Circumstances and strategies help only some of the families to get completely or partially out of poverty traps and provide a better future for the children. Governments may provide subsidies and welfare schemes to periodically lift certain sections of the poor families out of poverty traps. Subsidies can cover basic consumption and investment expenditures, subsidized loans for value addition to human capital like education, health services, high value informational services for increasing productivity, literacy, ability to handle bank accounts and learning about better occupational opportunities etc. The middle class and the rich pay taxes which finance these subsidies and prudential regulation warrants a high welfare achievement of these fiscal programs relative to the opportunity cost of funds to tax payers. Middle class families try to ensure that children get quality education, good value systems and family guidance to become productive in chosen occupations and independent and adaptable to confront and utilize the complexity of the economic system like climbing the corporate ladders fast given contractual and organizational setups, provide leadership in chosen occupation, become entrepreneurs or managers in financial intermediaries and develop ability in managing their family lives well. Firms and financial intermediaries try to ensure value maximization under all contingencies and control of the institutions by family members as long as family members are able to provide high quality services to their institutions. New firms and entrepreneurs come with technological innovations and changes in management technology. New entrepreneurs also bring new strategies of value maximization and quality in operational management. Financial opportunities like greater likelihood of obtaining bank loans for starting new businesses, possibility of raising capital through investment bankers or from venture capitalists and value adding financial innovations also unleash the latent entrepreneurial talent in the economic system. New methods of risk management lead to better performance in financial intermediaries while failures of excessively leveraged and highly illiquid institutions lead to financial turmoil. Prudential regulation requires that high value technological and financial innovations are encouraged and marketed through suitable institutions and markets but excessive risk taking and corrupt financial practices are discouraged through various rules and discretionary regulations. However, due to adverse selection and moral hazard it is difficult to keep high risk taking and corruption in check.

b) *Market Processes*

I also focus on the dynamics of markets or the "market processes". The dynamics of goods markets, labour markets and financial markets are studied separately as well as together as "integrated market processes".

i. *Dynamics of Individual Markets*
Dynamics of the Goods Markets

As described in the previous section, the goods market is characterized by imperfect competition. The imperfect competition essentially means that that there is a schedule of expected demand based on the choice of prices, quantities and qualities faced by a firm at any date. Thus at each date, each firm in any industry sets a price, the levels and composition of employment between different types of workers and the amount of investment expenditure.. At any date in any industry, depending on the difference between quantity supplied (through existing stock and quantity produced) and actual demand, markets clear primarily through rationing based on the minimum of quantity demanded and the available stock of goods. Inventories accumulate or get depleted at a certain rate relative to optimum. In the goods market, prices do not necessarily change over time with growing excess supply or demand as firms are also tied by other considerations like cost of inputs, the quality signals of prices, competitive pressures (like threat of losing market share by raising of prices and less than competitive profit in reduction of prices) and expected changes in demand. But if there is a permanent change in demand, then over time, firms begin to revise their price schedules. But these price changes are dependent on industry wide distribution of prices and the wholesale price indices.

Investment goods are produced through market based transactions as well as repeated contracts. Standardized but differentiated investment goods are transacted through the goods markets by bargaining over contracts. Plants and machinery with specific features are transacted through contracts between producers. Investment goods are most volatile. The reason is that macroeconomic shocks lead to consumption smoothing that is sustained by changes in the pattern of capital accumulation. Also, animal spirits based factors leads to frequent perceived changes in the marginal efficiency of capital and leads to unstable demand for investment goods over time which may or may not be accommodated by financial markets. However, if bankers share the animal spirits of entrepreneurs, then asset bubbles may take place from

time to time and end with significant adverse consequences.

If there is a permanent change and growth in demand for quality products, then over time, firms begin to increase production by hiring more production workers, by hiring more R&D staff and by hiring more management staff, provided bank borrowing constraints do not bind. As mentioned before, these expenditures boost aggregate demand as well as aggregate supply. Moreover, there is a multiplier operating as increasing expenditure by firms with higher demand growth leads to higher incomes which are spent partially on the products of other firms. But firms may be averse to R&D and usually running with idle capacity. Thus firms are more short term oriented as a result of which the medium term and long term growth suffers. Regulation through legal institutions, fiscal and monetary policies that takes the goods markets towards an optimal path is an issue. If regulation is uniform and provides incentives for R&D, if taxes are low and selective investment tax credit is available and if growth of the money supply is accommodative of economic expansion and reduces the interest cost of borrowing from banks and financial markets, then goods markets develop and grow sufficiently.

Dynamics of the Labour Market

In order to understand the dynamics of the labour market, it is important to understand the following two mechanisms: (i) the search process in the social network whereby employment and unemployment occurs (ii) the different aspects of labour contracts. Lastly, an integrated analysis of these two mechanisms gives us the correct insight.

Let me first outline the search process. For an individual, the probability of getting a good current wage offer, a good future wage offer given job search and a possible low probability of retrenchment are related to his connections in the social network. In the social network, the employers post wages among their connections. Employers face a high benefit of hiring given low hiring costs under high unemployment and depending on expected demand for goods. At any date, a potential worker is confronted with a maximum wage offer. There is a positive probability of being retrenched at every date. Search is time consuming and a substitute for working. Therefore, at any date, the individual either accepts the wage offer and works or engages in search. The potential worker has two possible (starting) state variables. He has a historically given savings and liquidity profile. The potential worker has to take the decision of accepting the maximum wage offer (which may also be null) or searching for a better job in the future. His reservation wage equates the value of acceptance to the value of search. The reservation wage varies directly with the expected future wage from search and the probability of retrenchment.

Many economists have emphasized that employment may become finance constrained when aggregate demand falls. However, notice that finance matters on the supply side as well, as the reservation wage also varies directly with accumulated savings and liquid assets in hand due to wealth and liquidity effects. Notice that conditional on natural rate of unemployment given the cyclical economic growth path, search unemployment is negatively serially correlated over time as high unemployment in one period reduces employer hiring costs and leads to lower unemployment and higher hiring costs in the next period. However, during high phases of economic growth, unemployment tends to fall over a period of time as the search process becomes more productive. Further, workers latch onto the opportunity afforded by new jobs so that they can accumulate assets for future contingencies

Next, I come to labour contracts. Generally speaking, there are three broad theories of labour contracts: (i) implicit contract theory (ii) insider-outsider theory and (iii) efficiency wage theory. According to implicit contract theory, risk-averse workers do not have complete income insurance in financial capital markets and therefore, firms which are risk neutral due to pooling of financial resources by large number of shareholders can profitably offer stable incomes to workers. The implication is of course, that there are nominal rigidities in the labour market despite changing demand and thus employment will vary accordingly. The insider-outsider model gives an account of how wage and employment are decided in the bargaining with the firm and the union. An implication is that union members will hold onto rents under different scenarios. The efficiency wage postulates that an employee will be paid a high wage as an incentive and a hiring threat contingent on shirking as a disincentive. The efficiency wage can be sustained only if there is a significant probability of being unemployed after being retrenched as this keeps the disincentive effective. In the context of this paper, I assume that firms provide efficiency wages to employees with the usual disincentive.

The demand for labour is the minimum based on the demand expectations in the goods markets and the availability of financial resources for employing labour given possibilities like credit rationing, loan commitments etc. The labour market at any date in any given industry is characterized by the minimum of the demand for labour by net new hiring (after adjusting for voluntary exit and retrenchment by firms of workers willing to go on) and the supply of labour force.

The supply of labour consists of new workers, those voluntarily exiting from employment contracts or being retrenched in the previous periods and yet to find a job, and the rest of available workers searching for jobs and willing to work at various wage schedules offered through contracts depending on their preferences, search costs and alternative opportunities.

Thus there is a combination of search unemployment and involuntary unemployment due to wage stickiness as well insufficient demand in the goods market. The labour market consists of a vector of past and present contracts (some of which overlap into different future dates). As mentioned before, each of the contracts consist of the length of the contract, the job description depending on different contingencies in the job (I assume the contracts are rarely fully specified for each contingency and therefore they are generally incomplete) and the wage profile throughout the length of the contract.

If there is high growth in demand and additional workers are required, then hiring, wages and contract lengths tend to get raised but subject to a continuity with existing contractual structures or past contracts. If demand falls due to an aggregate shock to productivity (such as a pandemic) such that existing labour force is not fully utilizable for some considerable amount of time, then firms engage in wage cuts and retrenchment of labour and very few firms except the very growing and profitable ones offer new contracts. Labour market policies are very hard to formulate under such a circumstance and effective implementation requires support from other types of policies. Supporting high unemployment insurance through fiscal and monetary policies can be particularly difficult.

Dynamics of Financial Markets

Money markets are markets for short term funds which are secured through various financial assets. Money market interest rates fluctuate considerably, being tied to support the monetary mechanism of the economy. When money market rates like interbank lending rates increase, they push up the cost of funds for banks and thus raise lending rates. Banks lend in credit markets with financial securities serving as collateral. Thus when the financial markets witness sharp fall, banks may be unable to get enough valuable collateral and engage in credit rationing to firms. On the other hand, during times when economy is booming, banks may engage in loan pushing activities. The primary market for securities is supported by investment banks who underwrite securities. The primary market activity is increased during a sustained boom in the stock market (the secondary market) and with a better position of the economy with respect to the fundamentals pertaining to real assets. The secondary market or the stock market is the market for long term securities which are bought and sold as per risks, returns and liquidity characteristics of the individual assets backing the securities. Financial dynamics in the secondary market is characterized by quasi-walrasian trading in financial assets which generally show a value growth trend but with cyclical boom-bust properties and periodic financial innovations and therefore, there is a feedback effect on the primary markets the dynamics of

which is characterized by repeated financial contracting (with possible renegotiation) between investment banks and firms which change the structure of risk-reward-liquidity. Financial security prices reflect a lot of information, risk-reward appetites and liquidity positions of market traders but a lot of information is hidden since at any date there are many traders do not engage in buying and selling but wait for prices to change later such that they can engage in profitable trade later on. So, it is debatable that financial markets are information efficient. The allocative properties of financial markets depend on the possible incompatibility between information and allocative efficiency (Allen and Gale (2000)). Regulation of financial contracts, financial innovations and organized financial exchanges are generally stringent and exhaustive.

Credit cycles characterize the financial markets (see Hawtrey (1927) and Keynes (1936)). When banks and other financial institutions have enough surplus funds and reserves and when they expect cash flows and gains from investing in assets and therefore find that lending and investing will increase the present discounted value of their portfolios, these institutions will start lending and investing more. With credit constraints and funding constraints relaxed, firms will borrow more for hiring production and R&D workers and managers from banks and borrow more from financial markets and financial institutions to invest in physical capital. This will increase aggregate demand and aggregate supply and encourage more lending and borrowing in the economy through demand externality mechanism and the multiplier process. However, if over-expansion occurs then many firms may default on borrowed funds and some banks and financial institutions may suffer. The banks and other financial institutions then engage in credit rationing and the economy moves down to a new trough of a recession. After the recession has gone some way, banks find themselves with more reserves than they would like to accumulate and thus again start lending more and the recovery phase begins towards a new peak of the ensuing boom. The frequency and amplitude of the credit cycles can create irrationality and tensions in the financial markets and cause asset bubbles not driven by fundamentals.

ii. *Integrated Market Processes*

The markets for goods, labour and short term and long term securities generally tend to move together. I sketch some patterns below.

Consider a sharp fall in security prices which takes place due to contraction in monetary policy or the poor performance of a high proportion of firms which is expected to last for some time. The drop in asset prices implies a fall in net worth which is the collateral of a firm. Banks respond by rationing credit to firms experiencing declining net worth and collaterized security values. Investment spending and spending on labour goes

down in the economy which depresses aggregate demand and through a multiplier process, takes the economy to a low level of aggregate economic activity and a high value of unemployment.

Now consider a bursting of real estate or a technology stock bubble. Investors and financial institutions having a large exposure in these areas will have a significant wealth loss. These investors and financial institutions may default on their loan obligations leading to some further debt defaults across the economy. Some individuals may go bankrupt and some financial institutions may fail. Again, this could drag the economy down considerably.

Now consider a very tight credit rationing scheme by a large section of the banks. Borrowing constraints and liquidity constraints begin to bind for a large section of the consumers and firms who routinely borrow to purchase consumer durables and to hire labour respectively. This will affect spending in the goods and the labour market and drag the economy down.

Financial innovations like stripped securities backed by reliable cash flow rights, limited degree of unemployment insurance and partial coverage of bankruptcy (individual and / or corporate) insurance may reduce risks faced in assets and labour markets and thus increase spending. The increased spending in turn leads to economy wide high cash flows which supports the initial financial innovations.

c) Economic Growth

Now I turn to the relation between financial system performance and economic growth. Traditional growth theories have been developed in light of what is now known as the developed world. Such growth theories highlight the importance of savings through the financial system and productivity growth. A broad brush description of such family of theories postulate that growth usually comes through higher savings and more liquidity, effective demand, trade based on comparative advantage and resource based advantage, coordinated capital accumulation by the private sector under high financial returns to capital (invested in trade, production), technological progress (partly exogenous and partly endogenous through investment in R&D and human capital) and government induced systemic positive externality like an efficient legal system, high quality infrastructure and efficient regulation. Economic growth generated surplus is generally used to bring about improved liquidity provision, specialization, financial innovation, diversification and optimal monitoring by financial markets and financial institutions which raises the rate of return on capital thus reinforcing the growth process in turn. However, many risks may remain uninsured without suitable policies and markets. On the other hand, low growth results from lack of competitiveness, low level of technology, low level of

savings, large population relative to savings and economic planning requiring scarce resources to be spread thinly over the population, inadequate development of financial institutions, the absence of broad financial markets, the distorting reactions of being subject to colonial surplus extraction in the past and excessive financial repression. These factors create a system of low level growth trap and only under some special circumstances like structural adjustment problems, unsustainable external debt and balance of payments deficits does such an economy develop a pro-growth dynamic liberalizing policy. Dynamic liberalization policies that lead to optimal growth paths lead to the promotion of financial accumulation through effective deregulation of institutions and markets, development of productivity growth and human capital through encouraging research and development, lifting the standards and reach of educational institutions, and unleashing entrepreneurship and high quality management through proper incentives built into the financial system. Under such a pro-growth policy, individuals and institutions are encouraged to take optimal risks given the protection by a social safety net and systems of risk sharing. However, as mentioned before, these programmes are subject to constraints imposed by effective demand. Also, while no doubt quite effective in the medium and long run, the policies can generally bring about only limited growth in the short run due to many socio-economic problems, political obstacles, instabilities associated with liberalization and structural problems of the economy creating formidable transaction costs. In order to achieve high growth rates in the short run, focus has to be shifted to a few high productivity industries and sectors and limit investment in other areas of economy at a minimum given the scarcity of resources. Socially and politically this is quite difficult to achieve, but if it does happen due to some fortuitous circumstances, then a significant opulence can be generated even in the short run.

The firm is the basic driver of economic system dynamics since investment spending and R&D boost growth on the supply side and employment generation boost growth on the demand side. Now consider a high and growing expected demand scenario. The firm entrepreneur will respond by increasing employment of workers, R&D staff and managers and increasing investment expenditure if she has access to funds. As soon as the production moves towards capacity constraint, more investment goods will need to be bought to increase capacity. If the firm has sufficient retained earnings then there can be purely internally financed expansion. Otherwise, the firm has to finance investment expenditure partly from available retained earnings and partly from selling shares in the market. In order to finance the wage bill (production workers, R&D staff and managers) and the purchase of all other non-

investment goods, the firm has to take recourse to bank borrowing with an equivalent amount of securities held by the firm as shares (I assume that physical capital is a specific asset and has no alternative use outside the firm and that no other entrepreneur can run the firm profitably. This makes physical capital not worthy as a collateral asset and I also assume that land owned by the firm is of low value due to limited size and location specificity). Thus, even if high and durable demand is expected, a firm which does not have sufficient internal funds can only finance itself if the stock market is booming thus enabling it to finance investment expenditure at a low external cost of funds and obtain wage bill financing by pledging the securities it holds. Further, the bank to the firm has also got to have an expectation of high and durable demand for the product of the firm which ensures that the firm can repay bank debt and costly recourse to collateral (securities) need not take place. If some firms are experiencing expected growth in demand in this way and similarly able to arrange financing by virtue of a booming stock market and optimistic bankers, their spending will increase incomes of other individuals and firms and will generate additional spending and increase the demand for the products of many other firms in the same way. The process can go at length through this demand externality mechanism creating an interaction between the multiplier and the investment accelerator. So if there is growth expectation for some firms, the demand externality mechanism ensures that it will be atleast partially fulfilled. The converse is the case for low growth expectations.

How does economic policy affect growth? What kind of policy is more effective? How should the policy mix change with circumstances? Let me begin with monetary policy. Expansionary monetary policy reduces the cost of debt relative to that of equity in the usual situation. With an expansionary monetary policy (consisting of higher money growth and lower cost of funds which lowers the rate of interest charged on lending by financial institutions) being pursued relative to past, the scale of operations of the typical firm will be increased (as the same marginal benefit of borrowing will be equated to a lower marginal cost) thus leading to higher employment, higher R&D and higher investment in fixed capital. Further, the easy monetary policy will provide incentives for higher entry in industry and reduce exit due to bankruptcy. Higher employment by firms will boost demand in a generally demand constrained environment (as already discussed above), higher R&D will increase productivity growth thereby increasing competitiveness (both in the domestic and foreign sphere) and tempering inflationary tendencies and higher investment will increase the growth rate and standard of living in the short run. However, one caveat should be mentioned: in a situation of absolute liquidity trap, the rate of interest cannot be lowered and thus monetary policy reduces its potency. Assuming that there is no liquidity trap in the general sense, why cannot an expansionary policy be always pursued? There are two clear dangers: the first is that when demand growth subsides there will be high inflation which will hurt the majority of the population with fixed wage contractual or permanent jobs (though there might be dearness allowance in wages, this cannot stop the increasing wage-price spiral with real welfare loss for a large section in the labour force); the second danger is that of new asset price bubbles being started with an expansionary policy which might burst with consequences like debt defaults, debt buildup and debt hangovers, insolvencies and illiquidity, incomplete projects and resource wastage. Fiscal policy can also be expansionary provided debt service ratio to GDP is not too high and provided other considerations allow it to be expansionary. This is rare. Even if conditions warranting expansionary fiscal policy through increasing the government expenditure financed by raising the public debt is warranted for the sake of restoring stability in the present and the near future, the future cost of debt build-up can be quite high given the generational accounting (see Auerbach and Kotlikoff (1995)). However, though tax cuts may not be feasible most of the time, investment tax credit policy can be pursued to boost capital accumulation and growth. Regulation should try to eliminate corruption and tax evasion and different kinds of regulatory arbitrage and remove barriers to competition and innovation. Note that, as already pointed out before, the process of economic growth is a process of gradual capital accumulation with inbuilt rhythms of booms and busts or cycles (no matter how irregular they may be), so the ideal policy should be to coax some growth when the economy is faltering, remaining indifferent through the majority of ups and downs and making policies which are restrictive when the economy overheats with risks of dangerous asset price bubbles and signals of unsustainable projects being pursued by the private sector. With this discussion, I turn to an examination of business cycles and corresponding policy.

d) Business Cycles

The same mechanism can generate business cycles (see Gertler (1988), Hawtrey (1927) and Hansen and Clemence eds. (1953)). Consider an initial high growth expectations phase for the representative firm. I assume that changes in past demand generate high growth expectations by the entrepreneur of the firm and require investment spending if production is anticipated to reach or cross capacity in the near future. This brings in the accelerator effect for each firm from time to time and one can surmise that it will be generally present for the representative firm. Then additional spending and the demand externality ensure that there will be an upward moving phase of GDP but which is cyclic as

determined by the interaction of the multiplier and accelerator on one hand and the interaction of the credit cycle and asset bubbles on the other hand. But after many firms have increased capacity substantially, there will be a slowdown of the demand externality process and there will be a natural expectation that demand will flatten out and that there will be idle capacity. This will reduce spending by firms and the peak of the business cycle is reached and the downward movement towards the trough begins. After a significant downward movement, interest rates and prices fall to sufficiently levels and demand picks up again and the trough is reached and the upward journey towards a new peak begins. And so on. Thus a business cycle mechanism is found in the same framework.

Financial crises are important in generating business cycles. Suppose some fairly large and leveraged banks become illiquid or insolvent due to non-repayment of debts by borrowers and a there is a simultaneous fall in asset prices. Thus affected banks cannot repay their debt to other banks. Thus other creditor banks become illiquid or insolvent. This can generate a contagion with significant non-repayment of debts and the relative magnitude of the crisis can vary depending on the degree of the fall in asset prices. Bank failures and financial contagion contract lending and reduce expenditure on labour hiring and investment goods thus ensuring that the contagion in the asset and credit markets spill over to the goods and the labour market. The contraction in aggregate economic activity can be very sharp and painful as was seen in the Great Depression and the recent Subprime Crisis.

I engage in a detailed investigation of financial stability and instability. Liberalizing pro-growth government policies or market innovations lead to high risk taking which, though fetching high returns initially, eventually become too high risky ventures since the financial system converges to a path of highest degree of optimism and highest risks and since negative externalities like corruption, congestion and skewed returns structures develop which are not properly internalized by agents with limited vision, bounded rationality and risk shifting characters. Financial system stays in a stable dynamic path as long as risk management is sound and reserves, liquidity and internal finance are used for inter-temporal smoothing and portfolio diversification is based on sound information and reliable projections of risks and rewards. Last, but not the least, financial stability is ensured as long as corruption free conservative decision making takes place in institutions and markets. Financial Systems become unstable due to periodic wealth dissipation caused by excessive strategic competition, lack of adequate corporate control, excessive leverage, illiquidity and insolvency of significantly important institutions, contagion of institutional failures, complex entanglement of debt obligations across diverse institutions, excessive risk taking caused by certain financial innovations, periodic artificial and short term asset price bubbles and crashes leading to the problem of lack of trust in financial markets causing excessive liquidity hoarding leading to liquidity traps, and lack of inter-temporal smoothing financial portfolios under incomplete markets in response to shocks created by coordination failures of decentralized competitive systems. Dynamic stabilization policies like fiscal transfers and monetary injections lose potency during financial instability if liquidity traps and restrictions on bailout packages (due to constraints imposed by requirements of fiscal programs for future periods and generations) develop.

Next I discuss the relations between multiple growth paths and different stability conditions. Low growth paths use low level of savings and are highly stable. If shocks to productivity or coordination failures occur which reduces national income then all that is required to restore the financial system on its initial path is a little more savings by raising the interest rate on bank deposits. For a high growth rate financial system, a destabilizing condition reduces income which in turn reduces savings and a very high interest rate is required to bring back the same level of savings. But a high interest rate on loans (which competition among banks induces after the interest rate policy) restricts borrowing or leads to credit rationing in a richer story. Thus the financial system may not be able to come back to the original high growth path. Forced savings through high taxation may be used by the fiscal authority, but it might lead to different distortions like tax evasion effort, low taxable work effort, leakages from government savings and investment programs etc. I end this section with a comment on the identification of a set of factors that drive business cycles around the different growth paths and a further comment on how business cycles can be controlled optimally.

Coordination failures in a decentralized economic system (see Cooper and John (1988)), shocks to productivity or demand, asymmetric information related problems in credit and labour markets, nonlinearities in economic relationships can separately or jointly produce phenomenon that is known as business cycles.

A prudential way of smoothing fluctuations caused by business cycles is liquidity injections by the financial institutions on a contingent basis focusing on the strategic and fundamentals driven aspects of the financial system. Too big or too influential to fail may be a policy worth pursuing on strategic grounds in order to counter financial contagion. Funding restructuring of insolvent firms whose reorganization value is greater than liquidation value (based on reasonable informational grounds) is another policy worth pursuing based on fundamentals driven ground. Such liquidity injections need to be in the nature of loans which can be

repaid as soon as the component which was the recipient of the loan can stand on its feet. If the effectiveness of liquidity injections is limited by different factors, then fiscal transfers may be needed. Stabilizing policy needs to be carefully formulated and implemented as there are lags such as recognition lags (recognition whether a shock is permanent or temporary), decision lags (decisions on policy take time), action lags (time elapses between a policy decision and implementation) and outside lags (the effect of a policy may be spread over time), uncertainty about private sector expectations reactions to policy changes and the uncertainty about the structure of the economy and shocks (see Lucas (1987) and Dornbusch and Fischer (1987)). A mix of rule based policy and discretion is required in the form of rule based activist policy.

e) *Inequality of Wealth and Income Distribution*

I have already argued that incomplete markets, incomplete participation and to a certain extent contracting relating problems have tendencies to develop and perpetuate wealth and income inequality. In this section I provide some further thoughts.

This book argues that financial processes are naturally skewed to generate persistent inequality and inequality in turn leads to skewed financial processes (see the discussions in Kuznets (1955), Herrick and Kindleberger (1983), Basu (194), Greenwood and Jovanovic (1990), and Ray (1999)). The link between finance and inequality is multidimensional: (i) finance concentrates wealth because the asymmetry of initial wealth and income distribution persists and amplifies generically due to increasing returns (fixed costs of acquiring human capital and fixed costs of starting businesses together with collateral requirements for bank credit) and unequal opportunities in financial and labour markets in the presence of market and contractual incompleteness. Unequal returns to assets and income structures leads to resource flows towards assets held by the rich thus reinforcing the skewed financial process (ii) incomplete participation increases wealth inequality and reduces the socio-economic mobility (iii) innovative methods in finance like micro credit (based on joint liability lending and peer monitoring) subject to conservative and honest methods can also potentially create wealth for significant proportion of the rural poor by financial and nonfinancial institutions operating in the rural world but may be thwarted by the burden of subsidy and of sustainability and by those pre-existing trading and financial intermediaries who tend to lost their business shares (iv) ideological tussle on whether the economic system should be oriented towards financial wealth accumulation at the expense of equally if not more reasonable social goals create divisions among individuals in the society. This leads to class structure

tensions which lead to limited socio-economic mobility and excessive regulation and financial repression. This increases economic inequality directly (by limiting mobility) and indirectly (by excessive regulation of economic activities). Dynamic redistributive policies should be analyzed in these contexts. Policies like redistribution of assets, promotion of equality of opportunities, alignment of economic goals and proper incentives tend to create a dynamic path with less inequality and one that affords the luxury of other social and political objectives.

A last word on inequality is in order. Inequality may be reduced both through trickle down and trickle up processes associated with the cyclical growth process described above. A trickle down process acts as follows: as growth occurs, an increasing fraction of spending will be devoted to products made by the middle class and the poor in the rural as well as the urban areas enabling them to join higher levels of income (however this trickle down process maybe very time consuming). A trickle up process acts as follows: as growth occurs, low income workers may become successful (with some drive and ingenuity and with the aid of a community network) in migrating to higher paying jobs (with associated geographical migration) while high wage workers and managers may be able to start their own firms and become successful entrepreneurs (the first effect is more significant in the early days of development while the second effect is more significant after the economy matures and becomes accommodative of new ideas, ventures and technologies and as risk sharing increases throughout the economy). Liberalization of the economy increases the pace of trickle up and trickle down processes and reduce inequality. Therefore, an economy should be allowed to be liberalized carefully in a phased manner with prudential regulation dealing with possible distortions and excesses created by liberalization.

V. CONCLUSION

The firm is the driving force of the economy since the activities of the firms boost aggregate demand as well as aggregate supply but it is the performance of the financial system which facilitates or restricts the activities of the firms. Financial systems allocate resources from savers to investors and since these two groups have different liquidity-risk-return characteristics, financial institutions and financial markets have to issue securities and innovate to bridge the gap. The demand multiplier (together with the investment accelerator) and the credit cycle create a cyclic growth process which needs to be stabilized from context to context through rule based activist monetary policy and regulation when there are fiscal constraints. Inequality and imperfections of financial markets reinforce each other making policy innovations necessary but liberalization of the economy may go a long way in reducing inequality and poverty.

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Suggested Strategy for Bangladesh Garment Manufacturers and Exporters Association (BGMEA) During and Post Covid-19 to Protect the Industry from Massive Loss

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Abstract- Export oriented readymade garment (RMG) industry of Bangladesh has flourished at a rapid pace utilizing elastic supply of cheap female labor. But COVID-19 turns up as a new threat for this industry. As the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) is one of the largest trade associations in the country representing the readymade garment industry, particularly the woven garments, knitwear and sweater sub-sectors with equal importance, it has vast responsibilities to protect the industry from massive loss. This study conducted based on current situation of supply chain in garment industry where try to find out the problem by SWOT analysis and Porter's five forces model. After pointing out the problem this study suggests some strategies both for the during and post Covid-19 to protect garment industry from massive loss.

Keywords: equilibrium, B2B, exports, SWOT, sustainability.

GJMBR-B Classification: JEL Code: M10

SUGGESTEDSTRATEGYFORBANGLADESHGARMENTMANUFACTURERSANDEXPORTERSASSOCIATIONBGMEADURINGANDPOSTCOVID19TOPROTECTTHEINDUSTRYFROMMASSIVELOSS

Strictly as per the compliance and regulations of:

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I. Introduction

Coronavirus is a disease which transmit from person to person. In December 2019 this virus was first detected in Wuhan City, China. After first detection, it was spreading all over the world day by day. In Bangladesh, the country's Government announced lockdown from March 26 and till now it's continuing. The US Center for Disease Control and Prevention announced this virus as "Epidemic". The World Health Organization called this virus as "Pandemic"(Hughes H. , 2020). Covid-19 outbreak hampered in every sector including garment and apparel sector.

The Bangladeshi garment industry is facing severe impacts from the COVID-19 pandemic. Garment factories are struggling to sustain in business operations, a large number of workers' already have lost their jobs and many others are facing risk for losing their jobs in the coming month. The novel corona virus (COVID-19) has presented the world with an unprecedented global health emergency. As of April 13, the global pandemic has infected more than 1,773,084 people, resulting in more than 111,652 deaths (WHO,

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2020a). (Hughes, 2020) mentioned that Covid-19 outbreak is not only for a particular country but also for whole world and supply chain in manufacturing companies are disrupted globally. (McKeever, 2020) mentioned that with the health crisis, Covid-19 outbreak spreading in labor market and economic crisis.

The main source of apparel raw materials is China, when Covid-19 was spreading in China then many apparel raw materials suppliers were stopped their activities by the instruction of Chinese Government. For this reason, the supply chain of apparel industry was disrupted. Specially Bangladesh, India, Sri Lanka, Vietnam & Cambodia were the most affected countries (Kelly, 2020). If I take example from Bangladesh, then 50% raw materials& 40% other equipment and machinery of garment & apparel industry come from China. In Myanmar 90% of raw materials come from China. Because of supply chain disruptions in Garment & Apparel sector already 10% or 20 companies are bankrupted and many other companies are going to be bankrupted very soon. According to the secretary of the Joint Apparel Association Forum Sri Lanka, in every week 1 to 1.5 tons' raw materials shortage in garment and apparel industry in Sri Lanka. So, they can't produce their products at the right time also because of the shortage of raw materials the operational cost is increasing day by day.

In Bangladesh, garment manufacturers have been forced to stop production or to reduce capacity due to the major disruption of end-to-end global supply chains and the emerging health crisis, which has resulted in national restrictions on people as well as economic activity. What makes this current situation particularly challenging - and extraordinary - is that both the demand and supply side of operations are being affected. Strict transportation restrictions are still in place hindering raw materials exports from reaching other garment-producing industries in the region. On the demand side, many Bangladeshi garment factories are also facing considerable difficulties. In March, COVID-19 outbreak turned into a global pandemic, significantly disrupting the global economy. With consumers staying at home and many physical stores being closed,

European and US-based buyers began cancelling and suspending orders from suppliers.

As a guardian of Garment industry in Bangladesh BGMEA should take proper step during and post covid-19. Because according to the Bangladesh Bank (the central Bank of Bangladesh) over 80% of country's GDP come from this sector and about 40 million people directly involve with this sector. So, to safe the country it's very necessary to take immediate step on this sector. This study covers-Chapter 1: A brief introduction of garment industry in Bangladesh, chapter 2:literature review, chapter 3: Broad objective, Methodology and limitations of the study, chapter 4: A summary on BGMEA, chapter 5: Current scenario of garment industry in Bangladesh , chapter 6: Conceptual framework where try to show sustainability of our garments industry, its dimensions and the challenges for sustainable garments industry, chapter 7: During & Post COVID-19 pandemic- situation analysis, suggestions and strategy for garments industry of Bangladesh, chapter 8: Porter's five factors model using for analyzing garment industry of Bangladesh and chapter 9: Brief conclusion.

II. Literature Review

Over the last decade the financial performance of Bangladeshi garment industry was noticeable. Garment industry is a labor intensive industry so maximum of its cost depend on the wages of labor. Bangladesh is grabbing that opportunity of cheap labor so it's now world third exported country after China and India (Chowdhury, 2014).

(Shuvro sen, 2020) conducted a study on covid-19 impact on garment workers in Bangladesh, where they found that because of supply chain disruptions already a significant number of workers lost their job from garments. The main sources of raw materials in garments & apparel industry is China. China was the first country where the Covid-19 was first attacked so this virus also name is China virus or Wuhan virus. So, the raw materials were not come at the needed time. Beside this maximum buyer cancelled their orders because retailers were under restrictions to open their shops. Owners was affected by this cycle, for this reason they were not able to pay salary to their workers as a result workers lost their job. Finally, their families are going under financial crisis.

The main problem of garment industry is deferred payment by retailers. Because of lockdown in different countries of the world & delayed in products supplies, retailers are not able to collect new products & can't sell their stored products at right time. For this reason, they do not pay their deferred payment to suppliers on time & they want more time for paying to the suppliers (Karim, 2020). A survey report shows that about 11% of Bangladeshi manufacturers are getting their payments at delay 1 to 10 days, 69% manufacturers are getting their payments at delay more than 10 days where some manufacturers even they have not guarantee to get payments, they don't know when they will get their payments from buyers (Anner, 2020).

(Mshura Shammi, 2020) conducted a study on Psychological and socio economic crisis during Covid-19 in Bangladesh where the questionnaire was surveyed from 1066 respondents in Bangladesh. They found that the partial lockdown of the government during the Covid-19 increased health crisis, increased public transmission, decreased living standard, increased economic vulnerability, increased poverty rate, decreased public awareness, spread Covid-19 and increased crime. Specially, garment workers were panic because many of them lost their job. It should be mention most of garment workers are living the below poverty line as their average salary is 7000 taka (Bangladeshi currency) to 12,000 tk. Where 85 taka is equal to the 1 dollar. They suggest that government should take proper step such as spreading public awareness, financial aid for mass public, ensuring public health by supplying PPE and mask, ensuring health safety for garment workers and practicing proper steps for reducing Covid-19 case.

(Saeed Anwar, 2020) conducted a study on Covid-19 and Bangladesh: Challenges and How to address them, they mentioned that Bangladesh is a middle income and over populated country where about 35% of total population is illiterate and about 21% of total population living below the poverty line. So, it's tough for Bangladesh to cope up with Covid-19 pandemic. They mentioned that the noticeable challenges for Bangladesh during the Covid-19 are maintaining social distance as Bangladesh is an over populated country, adequate testing facilities, mitigating impact of Covid-19 with limited resources, reducing public transmission, managing considerable amount of fund, reducing mental stress of mass public and ensuring health safety for workers. To reduce the impact of Covid-19 they suggested for diversification of industry from Dhaka (capital of Bangladesh) to other cities of the county, banned public transportation, maintaining isolation center, testing adequately & most importantly maintaining social distance.

(Abhijit Majumdar, 2020) Conducted an explanatory research on disclosing myth of socially sustainable supply chain for clothing industry of south Asian countries where they collected information based on semi-structured interviews from the experts, they mentioned that Covid-19 disclosed fragility of supply chain in clothing industry such as many workers lost their job and many companies are going to be bankrupted. Specialists said there are many cause for this fragile supply chain like as some renown brands dominated this industry (they take decisions for their own benefits) which hampered others, lacking of

workers' safety in their workplaces, lingering in wages paid to the workers, contract based labor used, unclear contract in case of product selling in foreign countries and most importantly major raw materials are based on China. To reduce the fragile supply chain, they suggest that government, suppliers, consultants, labor association, industry bodies and NGOs should work together, should be clear rights for workers' safety, reduce domination of specific brands and should diversify collection of raw material in different countries.

III. Objective, Methodology and Limitations of the Study

a) Objective of the study

The broad objective of the study is to analyze current situation of garments industry and suggest some strategies during and post COVID-19 pandemic by which Bangladeshi garment industry can protect them from massive loss.

b) Methodology of the study

I have followed qualitative methodology for this research with an aim to generate an in-depth understanding of the pandemic impact on garments industry and the role of BGMEA as a supreme authority of Bangladeshi garment industry. Data were extracted from secondary sources. Secondary data was collected because of their easy accessibility.

c) Limitations of the study

1. This research is used secondary information; the reliability of secondary information is tough to test.
2. Every theory of economics has limitation. That means if other things remain constant and demand and supply change equally, then strategy will be efficient.

IV. BGMEA at a Glance

The Bangladesh Garment Manufacturers and Exporters Association (BGMEA) is the supreme authority of Bangladeshi readymade garment industry. Since 1983 it has been playing important role in this sector. For this reason, Bangladesh is now world third exported country in readymade garment. BGMEA is dedicated to protect, promote and develop the garment industry with the help of country's government, imported country's authorities and specialists on this industry.

V. RMG Industry of Bangladesh

With the advantages of cheap labor Bangladesh started it garment business in the late 1970. When entrepreneurs found that this sector was going to be the more profitable than other sectors then they started to participate actively. Because of lower operating cost, Bangladesh was getting competitive cost advantages which was the motivation for the garment owners (Naila Kabeer, 2003). Within very short time Bangladesh grabbed it's third position in world apparel markets (Debapriya Bhattacharya, 2002). In FY 1983-84, RMG industry represented only 5% share in total export that amounted 31.57 million US$ while in FY 2000-01 the share reached more than 75% of total export which was equivalent to 4,859.83 million US$ (Rashed Al Mahmud Titumir, 2003). According to the president of BGMEA, in 2018 RMG sector contributes more than 84% of the total export from Bangladesh and more than 40 million workers directly involved with this sector.

VI. Framework of the Study

Sustainability of the RMG sector of Bangladesh.

Dimensions
- Fruitful feedback from the BGMEA to cope up with COVID-19 pandemic.
- Urge different world welfare organization to donate for the owners & workers.
- Urge to govt. for giving close eyes towards garments industries.
- Directions towards garments owners to continue garments with PPE of the workers & fulfill buyers' demands.
- Searching new suppliers of raw materials besides China & searching new markets for expanding export.

Challenges:

- Workers safety from infected with COVID-19.   • Collecting raw materials.
- Suspended orders cost of production recover.
- Financial aid Expanding exports during & after the pandemic   • Bank loan

Addressing the challenges for sustainable RMG sector:

1. Maintaining special transportation & PPE for workers.

2. During & post COVID-19 problem findings & solution.

3. Short term & long term strategies for expanding exports during & after the pandemic

4. Collecting raw material from India, Pakistan & other countries.

5. Suspended ordered sell at a cheap rate to cover the cost of production.

6. Urge Govt. to provide special loan facilities for export related garments.

VII.   During Covid-19 Pandemic- Situation Analysis, Suggestions and Strategy for Garments Industry of Bangladesh

a)   *During COVID-19 pandemic- SWOT analysis of Bangladesh garment industry*

Strengths:	Weaknesses:
1. Workers ready to work.	1. China stop sending raw materials. So, limited raw materials under collection.
2. Capacity to produce low price products.	2. Large no. of orders cancelled.
3. Capacity to provide health safety to the workers.	3. Antiquated technology.
4. Till today Garment owners have expectation. They are not frustrated.	4. Inefficient management during pandemic.
5. Govt. provides financial aids.	5. Stressed supply chain.

Opportunities	Threats:
1. New buyers are contracting with us for emergency product.	1. People maintaining social distance so they are not ready to purchase from shopping mall.
2. Producing PPE and Mask for meeting internal and International demand.	2. No clear information about when world will come round from infect with COVID-19.
3. Fewer orders cancelled compare to the competitors.	3. Falling aggregate demand
4. Shopping mall opened by government directions.	4. Existing orders may be cancelled any time.
5. 163.7 million people of our country.	5. Different countries ports are being locked.

b) *Short term- Protect yourself to survive*

Trends	Priorities
1. COVID-19 cases increasing regularly globally, especially in south Asia. 2. Buyers cancellation orders increasing day by day. 3. Muslim consumers are trying to purchase for upcoming Eid-ul-Fitr.	1. Reduced pricing promotions: Limited time price reductions encourage customers to act. As people have disposal income reduce, they want less prices products. 2. Sell in local market: As lock down continuing in many countries of the world where we exported. We can sell our products in local market targeting Eid-ul-Fitr. 3. Defend business and its critical assets. Protect human capital, financial capital, and supply chain relationships.

c) *During COVID-19 pandemic- situation analysis & suggestions with the help of economics*
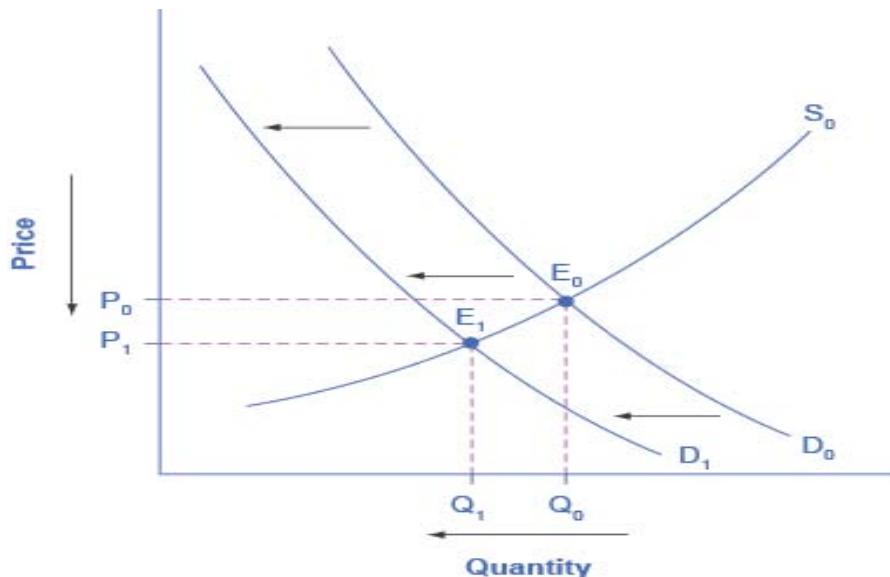

Figure 1: Shows us the equilibrium point fall from E to E1

i. *Why equilibrium point fall?*

Because quantity of supply & demand decrease equally, equilibrium point falls from E to E1.

ii. *Quantity of supply fall*

ILO published a report where they said like the other exported countries Bangladesh imports over 83% of raw materials for garment industry from China but recently because of the pandemic, they stop supplying raw materials. So, decreased quantity of supply.

iii. *Quantity of demand fall*

According to BGMEA like the other exported countries, Bangladeshi products buyers have either suspended or cancelled purchase orders worth more than $US 3.15 billion for COVID-19, affecting 1,136 factories. So, quantity of demand decrease.

iv. *Solution*

Solution is we have to reduce cost of production to sustain in the world market.

v. *How can reduce cost of production?*

Because of COVID-19 pandemic, the disposal income level decrease. So, customers want less prices products. We will produce less price products which reduce our cost of production. Another way to reduce cost of production is- we can produce PPE & Mask for meeting internal & international demand. As our labour cost is fixed because if we lay off workers it will create large unemployment level & economic recession. So, we will use labour to meet contemporary demand.

VIII. Post Covid-19 Pandemic- Situation Analysis, Suggestions and Strategy for Garments Industry of Bangladesh

a) *Post COVID-19- SWOT analysis for our garment industry*

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Strengths:
1. Low labour cost.
2. Trustworthiness to international brands.
3. Proficient garment specialists of Bangladesh.
4. Ability to provide enough supply of products.
5. Energy at comparatively lower prices.

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Weaknesses:
1. Above 80% of raw materials come from China.
2. Lack of marketing tactics.
3. Inadequate training for workers.
4. Exports mostly depend on USA & EU.
6. Competitive countries economic condition & GDP size better than us.

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Opportunities:
1. Because of the lock down, specialist getting more time to rethinking.
2. COVID-19 provides an opportunity to BGMEA to reflect and reconsider their tasks & responsibilities.
3. COVID-19 will help to the garment industry to enhance speed and innovation.
4. COVID-19 will influence to reshape the world business structure so there are big opportunities for them who are able to take efficient strategy.

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Threats:
1. Post COVID-19 shape of business world can influence negatively if our strategy not be effective.
3. Business can mostly depend on online business.
4. Buyers can reduce their consumptions to increase savings.
5. Post COVID-19 world may demand for low prices products. So, earning adequate profit can be challenging for garment industry.

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b) *Long term: Meet new reality*

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Trends
1. About no cases and vaccine availability. So, again people will do their daily routine task regularly.
2. Consumer's attracting towards online shopping to maintaining social distancing.
3. People are maintaining safety funds so reduce consumption.
4. People are being aware about their health.

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Priorities
1. Communicating regularly with brands & trying to expand the market.
2. Using online platform to grab online facilities like B2B.
3. Regularly analyzing consumer behavior to know their expected products.
4. Invest in new business model and innovation.

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*c) Post COVID-19 situation analysis with the help of economics*
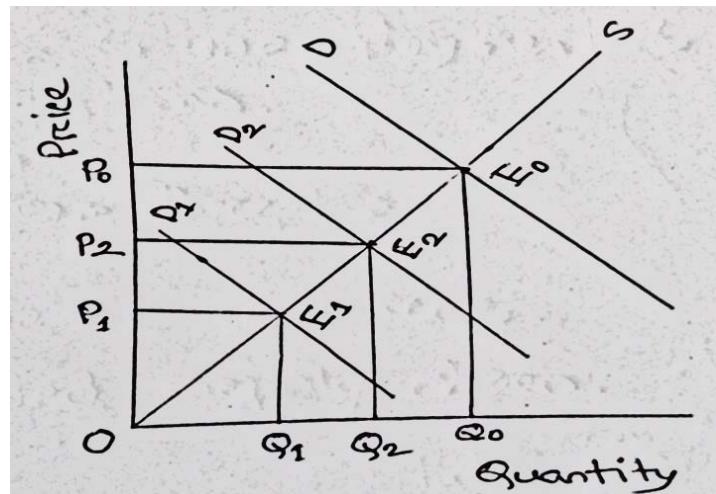
Figure 2: Shows the Equilibrium point fall because of pandemic & positively change after pandemic

Here, Equilibrium point E0= Prior COVID-19 pandemic.

     Equilibrium point E1= During COVID-19 pandemic.

     Equilibrium point E2= Post COVID-19 Pandemic.

Equilibrium point E & E1 already explained in short term plan.

Equilibrium E2 means after COVID-19 pandemic, aggregate demand & supply of the world will increase compare to the during COVID-19 pandemic E1. Although aggregate demand will not increase like before COVID-19 pandemic (E0). Because people will save some of their disposal income as a safety fund, before COVID-19 pandemic who were not save. So, they will not consume their total disposal income. During COVID-19 pandemic, many of the garments company of world will not sustain for their weak strategy. So, supply side also will not increase like before pandemic. So, there will create new equilibrium point E2.

i. *Post COVID-19 pandemic who will get competitive advantages compare to others?*

     As people already known that social distancing is need for good health. So, they will try to maintain social distancing. They can throw out their thinking of shopping from the shopping center. So, they will feel free to order goods from different trusted e-commerce platform. So, in long term, alternative plan like B2B platform will be the best strategy for our garments industry.

ii. *Alternative marketing strategy*

     Alternative marketing strategy can be defined as reach one market with the possibilities of more available markets in future. If I analyze data of garment industry from BGMEA and Bangladesh Bank (the central bank of Bangladesh), we found that only 41+ countries we covered but there are 200+ countries in the world so alternative marketing strategy can be helpful to reach new markets.

iii. *What tool can be useful for post COVID-19 garment business market?*

     This is the era of technological advancement and Post COVID-19 pandemic buyers will maintain social distance. So, the countries who have more technological access, they will get competitive advantage. This is the high time for Bangladeshi garments entering into the B2B business and capture the opportunities of technologies.

     Here are 5 lists of the top B2B websites that are leading the global B2B industry in 2019.

1. Alibaba
2. Trade Wheel
3. Amazon
4. HDgate
5. Global source

iv. *B2B platform*

     B2B is shorthand for "business to business." It refers to sales you make to other businesses rather than to individual consumers.

     Let discuss 7 among a hundred reasons how our buyer-oriented garment industry can benefit from B2B platform:

1.	More business opportunities:B2B platform will help us to cover higher number of customers with ensuring the target markets. Through B2B platform it's easy to access in new markets.
2.	Better Sales: A quality supply chain management and collaborative approach can help us to showcase our products. That will help to better sales.
3.	Sustainable growth:B2B platform ensures the sustainable growth. If once you can grab customer confidence on your products, then you will get permanent order from him. It will work as a chain benefit for you because your permanent customers will help you by suggesting products to their families, friends & other relatives. So, your quality can easily ensure your sustainability in B2B platform.
4.	Lower Costs:B2B platform ensures lower cost that other platform. Because you will get more customers there. We know every piece of production provides the operating cost benefit by reducing the fixed cost. A good management is important here in B2B platform for reducing the cost.
5.	Reach new markets: B2B platform gives opportunity to you boost products which will help you to reach new clients. Those clients don't necessarily have to be in your existing markets. So, they may be attracted by getting your products because of your smart features and you can get order many times.
7.	Customer feedback: Getting the customer feedback is costly but by using B2B platform you will able to get the customer feedback easily. You will get information about different countries customer demand & customizing your products based on the customer choices.

IX. Porter's Five Forces are
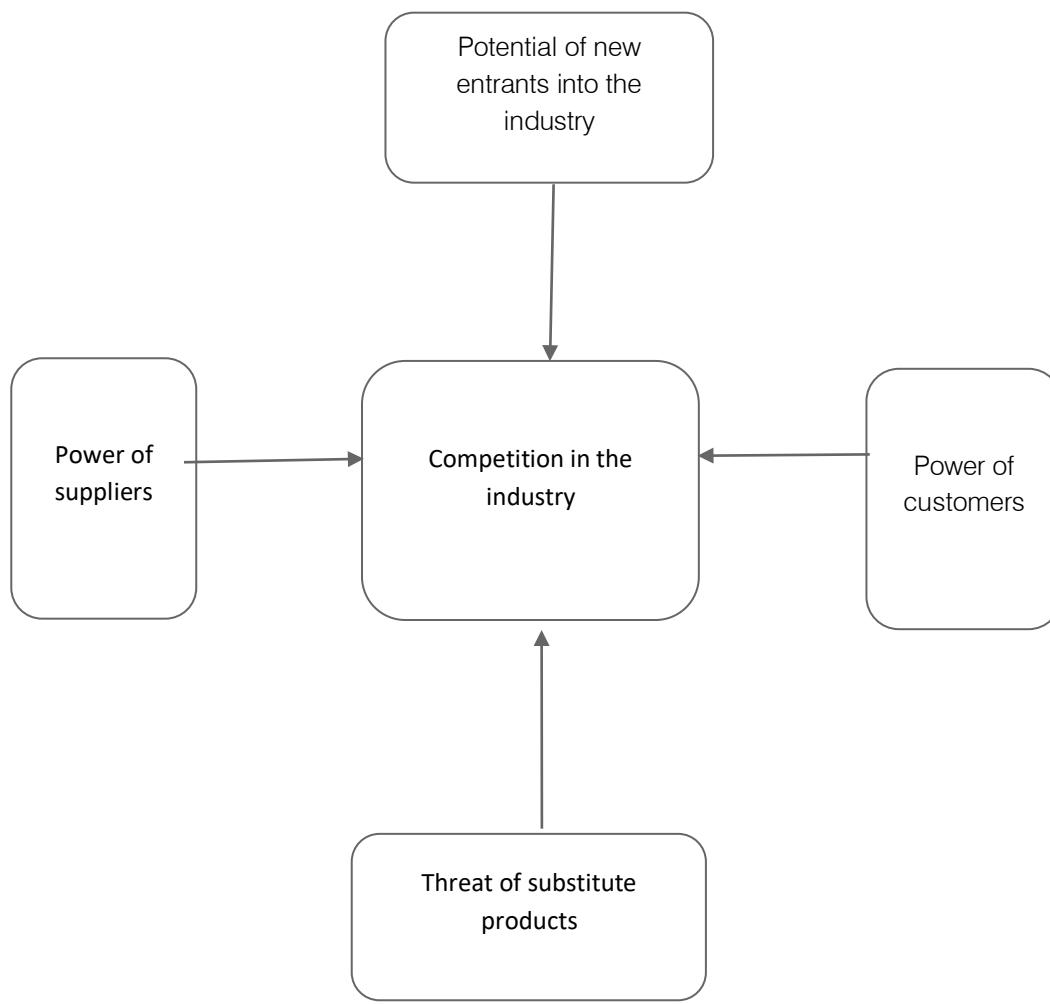
a) Porter's five factors model using for analyzing garment industry of Bangladesh

1. *Competition in the industry:* Our main competitors are China, India, Vietnam, Cambodia, Sri Lanka &Myanmar. After COVID-19 competition may rise to sustain in the industry. If any industry can't cope with that situation, they can be bankrupted. So, for short term main target should be sustained in business. For long term should be taken strategy like B2B & B2C.

2. *Potential of new entrants into the industry:* 73.38% export of Bangladeshi garment is in Europe. Think about the location of Bangladesh & EU. They are far from us so transportation cost is bigger for them to purchase products from us. So, after COVID-19 they can create Africa as a hub of garment industry because of cheap labor& very nearer to EU. So, we should make a business contract with EU.

3. *Power of suppliers:* As over 80% of raw materials imported from China. It's the prime source of raw materials. So, they have influenced on supply. But the opportunity is to possibility of use our jute as a raw material. Also, BGMEA can take initiative so that we can manage our raw materials. Where there will scientific grading of raw materials so that foreign brands can believe in our product qualities.

4. *Power of customers:* After COVID-19 business world. Customers will influence on the products because of decreasing aggregate demand. So, price of products may decrease but the strategy must be taken to reduce cost of production.

5. *Threat of substitute products:* As available garment industry in different countries of the world, this industry bears higher threat of substitute products. So, the solution is that we must be updated with the changing demand of customer, so that we can meet customers demand. We have to create research & develop department who always provides update result of customer demand.

X. Conclusion

The garment Industry of Bangladesh has massive impact on our economy. We need a sustainable garment industry to safe our economy, owners and workers. This study suggests readymade garments, surviving in the market during Covid-19 by maintaining equal operating profit and cost and using B2B platform for post Covid-19 to expand new markets, to ensure operating cost advantages and to gain competitive advantages. This study creates scope for further study on this topic by adding primary or secondary numerical data and using statistical model for analyzing events.

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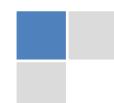
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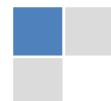
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Career	Financial

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Career	Credibility	Reputation

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Financial

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Career	Credibility	Financial

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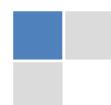
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GJ Community Access

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We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

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The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

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Acknowledgments

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PREPARING YOUR MANUSCRIPT

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.

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It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

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The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

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Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

PREPARATION OF ELETRONIC FIGURES FOR PUBLICATION

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

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TIPS FOR WRITING A GOOD QUALITY MANAGEMENT RESEARCH PAPER

Techniques for writing a good quality management and business research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of management and business then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

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6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.
Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:
- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.

- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

o Single section and succinct.
o An outline of the job done is always written in past tense.
o Concentrate on shortening results—limit background information to a verdict or two.
o Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

o Explain the value (significance) of the study.
o Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
o Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
o Briefly explain the study's tentative purpose and how it meets the declared objectives.
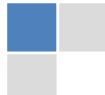
Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- o Report the method and not the particulars of each process that engaged the same methodology.
- o Describe the method entirely.
- o To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- o Simplify—detail how procedures were completed, not how they were performed on a particular day.
- o If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- o Resources and methods are not a set of information.
- o Skip all descriptive information and surroundings—save it for the argument.
- o Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- o Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- o In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- o Present a background, such as by describing the question that was addressed by creation of an exacting study.
- o Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- o Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- o Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- o Do not include raw data or intermediate calculations in a research manuscript.
- o Do not present similar data more than once.
- o A manuscript should complement any figures or tables, not duplicate information.
- o Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- o You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- o Give details of all of your remarks as much as possible, focusing on mechanisms.
- o Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- o One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- o Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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