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Editorial Office:
Administrative Sciences Department, Metropolitan College, Boston University
808 Commonwealth Avenue, Boston, MA 02215, USA
Tel: (+1 617) 358-5627 Fax: (+1 617) 353-6840
E-mail: jwlee119@bu.edu

Offprints Publishing Office:
Korea Distribution Science Association
Hanshin Officetel 1030, 2463-4 Shinheung-dong Sujeong-gu, Seongnam-city, Gyeonggi-do, KOREA
Tel: (+82 31) 740-7292 Fax: (+82 31) 740-7361
E-mail: kodisajournals@gmail.com.

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Assets, Risks and Vulnerability to Poverty Traps: A Study of Northern Region of Malaysia*

Abdelhak Senadjki[1], Saidatulakmal Mohd[2], Zakaria Bahari[3], Abdul Fatah Che Hamat[4]

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Abstract

The Northern States of Malaysia comprises of four states (Penang, Kedah, Perlis and Perak) still record high poverty incidence eventhough Malaysia has experienced a remarkable reduction of poverty over the past century. Economic activities in Perlis and Kedah that are predominantly agriculture in the rural area contribute to this disparity. To add, rural households are also subject to risks and uncertainties that make them more vulnerable to poverty. This study examines the impact of risks and assets on households' vulnerability to poverty. A survey of 400 respondents was conducted in December 2015 in the northern region of Malaysia. From these 400 questionnaires, only 298 were considered valid and used in the analysis. Using a logistic probability function, the results indicated that risks are not a significant threat to households. Gender and strata are crucial elements that significantly determine households' vulnerability. While human capital and financial capital significantly reduce households' vulnerability to poverty, physical and natural capitals were not statistically significant. The study suggests that the government and practitioners design strategies and policies with an assets-based approach. The asset-based approach is more appropriate for linking the causes of poverty to vulnerability.

Keywords: Vulnerability, Risks, Assets, Poverty, Northern region, Malaysia.

JEL Classification Code: I30, I32, I24.

1. Introduction

In recent years, economic development policies have recognised that households are vulnerable to poverty depending on their average income or expenditure, and the risks they face and assets they possess (Haq & Nazli, 2005; Barrett & McPeak, 2006; Ligon & Schechter, 2003). Numerous measures have been strategized by the United Nations through their millennium development agenda to ensure the significant reduction of poverty by the year 2015 for improved standards of living (United Nation, 2015). Vulnerability is another universal aspect of poverty, which makes it difficult for poor people to escape poverty (Omoniyi, 2013; Ligon & Schechter, 2003; Sachs, 2009). The poor are

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[1] First Author and Corresponding Author. Faculty of Business and Finance, Universiti Tunku Abdul Rahman, Malaysia. [Postal Address: Faculty of Business and Finance. Universiti Tunku Abdul Rahman. Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia] E-mail: abdelhak@utar.edu.my

[2] School of Social Sciences, Universiti Sains Malaysia, Malaysia. E-mail: eieydda@usm.my

[3] Centre for Islamic Development Management, Universiti Sains Malaysia, Malaysia. E-mail: bzak@usm.my

[4] Centre for Islamic Development Management & School of Social Sciences, Universiti Sains Malaysia, Malaysia. E-mail: abdfatah@usm.my

more vulnerable to health hazards, economic downturn and natural catastrophes than any other group (Calvo & Dercon, 2005; Christiansen & Boisvert, 2000; Ligon & Schechter, 2003). According to Sachs (2009), more than eight million people around the world die each year because they are too poor to survive on their usual daily meal. In the year 2010, the United Development Project (UNDP) estimated roughly 1.4 billion people were living in extreme poverty, about 93% of whom live in East Asia, South Asia and Sub-Saharan Africa (United Nation, 2010). In southeast Asia, Indonesia, Vietnam, Cambodia, Philippines, Thailand, and Malaysia have all fallen victim to extreme poverty at one time or another. Nevertheless, efforts to eradicate poverty are ongoing (Minh, 2012).

In Malaysia, poverty is a regional phenomenon that has heavily affected some states such as Kelantan, Perlis, Terengganu and Sabah (Kokubun, 2001). Sulaiman, Azman and Senadjki (2014) found a wide variety of risks distributed among household members in rural areas. Such uncertainty renders them more vulnerable to poverty as time passes. In many cases, it is hard to eradicate poverty due to the severity of risks affecting households' assets (World Bank, 2001; Alwang, Siegel, & Jorgensen, 2001). Despite Malaysia having successfully reduced its poverty rate from a high of 50% in the 1950s to less than 5% currently, a significant gap remains between the northern regional states compared to other states, namely Melaka, Penang, Selangor, Kuala Lumpur and Johor, indicating the vast difference between the rural and urban areas in terms of poverty eradication (Economic Planning Unit, Malaysia, 2017). Because of the risks and uncertainties, people living in rural areas are more vulnerable to poverty. Vulnerability to poverty still worries Malaysian policy makers. In case of any changes to the economy or the economic and welfare condition of households, the household could easily fall into poverty. This study therefore holds significance importance to understand the factors of vulnerability to poverty and to ensure that these households do not fall into the poverty trap. Instead of focusing only on the poor and marginalized groups, this study expands the area of coverage in poverty eradication, by touching on vulnerable groups among rural households. It does by revealing diverse capabilities with which people stand a better chance to move out of poverty. New initiatives are developed out of this study in order fight poverty, while advancing development.

This study investigates the impact of risks and assets on households' vulnerability to poverty. The study answers the following questions: 1) how could assets protect households from being vulnerable? 2) what are the risks that account for households' vulnerability? 3) how could risks trap households in vulnerability?

2. Literature Review

2.1. Risk Vulnerability to Poverty

Calvo and Dercon (2005); Fafchamps (1999); Fischhoff (1999); Klinke and Renn (2002) defined risk as uncertain events that undermine the well-being of a particular object or item. Moreover, risks could also imply uncertainty pertaining to the timing or magnitude of an event (Fafchamps, 1999). The seasonal fluctuation of farm income is often known in advance, but the severity is unpredictable. Furthermore, risk is conceptualised as the likelihood and potential severity of a particular and potentially adverse shock or stress, while vulnerability is the degree of exposure of households or individuals to shock and stresses, and their ability to prevent, mitigate or cope with the event (Fafchamps, 1999; Kates & Kasperson, 1983; Douglas & Ogloff, 2003). Risks such as accidents, diseases, natural disasters, harvest failures, economic downturn, or political violence occur all too frequently. To mitigate the adverse effects of such risks, the poor may invest in expensive preventive measures which unfortunately further embeds them in poverty (Barrett & Carter, 2005; Tesliuc & Kathy, 2004).

The underprivileged are typically more exposed to risks and are least protected (Hoogeveen et al., 2005; Klinke & Renn, 2002). They have limited assets and are less able to control risks and absorb shocks. Risks exposure has a direct bearing on people's well-being and increases the depth of vulnerability to poverty (Kates & Kasperson, 1983). Calvo and Dercon (2005) claimed that vulnerability to poverty is a result of a 'sense of insecurity' surrounding people in reference to the potential harm people would experience. People become more prone to poverty whenever an unexpected event (such as flood, drought, illness, unemployment spell) is beyond their control. Such people are more likely to fall victim to poverty. Siwar, Alam, Murad and Al-Amin (2009); Adger, Hughes, Folke, Carpenter and Rockström (2005); McGranahan, Balk and Anderson (2007); Alam et al. (2012); Alam et al. (2011a); Alam et al. (2011b) indicated that the agriculture sector in Malaysia is the most vulnerable to risks and uncertainties due to climate change. Studies have confirmed that the higher the potential for damage, loss or destruction of assets, then the higher the rate of poverty (Barrett & Carter, 2005; Tesliuc & Kathy, 2004; Hoogeveen et al., 2005; Sulaiman, Azman & Senadjki, 2014; Dercon, 2005; Barrett & Carter, 2005; Bebbington, 1999).

2.2. Assets Vulnerability to Poverty

According to Searle and Köppe (2014); Batavia and Beaulaurier (2001), people who experience poverty often

lack financial resources such as assets, savings and wealth. Savings assist people to deal with unexpected circumstances. Human capital such as educational level of an earning household member is a crucial factor to eliminate vulnerability to poverty (Anjua & Kamal, 2011; Calvo & Dercon, 2005; Zuluaga, 2007). The essential benefit of education is an increase in the ability of individuals to acquire higher income through getting formal employment. Calvo and Dercon (2005) claimed that education improves the quality of lives, and raises labour productivity by increasing creativity which promotes entrepreneurship and technological advances. Education plays a vital role in securing economic and social progress thus empowering income distribution which may consequently prevent people from poverty (Omoniyi, 2013; Sachs, 2009; Rainey, Robinson, Allen, & Christy, 2003; Olaniyan & Okemakinde, 2008; Asheim, 1996).

There is a significant link between the income an individual earns from labour and the vulnerability to poverty (Besley & Burgess, 2003). When an individual earns a high salary from his/her labour, the possibility of being poor is low in regards to the size of the household (Besley & Burgess, 2003; Benabou, 2003). People experience poverty often due to a lack of financial resources such as tangible assets, savings and wealth (Searle & Köppe, 2014). People who are prone to poverty do not have proper future plans and as such do not have the savings that could help them exit poverty. If an individual lacks these assets, it will be difficult for him/her to eliminate their vulnerability to poverty (Batavia & Beaulaurier, 2001). People's livelihoods depend on the services the ecosystem provides (Fisher, 2004; Cavendish, 2000; Smit & Pilifosova, 2003) of which natural resources remain the most important source of wealth. Most rich countries became rich due to abundant resources. As such, poverty increases where there is a lack of natural resources (Angelsen, Fisher, Jumbe, Shively, & Sserunkuuma, 2008; Scherr, 2000; Cavendish, 2000; Fisher, 2004; Reddy & Chakravarty, 1999).

Social capital is a key factor that holds communities together and provides a solution to social interaction (Ijaiya, Dauda, Paiko, & Zubairu, 2012). It is positively related to poverty reduction, whereby more social infrastructure (such as affordable houses, hospitals, shopping malls, good roads, bus stations) results in more interaction between people (Woolcock & Narayan, 2000). Social capital also stands for the ability of actors to secure benefits by virtue of membership in social networks or other social structures (Porte, 1998). If government bodies and other philanthropies fail to provide those social amenities, people will be vulnerable to poverty.

2.3. Conceptual Framework

The conceptual framework of the study is developed based on the discussion above. Figure 1 illustrates the link between the assets (financial capital, social capital, physical capital, natural capital and human capital), risks (disaster, economic downturn, political violence, harvest failure) and socio-demographic factors (age, gender, marital status, strata, household size). The diagram shows how the variables crystallise household vulnerability to poverty. The diagram illustrates that households depend not only on the average income and expenditure but also on the risks they face and the assets they possess (Haq & Nazli, 2005; Barrett & McPeak, 2006; Ligon & Schechter, 2003).

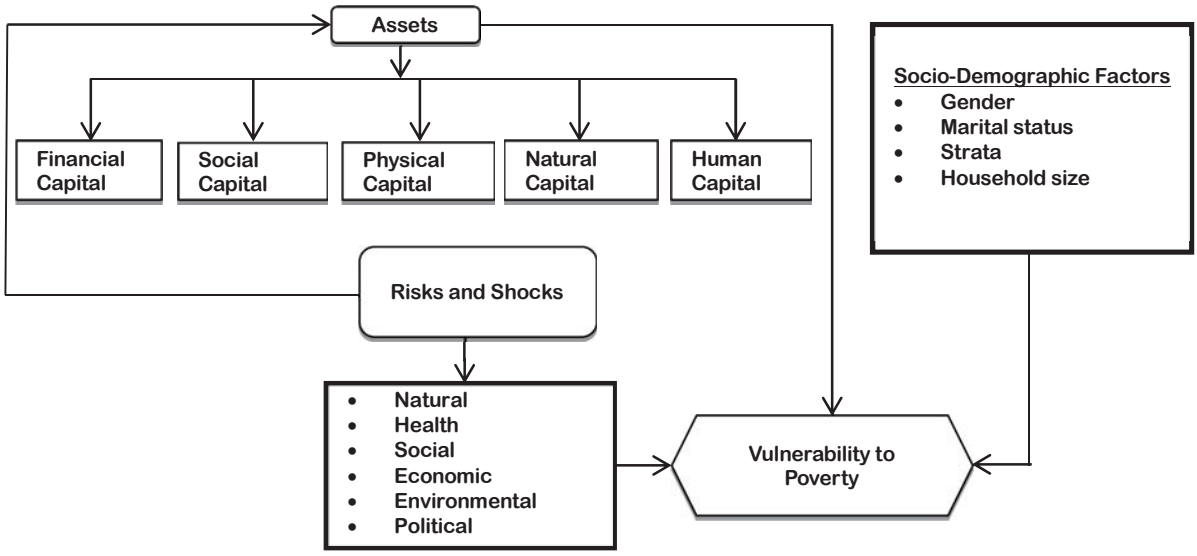

Figure 1: Conceptual Framework[2]

People who lack financial resources such as tangibles assets (house, land investments properties), savings and wealth are more vulnerable to poverty. People who have such financial assets can at any time liquidate them for cash (Searle & Köppe, 2014; Batavia & Beaulaurier, 2001). Porte (1998) stated that social capital is achieved when a strong relationship is developed between people, communities and social structure to create secure benefits by virtue of membership in social networks. Government, corporations and other organisational bodies provide social benefits such as good roads, hospitals, markets, houses, and schools in order to build strong relationships between people. Furthermore, physical, natural and human capitals are interrelated (Anjua & Kamal, 2011; Besley & Burgess, 2003).

Human capital (educational qualification of a household member) is a significant element that determines how much an individual earns. Zuluaga (2007) found that there is a negative relationship between education and poverty. According to Fisher (2004), natural resources remain the most important source of wealth. With the lack of these essential natural resources, extreme poverty is more likely to shift across the globe, affecting households significantly.

Households become more vulnerable to poverty when there is excessive property destruction due to unexpected events (Barrett & Carter, 2005; Tesliuc & Kathy, 2004; Hoogeveen et al., 2005). The higher potential for damage, loss or destruction of assets due to natural disasters, the higher the rate of poverty. This is because when assets are destroyed as a result of a disaster, many people are affected, especially the poor. When the ability to react to such calamities is low, people remain poorer.[2]

Socio-demographic factors are also fundamental in determining households' vulnerability to poverty. The elderly are physically and mentally weak and are more prone to health problems. However, if they do not have sufficient savings, they will be more prone to poverty (Adhikari, Soonthorndhada, & Haseen, 2011; Leonesio, Bridges, Gesumaria, & Del Bene, 2012). Females are more vulnerable to poverty, as their ability to react to unforeseen circumstances is less effective compared to men. The majority of poor households live in rural areas, and most depend on farming activities to earn a living. Therefore, when disaster afflicts their farm land, most of their crops are destroyed rendering them more vulnerable to poverty (Chaudhry, Malik, & ul-Hassan, 2009). According to Fadayomi and Olurinola (2014), married people's responsibilities are greater than those of individuals since the family has extended. Heads of households could be incapable of meeting the minimum requirement of the household's livelihoods when the household size is large. This may make the household's members more vulnerable to poverty.

3. Methodology

3.1. Data Population, Sampling and Administration of the Questionnaire

Data was collected from a one round survey. The research population comprises households living in both rural and urban areas. The appropriate sample size is calculated based on Krejcie and Morgan's (1970) formula as follows:

$$S = X^2NP(1-P) \div d^2(N-1) + X^2P(1-P)$$

S = required sample size;
N = the population size. Department of Statistics Malaysia (2017) indicated that there are 108,000 poor households in 2012.
d = the degree of accuracy or the level of precision expressed as a proportion (0.05);
X^2 = the table value of chi-square ($X^{2)}$ for 1 degree of freedom at 95 percent confidence level ($X^2 = 1.96^2 = 3.841$); and P = the population proportion or the degree of variability (assumed to be .50 since this would provide the maximum sample size)

Using the above formula, the estimated population is 384.

A survey was conducted in December 2015 in the northern region of Malaysia (Penang, Kedah, Perak and Perlis) where 400 questionnaires were distributed to the respondents. From these 400 questionnaires, only 298 were considered valid and used in the analysis. This is because 64 respondents were unable to provide the minim information required for the analysis and the remaining 38 questionnaire were not usable due to multicollinearity and normality problems.

The researchers handled the questionnaire with the aid of four local students studying at the School of Social Sciences (USM) and who originally reside in the northern region of Malaysia. The researchers were present during the surveys with the local research assistants to help and guide them in

[2] Monthly income and employment status (employed vs unemployed) are important factors that can affect poverty. This study excluded these two factors from the analysis due to following reasons:

1. The monthly income is used as measurement to poverty (the dependent variable), putting it as independent variable will lead to multicollinearity problem.
2. Employment status – were included to the model but initial data analysis showed that the inclusion of the variable distorts the model.

conducting the questionnaires adequately and appropriately. For accurate data and to minimise bias, the questionnaire was distributed to the respondents face-to-face, and the interview was conducted in the local dialects so that the researcher and the assistants could explain all parts of the questionnaire to the respondents. The research assistants explained the purpose of the study to the respondents and guided them (the respondents) in answering the questions.

A two-stage sampling technique was used to determine the representative sample of the study. The first stage is choosing the northern states of Malaysia, which are Penang, Kedah, Perak and Perlis. The northern states are chosen because they have the highest poverty rates in Peninsular Malaysia, and are the most exposed areas to a natural disaster such as floods (Economic Planning Unit, 2017). The second stage is the selection of the vulnerable households. A vulnerable household is identified as a household with a monthly income less than RM3600.

3.2. Ethical Considerations

This research observed ethical considerations when conducting the study (Punch, 1998). Respondents were assured that information will be treated with confidentiality and that anonymity will be guaranteed. The principle of informed consent is observed by explaining to the respondents the purpose and nature of this study and making it clear that they have the right to withdraw at any time. Respondents were also informed and briefed about the expected duration of the study. Regarding the second important ethical principle, which states that the respondents need to be assured of anonymity and confidentiality, four research assistants who helped in the data collection had explained to respondents that their information would not be revealed to the public. The research assistants explained that the researcher was trying to understand more about the situation of households. Respondents were asked if they had 30 minutes to help collect the data.

3.3. Pilot Study

After the development of the questionnaire in both English and Malay, a pilot test was carried out to test the validity and reliability of the questionnaire instruments. The pilot study was conducted with 50 households in Penang in September 2015.

3.4. Reliability of the Questionnaire

This study applied a phased instrument reliability analysis. The purpose of the reliability analysis in the pilot test phase was to ensure that the respondents in the principal study understood the questions and this had them to pick the best items that describe their position. Cronbach's alpha was used to test the reliability coefficient that assesses the consistency of the measuring scale. It is also used to measure the internal consistency that is how closely related a set of items is as a group. A 'high' value of alpha is often used (along with substantive arguments and possibly other statistical measures) as evidence that the items measure an underlying (or latent) construct. A reliability coefficient of 0.70 or higher is considered acceptable in most social science research. The results indicated that the coefficient of Cronbach's alpha for all items was above 0.70. This implies that the items have relatively high internal consistency.

3.5. Validity of the Questionnaire

The opinions of experts were also sought to determine the face and context of the validity of the measures used in the instruments. Two experts in the field of poverty and related issues and another expert on research design and data collection were consulted, and reviewed, examined and critically commented on the instruments both in English and Malay. Based on their constructive comments, the instruments were revised and submitted for more constructive feedback. Again, the researcher took the comments of the second revision and revised the questionnaire based on these comments. The questionnaire was submitted to the same experts for the third revision and was accepted.

3.6. Variable Measurement

3.6.1. Vulnerability to Poverty

In Malaysia, a household is considered poor if its income is less than the Poverty Line Income (PLI). This indicates a lack of resources to meet the basic needs of family members. A household is considered poor if its per capita income is less than the PLI equal to RM900 per month for an average family size of 4 (11^{th} Malaysian Plan). In Malaysia, a household is considered vulnerable to poverty if its income is less than RM3600 (11^{th} Malaysian Plan).

3.6.2. Assets

Assets are measured as the total set of assets that households own or have access to. An asset is identified as a stock of financial, human, natural, physical or social resources that can be acquired, developed, improved and transferred across generations. It generates flows or

consumption, as well as additional stock (Moser, 2006). Human capital (Dummy) is measured as the level of education. It is equal to 1 if a household head has tertiary education and equal to zero otherwise[3]. Social capital implies the membership to citizen associations and relationships of trust that facilitate co-operation. Natural capital implies the resources that households can acquire from nature such as land, soil and water. Physical capital denotes the basic infrastructure and tools that households have such as roads, sources of tilling, housing, livestock, food storage and valuables. Meanwhile, financial capital (Dummy, (1 = have savings at home /in banks, 0 otherwise) refers to savings at home or in the bank that the household owns or acquires[4]. Households were asked to indicate their assets (human, social, physical, natural and financial) from a given list.

3.6.3. Risks and Shocks[5]

This study defines risks as uncertain events that can reduce households' well-being. The uncertain event can be natural, health-related social, economic and environmental. Households were asked to indicate from a given list the various risks and shocks that they had experienced.

Natural Risks (Dummy): Drought (1 = experienced risks at least once, 0 otherwise)

Health Risks (Dummy): Illness, Injury, Disability (1 = experienced risks at least once, 0 otherwise)

Social Risks (Dummy): Death, Crime, Domestic Violence, Gangs (1 = experienced risks at least once, 0 otherwise)

Economic Risks (Dummy): Unemployment; Harvest Failure (1 = experienced risks at least once, 0 otherwise)

Environmental Risks (Dummy): Pollution, Deforestation (1 = experienced risks at least once, 0 otherwise)

Political Risks (Dummy): Ethnic Discrimination (1 = experienced risks at least once, 0 otherwise)

The logistic probability function is used taking the values of 1 and 0 as the dependent variables with 1 representing households vulnerable to poverty and 0 representing households not vulnerable to poverty.

4. Analysis and Discussion

Since logit parameter estimates (Table 1) do not have direct interpretations, the discussion of the results focuses on the marginal effect (Table 1). Five variables (natural risk, economic risk, environmental risk, social capital and marital status) were omitted from the model due to insufficient data and/or multicollinearity problem[6]. Therefore, analysis of the said variables would not be possible. Table 1 reveals that the regression model is significant (Prob > X^2 = 0.000). Results of Table 2 indicated that goodness-of-fit test model is significant (Prob > X^2 = 0.886). The results of Table 1 indicate that gender (z=3.390, p=0.001), strata (z=2.857, p=0.004), human capital (z=-3.35, p=0.001) and financial capital (z=-5.12, p=0.000) are all statistically at 1% level of significance. Health risk, social risk, political risks, household's size, physical capital and natural capital are all not statistically even at 10% level of significance.

Analysis of Table 1 is based on the marginal effects. The results of Table 1 indicate that females are 29% more likely to be vulnerable compared to males, ceteris paribus. This is not surprising as previous studies have confirmed that females are less likely to access land ownership. It is well documented that in developing countries, particularly in Africa and Asia, females do not have equal access to land ownership. Female-headed households in rural areas are less productive as they mostly lack access to agricultural land, services and productive assets. This limits their output and makes them less resistant to risks and shocks, and more vulnerable to poverty. It can also be explained by the fact that females are low paid compared to males. Studies have shown that in many developing countries females are mostly engaged in informal jobs and have low paid salaries. Another reason could be access to employment as females have higher levels of unemployment compared to men.

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[3] Education was first considered primary and secondary education. Education is treated as dummy variable with 1 those receiving secondary education and 0 those receiving primary and secondary education. The numbers of those receiving primary education is negligible (2.8%), thus they are grouped together with secondary education (44.84%).

[4] The study target group is low income group. There is not individual with good financial background. Their income and economic condition are similar. Therefore, this study measured the financial capital as a dummy which is most appropriate in this case.

[5] For Health, Social and Environmental Risk, if they are categorized, then there will be too many zeros because many households did not report the different risks. The initial analysis was conducted by categorizing these variables and it just distorted the model (F-Statistics became insignificant) because of too many missing variables. That was why this study has lumped them together.

[6] This is because respondents in the period of the questionnaire distribution responded that they do not have access to social capital. Also during this period respondents reported that they have not experience natural risks, economic risks and environmental risks

Table 1: Logistic regression, odds ratio and marginal effects

Vulnerability	Coef.	Odds Ratio	Std. Err.	z	P>z	dy/dx
Health Risk (Dummy)	0.413	1.512	0.410	1.52	0.128	0.098
Social Risk (Dummy)	-0.284	0.752	0.211	-1.01	0.311	-0.067
Political Risk (Dummy)	0.251	1.28	0.438	0.74	0.460	0.060
Gender	1.220***	3.390***	1.216	3.4	0.001	0.290***
Strata	0.923***	2.517***	0.816	2.85	0.004	0.219***
Household size	-0.114	0.891	0.077	-1.32	0.188	-0.027
Human Capital (Dummy)	-1.543**	-0.213**	0.148	-2.23	0.026	-0.284**
Physical Capital	0.098	1.103	0.314	0.35	0.729	0.023
Natural Capital	0.054	1.056	0.516	0.11	0.911	0.013
Financial Capital (Dummy)	-1.311**	-0.269**	0.073	-4.8	0.000	-0.304**
Cons	-1.899**	0.149**	0.114	-2.48	0.013	

LR X^2 (10) = 61.92 Prob > X^2 = 0.0000
Log likelihood = -168.73374 Pseudo R^2 = 0.1550
(**) and (***) denotes significant at 5% and 1% respectively
dy/dx is for discrete change of dummy variable from 0 to 1

Table 2: Logistic model for vulnerability, goodness-of-fit test

Number of observations	295
Number of groups	10
Hosmer-Lemeshow X^2 (8)	3.67
Prob > X^2	0.886

Table 1 also indicated that rural households are 21% more likely to be vulnerable compared to urban households. This is because rural households mostly rely on agricultural activities that generate little income compared to industrial and services activities. Urban households have more employment opportunities compared to rural households as most companies and industries are located in urban areas. The results indicated that households with tertiary education are 28% less likely to be vulnerable compared to households without tertiary education. The results confirm the human capital theory and that the level of education is an essential factor that determines people's livelihoods. This is supported by Fafchamps and Quisumbing (1998) who found that one additional year of schooling could increase the household income by 4.5%. Bokosi (2007); Owuor et al. (2007) also found that obtaining secondary and primary education might decrease the probability of being poor and help them escape from chronic poverty. It is important to note that promoting formal education for households is crucial to ensure higher average annual earnings and escape poverty.

The findings also indicated that households who have savings are 30% less likely to be vulnerable in the future compared to households who do not have savings (Table 1). Households could invest their savings and generate more income. They could also use their saving to manage uncertainties. Studies proved that households tend to use savings to cope with unexpected events. In that way, they can secure themselves from being unable to manage against these risks and fall into the vulnerability trap.

Surprisingly physical capital and natural capital are not statistically significant. This does not lead us to conclude that these two assets are not important to households' well-being. Studies have confirmed that access to physical and natural assets is essential to keep households from being vulnerable to poverty. Studies have proven that access to mechanical tractors, water, fertilisers and other natural resources can enhance farm productivity and then increase production. Marketable surplus leads to higher income generation thereby reducing the probability of being vulnerable to poverty (Omolehin et al., 2007). Shah *et al*. (2006) also indicated that adopting improved production technology increases more than thrice the provincial mean of wheat yield in Pakistan, thereby increasing farm revenues. Bokosi (2007); Owuor et al. (2007) discovered that livestock assets significantly contribute to the reduction of the probability of being chronically poor. However, the question to be answered is why in our case physical capital is not significant to keep households out of poverty? To answer this question, a further investigation should be carried out. One possible explanation is that households targeted in this study have limited access to such assets.

Although households indicated that they had experienced risks and shocks such as health risks, political risks and social risks, the results show no significant impact of these risks on households' vulnerability. It is well understood that risks and shocks are crucial in determining households' vulnerability to poverty (Siwar et al*.,* 2009; Kapoor & Ojha, 2006; Cheng & Tao, 2010; Hertel *et al.,* 2010; Somi *et al.,* 2009; Gunter & Harttgen, 2009). Risks and uncertainties have a direct negative impact on the household asset accumulation (Giesbert & Schindler, 2012) which causes poor households to fall further into chronic poverty while pushing the non-poor into transit poverty. In the present study, the severity of these risks and shocks was not significant to pose any threat to households' well-being.

5. Conclusion and Policy Implications

To adequately eradicate poverty and vulnerability, the government and practitioners should design strategies and policies using an assets-based approach. The results of this study showed that the asset-based approach is more appropriate for linking the causes of poverty to vulnerability. The asset-based approach includes:

Physical Capital: Establishing and strengthening an adequate and effective mechanism to serve households to (re)build their physical capital by ensuring adequate governance and well-defined institutional responsibilities. Also, ensuring the minimum level of service that guarantees households' needs of equipment and resources that remain affordable in both the short and long run.

Financial Capital: Provides special financial products to poor households and raises the return on existing savings. This can be done by developing an operational financial system specially tailored for the poor (households).

Human Capital: Enforce or/and establish departments and institutions that can provide training and know-how to the poor and vulnerable, where they are taught, trained and empowered on ways to be self-organised, and how to mobilise their abilities and capacities effectively and efficiently.

Natural Capital: Direct and indirect support and assistance should be provided to households to (re)build their natural capital. This support should include loans and facilities to purchase and/or extend their asset capacities.

6. Limitation and Suggestions for Future Research

While the study is for Northern Region, the results could not be generalized to the whole Northern Region population as it only focused on the low-income group and the study area under studied did not record any obvious risks and therefore the households have limited risks and vulnerability. In order to understand risks and vulnerability in a wider perspective, the study area needs to be diversified and respondents need to include more income group as high-income group could report other type of vulnerability than the low-income group.

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Overemployment of Workers in Penang, Malaysia: An Empirical Analysis*

Jacqueline Liza Fernandez[1], Lim Ee Shiang[2]

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Abstract

Many workers today encounter the problem of overemployment which occurs when actual working hours exceed preferred or desired working hours. Overemployed workers desire to work fewer hours although this may entail a concomitant decline in earnings. This research is conducted to examine the likelihood of overemployment among employees in a particular state in Malaysia, that is, Penang. This study uses primary data that was collected in a survey encompassing a total of 525 employees in the state. A logit model is used to analyse the relationship between the likelihood of overemployment and various socio-demographic, household and work-related variables. The factors that are significantly related to overemployment are ethnicity, age, education, number of children in the household, occupation, hours of work and control over work schedule. Based on the findings of this paper, it is suggested that policies such as offering part-time jobs or job-sharing options to older workers, implementing family-friendly policies, adopting decent working time measures and strategies that give workers more control over their work schedule are some possible ways to deal with the issue of overemployment.

Keywords: Overemployment, Hours mismatch, Actual hours of work, Preferred hours of work, Malaysia.

JEL Classification Code: J00, J21, J22.

1. Introduction

Most countries have statutory regulations on working time. Nevertheless, workers often work more or fewer hours than they would prefer. There are two forms of hour mismatches. The first type of hour mismatch is overemployment which occurs when actual hours of work exceed desired hours of work; in addition, overemployed workers state a preference to reduce hours of paid work even if to do this lessens their income. Theoretically, overemployment implies that the marginal rate of substitution of leisure for income (MRS_{LY}) exceeds the wage rate and the worker's utility is not maximised, and so the overemployed worker would be better off with less hours of work, albeit with lower earnings. The second type of hour mismatch is underemployment which occurs when actual hours of work is less than the desired hours of work. Labour market rigidities contribute to the problem of hour mismatches in so far that employees have to accept jobs where the number of working hours (which are determined by technical and organisational characteristics) do not match employees' preferences. Therefore, many full-time workers have a stronger preference for working fewer hours than part-time workers; conversely, part-time workers have a stronger preference

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[1] First Author and Corresponding Author. School of Social Sciences, Universiti Sains Malaysia, Malaysia [School of Social Sciences, Universiti Sains Malaysia, 11800 USM, Penang, Malaysia] E-mail: lfjacq@usm.my

[2] School of Social Sciences, Universiti Sains Malaysia, Malaysia. E-mail: eslim@usm.my

for working more hours than full-time workers (Wielers, Munderlein, & Koster, 2014).

The issue of hour mismatches needs to be addressed in view of its likely consequences. Both types of hour mismatches, i.e. underemployment and overemployment, have negative consequences on the welfare of workers. However, this study focuses on overemployment because aside from its effect on workers, overemployment has spillover effects on the organisation. For workers, the effects of overemployment (resulting from long working hours) include the higher risk of occupational injury (Dembe, Erickson, Delbos, & Banks, 2005) and mental health problems (Dooley, 2003). The spillover effects of overemployment on the organisation are its adverse effects on productivity and firm performance due to increased absenteeism and turnover rates (Golden, 2012).

Globally, 22 percent of the workforce (or about one in five workers) work more than 48 hours per week, which is deemed as excessive by the International Labour Organisation (Lee, McCann, & Messenger, 2007). In Malaysia, the Malaysian Employment Act defines the work week as 48 hours per week, with a maximum of 8 working hours per day and 6 working days per week. But there is evidence to show that many Malaysian employees tend to work more than the standard hours of work. For instance, a survey carried out by an online recruitment firm showed that 70 percent of 954 employees who were employed in different industries in Malaysia worked 2-5 extra hours daily beyond their normal hours of work and the majority were not paid for the extra hours of work. In addition, 63 percent of the workers in the survey felt that they did not have adequate time with their families as a result of long working hours (Jobstreet, 2013). The Malaysian Trade Union Congress (MTUC) has urged employers to reduce the hours of work to 6 hours per day akin to the practice in developed countries like Sweden. MTUC also highlighted the fact that some neighbouring countries in Southeast Asia have already reduced the maximum working hours to 40 hours per week compared to the 48 hours per week which is permitted by the Malaysian law (Khor, 2016). MTUC's suggestion to reduce hours of work has been supported by the Ministry of Women, Family and Community Development. The results of Jobstreet's survey on the prevalence of long working hours of Malaysian employees and MTUC's proposal to reduce hours of work justify the need for this research on the issue of overemployment among Malaysian workers.

The objective of this study is to identify the various socio-demographic, household and work-related factors associated with the likelihood of being overemployed (which refers to the desire for fewer hours of work even if it entails less income) among Malaysian workers, with a focus on Penang, which is one of the most developed states in Malaysia with a vibrant labour market. An understanding of the factors that contribute to this problem will enable policy makers to implement targeted and effective policies to curb it.

2. Literature Review

Overemployment is often related to socio-demographic, household and work-related factors. Socio-demographic variables include age, gender, ethnicity and education; the household factors include the worker's status in the household and childcare responsibilities; and lastly the work-related factors encompasses occupation, hours of work as well as the perception of workers regarding their job with respect to control over work schedule, work-life balance and job satisfaction.

Most studies take into account the relationship between overemployment and three key socio-demographic variables, namely age, gender and education. Age may influence desired work hours as younger workers who are just entering the workforce tend to have very different work preferences than those who are older and nearing retirement. Previous studies (e.g. Golden & Gebreselassie, 2007; Angrave & Charlwood, 2015) show a clear pattern by age, with overemployment low among young workers but rising with age. According to Reynolds (2003), young workers are less likely to be overemployed because they are eager to work and also lack bargaining power in the job market. Another demographic variable that is of interest is gender. Women tend to do a greater share of household work than men; in addition, gender inequalities in the work place tend to reduce women's job commitment as well as the tendency to make labour market work their central priority (Reynolds, 2005). As a result, women tend to desire fewer hours of work. Empirical evidence (e.g. Sousa-Poza & Henneberger's (2002) study which covers twenty one countries; Golden & Gebreselassie's (2007) research in the United States) indicates that women are more likely to be overemployed than men.

Another important socio-demographic factor is education. Reynolds (2003) explains that workers with higher education level are more likely to have an unmet desire for fewer hours. Their desire for fewer hours of work is because they hold jobs which pay well and demand many hours, and both these factors increase the likelihood that a worker's actual hours will exceed preferred hours of work. It is also argued that in the case of male workers, those with higher education may be more likely to hold a modern view of fatherhood and have a greater inclination to spend more quality time with the family.

The second group of variables is household or family characteristics such as the presence of a full-time homemaker and childcare duties. All workers have to allocate time for labour market work and their personal life. The time squeeze may be more pronounced in the absence of a full-time homemaker (e.g. in the case of single working parents and dual-earner couples with children) and this can give rise to an unmet desire for fewer working hours (Jacobs & Gerson, 2001). In contrast, breadwinners (particularly men) can work many hours because they have spouses who perform unpaid domestic work (Reynolds, 2014). Furthermore, men who are breadwinners feel responsible for the economic well-being of their families (Kaufman & Uhlenberg, 2000); this increases their desire for additional work hours and reduces the likelihood of overemployment. Another important household characteristic is childcare duties, which is proxied by number of children and age of the youngest child. The difficulty of integrating paid work and childcare increases the probability of individuals wanting less working hours. This occurs among female workers (Van der Lippe, 2001) as well as male workers (Abendroth, Pausch, & Bohm, 2014).

The last category of factors is work-related factors, such as occupation, hours of work, control over work schedule, work-life balance and job satisfaction. Overemployment is related to type of occupation/job since some jobs require more working hours. Golden and Gebreselassie (2007) opine that overemployment is more likely to occur in occupations for which there are no legally required overtime pay premium as well as occupations that tend to be paid by salary rather than hourly wages. These job characteristics are more common among white-collar workers. According to Reynolds (2003), professionals are more likely to desire fewer hours of work compared to blue-collar workers. Golden's (2004) study also found that white-collar workers in managerial and professional groups have significantly higher levels of overemployment while blue-collar workers are less likely to experience overemployment.

The link between hours of work and overemployment can be understood in the context of the work-leisure model of time allocation (McConnell, Brue & Macpherson, 2013). The hour mismatch problem arises when an individual has not attained his/her optimum position. Workers with long hours of work often want to reduce their working hours. According to Sousa-Poza and Henneberger (2002), the percentage of workers who desire fewer hours of work rises as working hours increase. Empirical studies show that overemployment is significantly related to hours of work (Reynolds, 2003; 2004; 2005). Golden and Gebreselassie's (2007) study shows that full-time workers have a progressively higher probability of being overemployed corresponding to the length of their usual weekly hours.

In addition to hours of work, other time-related factors include control over work schedule as well as work-life balance. In one of his earlier studies, Reynolds (2003) showed that workers who have adjustable work schedules (implying greater control over the work schedule) are able to coordinate work and non-work activities, thereby reducing the likelihood of overemployment. This is corroborated in his later study (Reynolds & Aletraris, 2007) which shows that men who have control over their work schedule desire smaller reductions in their work hours because the ability to control their schedule is associated with an increase in their appetite for work. Hours of work also impinges on work-life balance. Work-life conflict occurs when an individual's capability to satisfy the needs of family is affected by labour market work. As work-life conflict increases, workers prefer to reduce their work load by a larger extent (Reynolds & Aletraris, 2007). Lastly, studies on overemployment also include another work-related variable, i.e. job satisfaction. Satisfaction with paid labour is expected to decrease the likelihood that individuals encounter hour mismatches. The negative impact of job satisfaction on hour mismatches is documented in the literature (e.g. Bloch & Taylor, 2012; Reynolds & Aletraris, 2007).

3. Data and Methodology

Primary data is used in this study. The data was collected using a structured questionnaire that was distributed to workers in Penang. A total of 525 respondents were surveyed comprising 207 (39.4 percent) Malays, 239 (45.5 percent) Chinese and 79 (15 percent) Indians and others. This distribution is similar to the ethnic composition of Penang's population, that is, 40.9 percent Malays, 41.5 percent Chinese and 17.6 percent Indian and others. The sample consists of 253 (48.2 percent) males and 272 (51.8 percent) females which also reflects the state's gender composition i.e. 50.01 percent males and 49.99 percent females.

This study aims to examine factors that influence workers' employment status (overemployed versus not overemployed). A worker is overemployed if he/she desires to work fewer hours for less pay, while a worker is not overemployed if he/she prefers to maintain current hours of work for the same pay or prefers to work more hours for more pay. The dependent variable will take a value of 1 if the respondent desires to work fewer hours for less pay, 0 otherwise. Given that the dependent variable is a binary choice variable, a logistic regression model is used to formulate the worker's employment status.

The logit model can be specified as follows:

$$L_i = \text{In}\ \frac{P_i}{(1-P_i)} = \alpha + \beta_i X_i + \varepsilon \quad (1)$$

where Pi is the probability of being overemployed, $(1 - P_i)$ is the probability of not being overemployed, $\text{In}\frac{P_i}{(1-P_i)}$ represents the log of odds of being overemployed, X_i are the independent variables, α is the constant, β_i are the parameters to be estimated and ε is the error term. The model is estimated using the maximum-likelihood estimation method. The odds ratios are calculated by exponentially converting the estimated coefficients, where the dividing line between a positive and negative relationship is 1 and not 0. The list of independent variables and their measurements are presented in Table 1.

Table 1: List of Independent Variables and Measurements

Variables	Measurement
Socio-demographic factors	
Gender	
FEMALE	1= female; 0=otherwise
	Reference group is male respondents
Ethnicity	
NON_MALAY	1=non-Malay; 0=otherwise
	Reference group is Malay respondents
Age	
AGE26-45	1= age is 26-45 years; 0=otherwise
AGE>45	1= age is above 45 years; 0=otherwise
	Reference group is respondents below the age of 26 years
Education	
SPM	1=highest education level attained is SPM (O-level education) or equivalent; 0=otherwise
STPM	1=highest education level attained is STPM (A-level education) or equivalent; 0=otherwise
DEGREE&ABOVE	1=highest education level attained is bachelor's degree or higher; 0=otherwise
	Reference group is respondents whose highest education level is below SPM level (i.e. PMR and below)
Household factors	
Status in household	
SOLE EARNER& DEPENDENTS	1= respondent is sole earner (unmarried/divorced/widowed) with dependent(s); 0=otherwise
DUAL EARNER	1= respondent and spouse are working; 0=otherwise
BREADWINNER	1=respondent is the breadwinner with a non-working spouse/partner; 0=otherwise
	Reference group is sole earner (unmarried/divorced/widowed) without dependent(s)
Children	
CHILD 123	1= respondent has 1- 3 children; 0=otherwise
CHILD 4	1= respondent has 4 or more children; 0=otherwise
	Reference group is respondents without children
Work-related factors	
MANAGERIAL	1=if respondent's occupation is in the managerial category; 0=otherwise
PROFESSIONAL	1=if respondent's occupation is in the professional category; 0= otherwise
OTHER WHITE COLLAR	1=if respondent's occupation is in the category of other white collar jobs; 0=otherwise
	Reference group is respondents who are non-white collar workers
HOURS>48	1 =if respondent works more than 48 hours per week; 0=otherwise
WORK LIFE BALANCE	1 =if respondent is very satisfied or satisfied with current overall work-life balance based on a 5-point Likert scale where responses range from very dissatisfied to very satisfied; 0 =otherwise
JOB SATISFACTION	1 = if respondent gives a rating of very satisfied or satisfied with regard to current job satisfaction based on a 5-point Likert scale where responses range from very dissatisfied to very satisfied; 0=otherwise
CONTROL WORKHOURS	1 = if respondent gives a rating of strongly agree or agree with regard to their ability to schedule working hours based on a 5-point Likert scale where responses range from strongly disagree to strongly agree; 0=otherwise

4. Sample Characteristics

Table 2 presents the descriptive statistics of the sample of 525 respondents which comprises 114 workers (21.7 percent) who are overemployed and 411 workers (78.3 percent) who are not overemployed (i.e. underemployed workers as well as workers who do not have a mismatch between their actual and preferred hours of work). The mean age of workers in the sample is 32 years. The mean age of overemployed workers is 36.3 years while the mean age of non-overemployed workers is 30.8 years. Hence, on average, overemployed workers are older than non-overemployed workers. Women constitute slightly more than half the number of workers in the entire sample as well as in the sub-samples of overemployed and non-overemployed workers. However, there is a slightly higher percentage of women in the overemployed group as compared to the non-overemployed group (i.e. 54.8 percent versus 51 percent). In terms of ethnicity, about 61 percent of the respondents are non-Malays but the proportion of non-Malays in the overemployed group (67 percent) is higher than the corresponding figure (59 percent) in the non-overemployed group. The education profile of workers in the sample is as follows: about 45 percent of the respondents have attained a high level of education (bachelor's degree or above), while 43 percent of the respondents have medium level education (STPM/A-level or SPM/O-level) and nearly 12 percent have low education (PMR or below). The percentage of workers with high education is greater in the overemployed group than in the non-overemployed group (i.e. 50 percent versus 44 percent).

Two household factors are included in this study. The first factor is the status of the worker in the household. Workers are divided into two main groups, i.e. workers who have a spouse/partner versus workers who do not have a spouse/partner. The first group which comprises workers with a spouse/partner is sub-divided into two categories, i.e. (i) dual earners (which refer to respondents with a working spouse) and (ii) breadwinners (which refer to respondents with a non-working spouse). The second group which comprises workers without a spouse/partner (i.e. workers who have never been married, widowed or divorced) is sub-divided into two categories: (i) sole earners with dependents and (ii) sole earners without dependents. Among the overemployed workers, 47 percent are in the dual earner category while 28 percent are sole earners without dependents. The reverse pattern is noted in the non-overemployed group; i.e. 42 percent are sole earners without dependents while 29 percent are in the dual earner category. The high percentage of dual earners in the overemployed group is not surprising given that the desire for less working hours arises from the time squeeze that these workers encounter since both partners are working; furthermore, there tends to be a willingness among respondents in this category to trade-off part of their earnings for shorter hours of work since the dual-earner household is supported by the income of two persons. The second household variable is the number of children. In the overemployed group, 55 percent of the workers have children and 45 percent do not have children, while in the non-overemployed group, 64 percent do not have children and 36 percent have children. In other words, the majority of non-overemployed workers do not have childcare duties while the majority of overemployed workers have childcare duties.

The work-related variables include occupation, hours of work as well as workers' perceptions regarding job satisfaction, work-life balance and control over work schedule. Occupational groups are divided into non-white collar jobs (i.e. blue collar and pink collar jobs) and white collar jobs (i.e. managerial, professional and other white collar jobs). The occupational distribution of workers in the sample indicates that about 39.5 percent of the respondents are non-white collar workers and 60.5 percent are white-collar workers (i.e. approximately 7 percent are managerial workers, 34 percent are professionals and 20 percent are in other white collar jobs). There are some differences in the occupational distribution of overemployed and non-overemployed workers; firstly, 35 percent of overemployed workers are non-white collar workers while 41 percent of non-overemployed workers do not hold white collar jobs; secondly, 12 percent of overemployed workers are managerial workers while only 5 percent of non-overemployed workers are in this occupational group. The next variable is weekly hours of work. The mean hours of work in the sample is 41.5 hours. The mean hours of work is 44.2 hours in the case of overemployed workers and 40.8 hours among non-overemployed workers. This indicates that overemployed workers work longer hours than non-overemployed workers, on average.

Finally, work-related factors include workers perceptions with respect to control of work schedule, work-life balance and job satisfaction. In the sub-sample of non-overemployed workers, 65 percent are highly satisfied/satisfied with their job, 58 percent are highly satisfied/satisfied with their work-life balance while 46 percent strongly agree/agree that they have control over their work schedule. The corresponding figures for these variables are much lower for overemployed workers.

Table 2: Descriptive Statistics of the Variables

Variables	Total (n=525)		Overemployed (n=114)		Non-overemployed (n=411)	
	Mean	SD	Mean	SD	Mean	SD
FEMALE	0.518	0.500	0.548	0.500	0.510	0.501
NON MALAY	0.607	0.489	0.670	0.472	0.590	0.492
AGE	32.04	10.58	36.30	11.55	30.84	9.98
AGE<26*	0.315	0.465	0.183	0.388	0.352	0.478
AGE26-45	0.550	0.497	0.583	0.495	0.541	0.499
AGE>45	0.135	0.342	0.235	0.426	0.107	0.309
PMR & BELOW*	0.118	0.322	0.096	0.295	0.124	0.330
SPM	0.252	0.435	0.183	0.388	0.272	0.445
STPM	0.178	0.383	0.226	0.420	0.165	0.372
DEGREE&ABOVE	0.452	0.498	0.496	0.502	0.439	0.497
SOLE EARNER&NO DEPENDENTS*	0.391	0.488	0.278	0.450	0.422	0.495
SOLE EARNER&DEPENDENTS	0.171	0.377	0.122	0.328	0.184	0.388
BREADWINNER	0.106	0.308	0.130	0.338	0.100	0.300
DUAL EARNER	0.332	0.471	0.470	0.501	0.294	0.456
NO CHILD*	0.602	0.492	0.452	0.500	0.643	0.480
CHILD 123	0.351	0.478	0.452	0.500	0.323	0.468
CHILD 4	0.047	0.213	0.096	0.295	0.034	0.181
MANAGERIAL	0.066	0.249	0.122	0.328	0.051	0.220
PROFESSIONAL	0.342	0.475	0.322	0.469	0.347	0.477
OTHER WHITE COLLAR	0.197	0.398	0.209	0.408	0.194	0.396
NON WHITE COLLAR*	0.395	0.489	0.348	0.478	0.408	0.492
WEEKLY HOURS OF WORK	41.53	12.77	44.16	11.50	40.79	13.02
HOURS>48	0.235	0.425	0.339	0.475	0.206	0.495
WORK LIFE BALANCE	0.548	0.498	0.452	0.500	0.575	0.495
JOB SATISFACTION	0.634	0.482	0.574	0.497	0.650	0.477
CONTROL WORKHOURS	0.435	0.496	0.330	0.472	0.464	0.499

* Note: * denotes the reference group for the various categorical variables

5. Empirical Results

Table 3 shows the results of the logit model. The coefficients of the logit model represent the log of odds of overemployment. The goodness-of-fit of the model is evaluated using the likelihood ratio (LR) statistic. The value of the LR statistic (69.55) is higher than the critical value of the chi-squared statistic (χ^2=36.191) and the probability value of the LR statistic is almost zero. This implies that one or more of the total effects in the model is important for predicting the probability of overemployment. Therefore, this suggests that the model is a good fit for the data.

The results show that the dummy variable for gender has a positive relationship with the dependent variable where the odds of overemployment of female workers are 1.44 times higher than for male workers. The positive (albeit insignificant) relationship is consistent with other empirical evidence, e.g. Sousa-Poza and Henneberger (2005) and Golden and Gebreselassie (2007), which also find that women are more likely to be overemployed than men. The higher likelihood of overemployment of the fairer sex may be attributed to the larger share of domestic work that is generally shouldered by women which creates a desire for fewer hours of work. In addition, overemployment among women may be due to gender discrimination in the workplace which tends to reduce women's job commitment as well as the tendency to make labour market their main priority (Reynolds, 2005).

This regression model includes a dummy variable for ethnicity. In Malaysia, the three main ethnic groups are Malay, Chinese, Indian and others. The dummy variable, NON MALAY, refers collectively to Chinese, Indian and other minority groups while the base group comprises Malays.

Table 3: Results of Logit Model

Independent Variables	Variable Name	Estimated coefficient (β)	Odds ratio (e^{β})	z-score	Std. Error
Gender	FEMALE	0.367	1.444	1.47	0.250
Ethnicity	NON MALAY	0.505**	1.657	1.96	0.258
Age	AGE26-45	0.442	1.556	1.25	0.354
	AGE>45	1.436***	4.204	2.85	0.503
Education	SPM	0.205	1.228	0.44	0.468
	STPM	1.340***	3.820	2.64	0.507
	DEGREE&ABOVE	1.269***	3.556	2.63	0.483
Status in household	SOLE EARNER&DEPENDENTS	-0.261	0.771	-0.69	0.376
	DUAL EARNER	0.533	1.705	1.07	0.500
	BREADWINNER	0.177	1.193	0.29	0.619
No. children in household	CHILD 123	0.081	1.084	0.17	0.472
	CHILD 4	1.181*	3.258	1.74	0.677
Occupation	MANAGERIAL	0.179	1.196	0.38	0.467
	PROFESSIONAL	-0.547*	0.579	-1.70	0.321
	OTHER WHITE COLLAR	-0.316	0.729	-0.92	0.342
Hours of work	HOURS>48	0.575**	1.778	2.21	0.261
Work-life balance	WORK LIFE BALANCE	-0.424	0.655	-1.61	0.264
Job Satisfaction	JOB SATISFACTION	-0.162	0.851	-0.62	0.262
Control work schedule	CONTROL WORKHOURS	-0.506**	0.603	-2.05	0.247
Constant	CONSTANT (α)	-2.870	0.057	-5.07	0.566
LR statistic		69.55			

Note: ***, **, * indicate 1%, 5% and 10% level of significance, respectively.

The results indicate that the odds of overemployment are 1.66 times higher for non-Malays than for Malays. National-level statistics indicate that non-Malays generally work longer hours than Malays and therefore this contributes to the greater likelihood of overemployment among non-Malays (Saari, Dietzenbacher, & Los, 2014).

One possible reason for the difference in hours of work by ethnicity is that non-Malays (particularly Chinese, the dominant non-Malay group in the Penang labour market) experienced hardships as immigrants in yesteryears which shaped their value orientation towards becoming more money-oriented (Idris, 2008). Therefore, non-Malays tend to work long hours to meet their income targets and ultimately they are more likely to be overemployed.

The regression analysis shows the coefficients for age dummies are positive and it is statistically significant for the oldest age group (above 45 years). The odds of overemployment among workers above the age of 45 years are 4.2 times higher than the youngest age group (below 26 years). This implies older workers are more likely to be overemployed than younger workers. This result is similar to the findings of previous studies, e.g. Golden and Gebreselassie (2007) and Angrave and Charlwood (2015), which find that overemployment is positively related with age. Among the factors that may explain the desire for fewer hours of work among older workers are health issues, greater financial stability associated with a long working life and a preference for flexible working options prior to retirement. In short, the result shows that the likelihood of overemployment appears to increase with age.

Education level plays an important role in the determination of overemployment among workers. Education level is categorised into four different groups, that is, PMR or below (the base group), SPM, STPM and bachelor's degree or above. The coefficients of the education variable are positive and significant for workers with STPM-level education and tertiary education (bachelor's degree and above). The odds of overemployment are more than 3 times higher for workers with STPM and high education (bachelor's degree or above) as compared to workers with low education (the base group). This result is similar to Jacobs and Gerson's (2001) finding which shows that high education level is positively associated with the desire to reduce hours of work. People with high education (degrees) are more likely to hold high positions and work long hours, and this increases the

likelihood that a worker's actual working hours exceeds the preferred working hours (Reynolds, 2003).

The model includes two sets of dummy variables with regard to household characteristics, namely, the status of the individual in the household and number of children in the household. The results indicate that sole earners with dependents are less likely to be overemployed than sole earners without dependents; on the other hand, workers who have a spouse (i.e. breadwinners as well as dual earners) are more likely to be overemployed than sole earners without dependents. However, none of the dummy variables are significantly related to the likelihood of overemployment, which implies the status of an individual in the household does not play an important role in the determination of overemployment. The second set of dummy variables represents number of children. Number of children is a proxy of child care responsibilities. The results show that the relationship between overemployment and number of children is significant and positive for the dummy variable CHILD 4 (i.e. 4 or more children in the household). This result is corroborated by the findings of Jacobs and Gerson's (2001) study which show that workers with more children tend to have less working hours.

The last group of factors in the model is work-related factors which include occupation, hours of work, work-life balance, job satisfaction and control over work schedule. The first work-related factor is type of occupation. Occupational groups are broadly divided into white collar occupations (managerial, professional and other white collar occupations) and non-white collar occupations (the base group). The results indicate that managerial workers are more likely to be overemployed than workers in the base group but the coefficient for this variable is not statistically significant. On the other hand, professionals and other white collar workers are less likely to be overemployed than non-white collar workers; however, only the coefficient for the dummy variable PROFESSIONAL is statistically significant. This result differs from the findings of some previous studies (e.g. Reynolds, 2003; Golden, 2004) which show that professionals are more likely to be overemployed. The lower likelihood of overemployment among professionals (as compared to non-white collar workers) in this study may be because of the willingness of professionals to work long hours in order to avoid 'career suicide' as fewer hours of work tends to spell a less prestigious and less upwardly-mobile career path (Bradford, 2011). In addition, the opportunity cost of reducing the hours of work for professionals is higher than for non-white collar workers (the base group). This is because the wage rates of professionals are higher compared to blue-collar workers (Department of Statistics, 2015).

The second work-related factor is hours of work. The dummy variable for HOURS>48 has a significant and positive relationship with overemployment. In other words, workers who work more than 48 hours per week are more likely to be overemployed than those who work less than 48 hours per week. Specifically, the results show that the odds of overemployment are 1.8 times higher for workers who work more than 48 hours per week compared to those who work less than 48 hours of work per week. This finding parallels the results of Sousa-Pouza and Henneberger (2002) and Reynolds (2005) studies which show that the percentage of workers who want to work less hours increases as working hours increase. It is expected that individuals with long working hours experience problems of exhaustion, work stress and insufficient time for family activities, and this results in the desire for fewer hours of work.

Other work-related variables are workers' perceptions regarding work-life balance, job satisfaction and control of work schedule. All three variables are negatively related with overemployment. However, only control of work schedule is significantly related with overemployment. Reynolds (2003) obtained a similar result and explained that workers who have adjustable work schedules are able to coordinate work and non-work activities, thereby reducing the likelihood of overemployment. A later study by Reynolds and Aletraris (2007) showed that men who have control over their work schedule desire smaller reductions in their work hours because the ability to control their schedules is associated with an increase in their appetite for work.

6. Conclusion

This study examines the socio-demographic, household and work-related factors that affect overemployment in the Penang labour market. The results indicate that overemployment is significantly determined by ethnicity, age, education, number of children, occupation, hours of work and control of work schedule. Specifically, it is shown that the odds of overemployment are higher for non-Malays, older workers (above 45 years), more educated workers (STPM level, bachelor's degree or above), workers with many children (4 or more) and workers with long hours of work (above 48 hours per week). The odds of overemployment are lower for professionals and workers who have control over their work schedule.

The above findings can be used to discuss some policy implications. The higher likelihood of overemployment among older workers suggests a need to offer them part-time jobs or job-sharing options in line with their preference for fewer hours of work. This will enable firms to retain

senior and experienced employees, who may otherwise consider leaving their job if the problem of overemployment is not resolved. Another key finding is the positive relationship between overemployment and number of children. This implies the need for family-friendly policies (e.g. parental leave, maternity leave etc.) to reduce overemployment. Providing childcare facilities in/near the workplace is another possible solution since overemployment is partly attributed to childcare demands.

The results also show that overemployment is more likely to occur among workers who work more than 48 hours per week. The move to reconfigure working time policies and limit overtime work is a step in the right direction to reduce overemployment. The five dimensions of decent working time propagated by ILO - healthy working time, 'family-friendly' working time, gender equality through working time, productive working time, and choice/influence regarding working time – provide a framework for policies which can advance the goal of decent working time (Messenger, 2006). The adoption of decent working time measures would reduce work-life conflict, which in turn will reduce the likelihood of overemployment. In order to encourage the implementation of decent working time measures in the workplace, employers should be given incentives (for instance, tax incentives). Finally, overemployment is inversely related to control over work schedule. In line with this finding, it is proposed that employers provide workers with more control over their work schedule. This includes strategies that give workers more control in determining the length of the working day, starting and finishing times, break times and the schedule of paid/unpaid leave.

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Analysis of Staple Food Price Behaviour: Multivariate BEKK-GARCH Model*

Kumara Jati [1], Gamini Premaratne [2]

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Abstract

This study examines the behaviour of staple food price using Multivariate BEKK-GARCH Model. Understanding of staple food price behaviour is important for determining the unpredictability of staple food market and also for policy making. In this paper, we focus on the commodity prices of sugar, rice, soybean and wheat to examine the volatility behaviour of those commodities. The empirical results show that the own-volatility spillover are relatively significant for all food prices. The own-volatility spillover effect for sugar price is relatively large compared with the volatility spillover of other staple food commodities. The findings also highlight that the price volatility of wheat increases during food crisis more than it does when the condition is stable. Also, the own-volatility of rice and wheat in the period of the food crisis is significant and higher compared to the period before food crisis indicates that the past own-volatility effects during food crisis are relatively more difficult to predict because of the uncertainty and high price volatility. Policy recommendations that can be proposed based on the findings are: (1) a better trade agreement in food commodity trade, (2) lower the dependence on wheat importation in Indonesia, and (3) reliable system to minimize food price volatility risks.

Keywords: Staple food price, Multivariate BEKK-GARCH, Volatility, Food crisis.

JEL Classification Code: C32, E31, G17, Q17.

1. Introduction

The food crisis in 2008 took place mainly due to the factors such as biofuel production, income and population growth, rising energy prices and weather disruption (Braun, 2008). When the food crisis occurred several problems such as higher food prices, sustainability of certain financial institutions, and also the uncertainty of future nutritional emergencies may arise (Apergis & Rezitis, 2011). In addition, the food price volatility may also create a market risk which enhanced uncertainty about the prices.

The price behaviour of staple food is very critical to people who live in poverty. These poor people are vulnerable to the increase in staple food price as they spent most of their disposable income on food (Naylor & Falcon, 2010). According to FAO (2011a), during the food crisis, not only price of food increase, but also undernourished people (0.1% in Asia and 8% in Africa). There were 642 million people suffered from chronic hunger in Asia Pacific and 265 million people also live undernourished in sub-Saharan Africa (Mahon, 2012). Therefore, the relevant authorities should make policy to control food prices, which helps to

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[1] First Author and Corresponding Author. Trade Policy Analysis and Development Agency, Ministry of Trade of Republic of Indonesia, Indonesia. [Postal Address: Kumara Jati, Ph.D., Pusat Pengkajian Kerjasama Perdagangan Internasional, Kementerian Perdagangan, Gedung Utama Lt.15, Jl.M.I.Ridwan Rais No.5, Gambir, Jakarta Pusat, Indonesia. Zip Code : 10110]
E-mail: kumara_jati@yahoo.com

[2] UBD School of Business and Economics, Universiti Brunei Darussalam, Brunei Darussalam.
E-mail: gamini.premaratne@ubd.edu.bn

decrease the number of poor people in the country. The increase in staple food price is strongly relevant to the food policy. Developing countries are concentrated only on commodities that are vulnerable to price fluctuations. International prices can be used as the important reference price for stakeholder so they can see the big picture of food market condition and volatility. Briesch et al. (1997) stated that the reference price can be selected on the basis of fit and prediction of the analysing volatility structure of food prices during food crisis using a multivariate GARCH framework. Based on IMF (2008), volatility structure refers to time-varying volatility structure that the variance decomposition is no longer constant over the sample, but can change at each point in time as a result of changes in the conditional variance.

The staple food price behaviour basically depends on their supply and demand in the market. The supply side is the ability and willingness to produce staple food. The demand side of staple food is mainly driven by income growth. For instance, an increasing demand for staple food, including cereals up to a certain level of income, after which further increases in income levels result in an actual decline in cereal demand (Regmi & Meade, 2013).

China is the biggest rice and soybean producer in the world with 30.3% of the world rice and soybean production (see Table 1). Top ten countries make up 75.1% of the world sugar production, 85% of the world rice production, 90% of the world soybean and 84% of the world wheat production. This indicates that the four basic commodity production is dominated by just a few countries because more than three-quarter world food production handled by 10 countries compared to other food producing countries in the world.

Table 1: 10 Biggest Sugar, Rice, Soybean and Wheat Producer Countries in the Year 2016* (in thousand Tons)

No	Sugar Producer		Rice Producer		Soybean Producer		Wheat Producer	
	Country	Amount	Country	Amount	Country	Amount	Country	Amount
1	Brazil	37,780	China	146,500	China	68,508	EU-27	143,574
2	India	23,945	India	106,500	USA	41,559	China	128,000
3	EU-27	16,200	Indonesia	36,600	Argentina	34,350	India	90,000
4	China	9,530	Bangladesh	34,515	Brazil	31,350	Russia	72,000
5	Thailand	9,270	Viet Nam	27,800	EU-27	10,902	USA	62,859
6	USA	8,465	Thailand	18,600	India	6,080	Canada	31,500
7	Mexico	6,678	Myanmar	12,500	Mexico	3,675	Australia	28,300
8	Pakistan	5,725	Philippines	12,000	Russia	3,270	Ukraine	27,000
9	Russia	5,600	Brazil	8,025	Paraguay	2,985	Pakistan	25,300
10	Australia	5,100	Japan	7,790	Bolivia	2,200	Turkey	17,500
11	Others	42,648	Others	72,967	Others	21,605	Others	118,689

*Prediction, source: calculated from USDA and World Bank (2017)

Brazil is the biggest sugar exporter and the second biggest soybean exporter in the world with 49% of the world sugar export and 18% of the world soybean export (see Table 2). In 2016, top ten countries make up 86% of the world sugar production, 92% of the world rice production, 98% of the world soybean and 93% of the world wheat production. This indicates that the four basic commodity export is dominated by just a few countries because more than 80% of the world food export handled by 10 countries compared to other food exporting countries in the world.

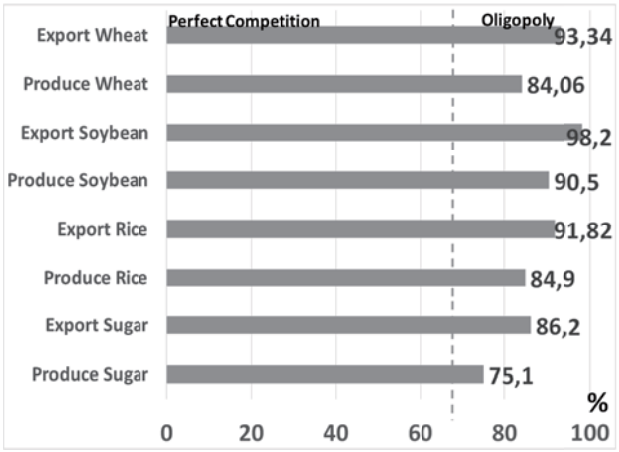
Table 2: 10 Biggest Sugar, Rice, Soybean and Wheat Exporter Countries in the Year 2016* (in thousand Tons)

No	Sugar Exporter		Rice Exporter		Soybean Exporter		Wheat Exporter	
	Country	Amount	Country	Amount	Country	Amount	Country	Amount
1	Brazil	27,120	India	10,000	Argentina	32,700	Russia	30,000
2	Thailand	8,000	Thailand	9,500	Brazil	15,500	USA	26,535
3	Australia	4,000	Viet Nam	5,800	USA	10,886	EU-27	25,000
4	Guatemala	2,310	Pakistan	4,200	Paraguay	2,710	Canada	21,500
5	EU-27	1,500	USA	3,556	China	1,900	Australia	20,500
6	India	1,500	Myanmar	1,500	Bolivia	1,850	Ukraine	15,500
7	Mexico	1,405	Cambodia	1,000	India	900	Kazakhstan	8,500
8	Cuba	1,200	Uruguay	880	Russia	450	Argentina	8,000
9	Colombia	600	Brazil	650	Ukraine	350	Turkey	5,600
10	Argentina	550	Argentina	550	EU-27	350	Mexico	1,500
11	Others	7,719	Others	3,355	Others	1,226	Others	11,597

*Prediction, source: calculated from USDA and World Bank (2017)

There is an indication of oligopoly from 10 biggest countries that produce and export food commodities. Oligopoly can be defined as a market model of the imperfect competition, which some have a significant market share that can influence the food prices in the market (Severová et al., 2011). Figure 1 shows that from production side: soybean has the highest number with 90.5%, secondly rice is 84.9%, thirdly wheat is 84.06%, and fourthly sugar is 75.1%. Then, on export side: soybean also has the highest number with 98.2%, secondly wheat is 90.6%, thirdly rice is 92%, fourthly sugar is 83.6% and lastly corn is 66.5%.

The oligopoly condition affected the food price condition. The assumption of price behaviour in finance is that there is no traditional theory about expected utility maximization in efficient markets with rational players (Ritter, 2003). So, every player in the food market (producer, consumer, and government) has their own contribution (behaviour) to create efficient market or market failure (crisis).



Source: calculated from USDA and World Bank, 2017

Figure 1: Percentage of 10 Countries that Produce and Export Staple Food in 2016

2. Literature Review

Wu and Li (2013) examine the commodity market volatility spillovers of staple food in China using univariate and multivariate GARCH models. For crude oil, corn and fuel ethanol markets of China's based on the weekly data, Wu and Li (2013) found that there were unidirectional spillover effects from the crude oil market to the corn and fuel ethanol markets. Results also show that there is no spillover effect from corn and fuel ethanol to the crude oil market. Lahiani et al. (2014) also examine volatility spillovers of wheat, cotton, sugar and corn using VAR-GARCH. The results show that these commodities have different degrees of sensitivity to past own shocks and volatility even though there is a significant return and volatility transmission across commodities. Serra et al. (2011) analyse the volatility interactions between crude oil, ethanol and sugar prices in Brazil for 2000-2008. Findings based a standard BEKK-GARCH model show that corn prices are closely connected to the crude oil prices.

The study of Al-Maadid (2016) observed the effects of food prices and macroeconomic news on GCC stock market. He found that the financial crisis affected fuel and food causality in both directions in fuel-food relationship. Further, the study concluded that the global impact of the financial crisis had important effects on the food and fuel sectors. Recently, Abdlaziz, Rahim and Adamu (2016) examine oil and food prices co-integration nexus for Indonesia. They found some evidence on the long-run raw commodity price movements that have no relation to the theory of commodity storage. Taking account of recent literature, we noted that there is not much has been done to analyse staple food price behaviour using BEKK-GARCH model, especially for sugar, rice, soybean and wheat.

Many studies used multivariate GARCH models to examine interlinkages between markets. For example, Baele (2005) examines the volatility spillover effects in the European Union (EU) markets using a regime switching to study whether there is any evidence of contagion between the US market and local European Union equity markets. The results from a bivariate BEKK-GARCH model showed that the probability of spillover intensity in the US and European markets significantly increased during 1980s and 1990s.

Abou-Zaid (2011) studied the volatility spillover of stock market from the UK and US to certain emerging markets such as Turkey, Egypt and Israel using a trivariate BEKK-GARCH Model. Abu-Zaid concluded that there was unidirectional return spillover from US to Egypt and Israel, but not for Turkey. Li and Giles (2013) examine volatility spillover of stock markets in the US and seven Asian countries using a framework similar to Abu-Zaid. The results show that there was a significant bidirectional volatility spillover between Japanese market and emerging market after the financial crisis period from 2008 to 2012. Moreover, stock markets in Indonesia, China, Malaysia, and India have shown strong volatility spillover with Japan.

3. Methodology

3.1. ARMA- GARCH(p, q) Model

With the introduction of autoregressive conditional heteroskedasticity (ARCH) model by Engle (1982), its various generalizations are introduced to capture styled facts often observed in financial data such as volatility clustering and fat tails. Bivariate and multivariate structure of GARCH models allow to capture spillover and conditional correlations between variables. In terms of distributional assumptions, it was discovered the conditional distributions such as Student's-t and conditional normal are not sufficiently heavy-tailed to account for excess kurtosis and asymmetry often observed in financial data (Premaratne and Bera, 2001).

In this paper, we consider a simple univariate GARCH (1,1) model with a conditional mean and variance equations as follows:

Mean equation: GARCH(1,1)

$$y_t = \lambda_0 + \lambda_1 y_{t-1} + \theta \dot{o}_{t-1} \dot{o}_t \quad (1)$$

where λ_0, λ_1 and θ are parameters of ARMA(1,1) model. y_t and $\grave{O}_t$ refers to returns and residuals of the data respectively.

Variance equation: GARCH(1,1)

$$h_t = c_0 + \alpha_1 \grave{O}_{t-1}^2 + \beta_1 h_{t-1} \quad (2)$$

where c_0 is a constant term and parameters $\alpha_1 > 0$, $\beta_1 > 0$ and $\alpha_1 + \beta_1 < 1$ to maintain positivity and stationarity of conditional variance h_t at time *t*. Equation (1) provides an ARMA structure of conditional mean equation and Equation (2) is a conditional variance which enable to capture time-varying volatility of the data.

3.2. The Multivariate BEKK-GARCH(1,1)

Now consider multivariate BEKK formulations of conditional variance, h_t introduced by Baba, Engle, Kraft and Kroner (1990). The conditional variance of multivariate GARCH (1,1) model can be written as:

$$H_t = C^{'}C + A^{'}\grave{O}_{t-1}A + B^{'}H_{t-1}B \quad (3)$$

where H_t is conditional variance of the multivariate BEKK-GARCH, *C* is equal $\mathrm{N} \times \mathrm{N}$ upper triangular matrix of constants, *A* and *B* are $\mathrm{N} \times \mathrm{N}$ matrices of parameters, ε_{t-1} is a residual matrix at time $\mathrm{t}-1$.

In the case of Bivariate BEKK-GARCH (1,1) the model can be written as follows:

$$\begin{bmatrix} h_{11,t} & h_{12,t} \\ h_{21,t} & h_{22,t} \end{bmatrix} = \begin{bmatrix} c_{11} & c_{12} \\ 0 & c_{22} \end{bmatrix} \times \begin{bmatrix} c_{11} & 0 \\ c_{12} & c_{22} \end{bmatrix} + \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \times \begin{bmatrix} \varepsilon_{1,t-1}^2 & \varepsilon_{1,t-1}\varepsilon_{2,t-1} \\ \varepsilon_{1,t-1}\varepsilon_{2,t-1} & \varepsilon_{2,t-1}^2 \end{bmatrix} \times \begin{bmatrix} a_{11} & a_{21} \\ a_{12} & a_{22} \end{bmatrix} + \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix} \times \begin{bmatrix} h_{11,t-1} & h_{12,t-1} \\ h_{21,t-1} & h_{22,t-1} \end{bmatrix} \times \begin{bmatrix} b_{11} & b_{21} \\ b_{12} & b_{22} \end{bmatrix} \quad (4)$$

where c_{ij}, a_{ij} and b_{ij} are constants for $\mathrm{i,j} = 1,2$. The model specification guaranteed the positivity of conditional variance. According to Worthington and Higgs (2004), there are matrix *B* and matrix *A*. Matrix *B* is related to GARCH effects, the elements of b_{ij} in matrix *B* shows the persistence in conditional volatility between market *i* and *j*. On the other hand, matrix *A* is related to ARCH effects, the elements of a_{ij} in matrix *A* shows the degree of innovation from market *i* to *j*.

We also examine the covariance specification used above to analyse the volatility spillover and conditional correlation in commodity prices Assume that the price denoted by P_t at time t and P_{t+1} at time $\mathrm{t}+1$. Moreover, the returns at time t, y_t can be defined as $y_t = \log(P_t / P_{t+1})$, a return series that follows an ARMA(1,1) model given in equation below.

$$y_t = c_t + \lambda_1 y_{t-1} + \varepsilon_t + \delta_1 \varepsilon_{t-1} \quad (5)$$

$$H_t = M_t + A_1 \varepsilon_{t-1}\varepsilon_{t-1}{}' A_t + B_t H_{t-1} B_t \quad (6)$$

where A_t and B_t are diagonal matrices. H_t is defined as multivariate GARCH formulation, M_t is constant matrix, ε_{t-1} represents residual matrix for period $\mathrm{t}-1$, λ_1 and δ_1 are constant column vectors as well.

M_t, A_t and B_t are coefficient matrices of the estimated BEKK-GARCH model as expressed below:

$$M = \begin{pmatrix} M(1,1) & M(1,2) & M(1,3) & M(1,4) \\ M(2,1) & M(2,2) & M(2,3) & M(2,4) \\ M(3,1) & M(3,2) & M(3,3) & M(3,4) \\ M(4,1) & M(4,2) & M(4,3) & M(4,4) \end{pmatrix} \quad (7)$$

$$A = \begin{pmatrix} \alpha(1,1) & 0 & 0 & 0 \\ 0 & \alpha(2,2) & 0 & 0 \\ 0 & 0 & \alpha(3,3) & 0 \\ 0 & 0 & 0 & \alpha(4,4) \end{pmatrix} \quad (8)$$

$$B = \begin{pmatrix} \beta(1,1) & 0 & 0 & 0 \\ 0 & \beta(2,2) & 0 & 0 \\ 0 & 0 & \beta(3,3) & 0 \\ 0 & 0 & 0 & \beta(4,4) \end{pmatrix} \quad (9)$$

Our aim of the study is to estimate the above models to examine the nature of volatility relationship between commodity prices. Therefore, α and β parameters are of our interest.

4. Data

We use monthly data for sugar, rice, soybean, and wheat prices from November 1983 to December 2016, which consists of 398 observations collected from the World Bank database. We define the staple food commodity variables as returns of sugar price (RSP), return of rice price (RRP), return of soybean price (RSBP), and return of wheat price (RWP). The models are estimated using Eviews and Oxmetrics software. We also separate the data into four periods, period before food crisis (before 2007), period of food crisis (2007-2010), period after food crises (2011-2016)

and the full period. The different sample period of data will be used to examine the behaviour of selected commodities before, during and after the food crisis. The world food prices have increased more than 100% in the early 2007 to middle 2008 due to the food crisis (World Bank, 2013). It is also highlighted that world food crisis took place during the period of July 2007-June 2008 and June 2010-February 2011 (see World Bank, 2012; and Cuesta et al., 2014)

Table 3 below shows that the mean return of sugar prices (RSP) is the highest among others and wheat returns show a negative returns for the period. Returns of rice shows highest skewness and kurtosis values indicating non-normality behaviour of data. Further, other series also show excess kurtosis and some skewness as evidence of non-normality. The normality of the data is rejected by the Jarque-Bera test.

Table 3: Descriptive Statistics of Data

	RSP	RRP	RSBP	RWP
Mean	0.0007	0.0002	0.0002	-0.0002
Median	0.001	-0.001	0.0003	-0.0009
Maximum	0.14	0.178	0.105	0.099
Minimum	-0.109	-0.122	-0.111	-0.106
Std. Dev.	0.036	0.026	0.024	0.026
Skewness	0.21	1.239	-0.235	0.195
Kurtosis	3.573	12.11	5.954	5.57
Jarque-Bera	8.39	1480.2	148.3	112.12
Probability	0.015	0.000	0.000	0.000
Sum	0.288	0.102	0.083	-0.095
Sum Sq. Dev.	0.539	0.273	0.234	0.269
Observations	398	398	398	398

The empirical distribution of the returns of staple food prices. Figure 2 shows that distribution of sugar returns is almost normal but distributions of RRP, RSBP and RWP exhibit a non-normal distribution with peakedness providing consistent findings as in Table 3.

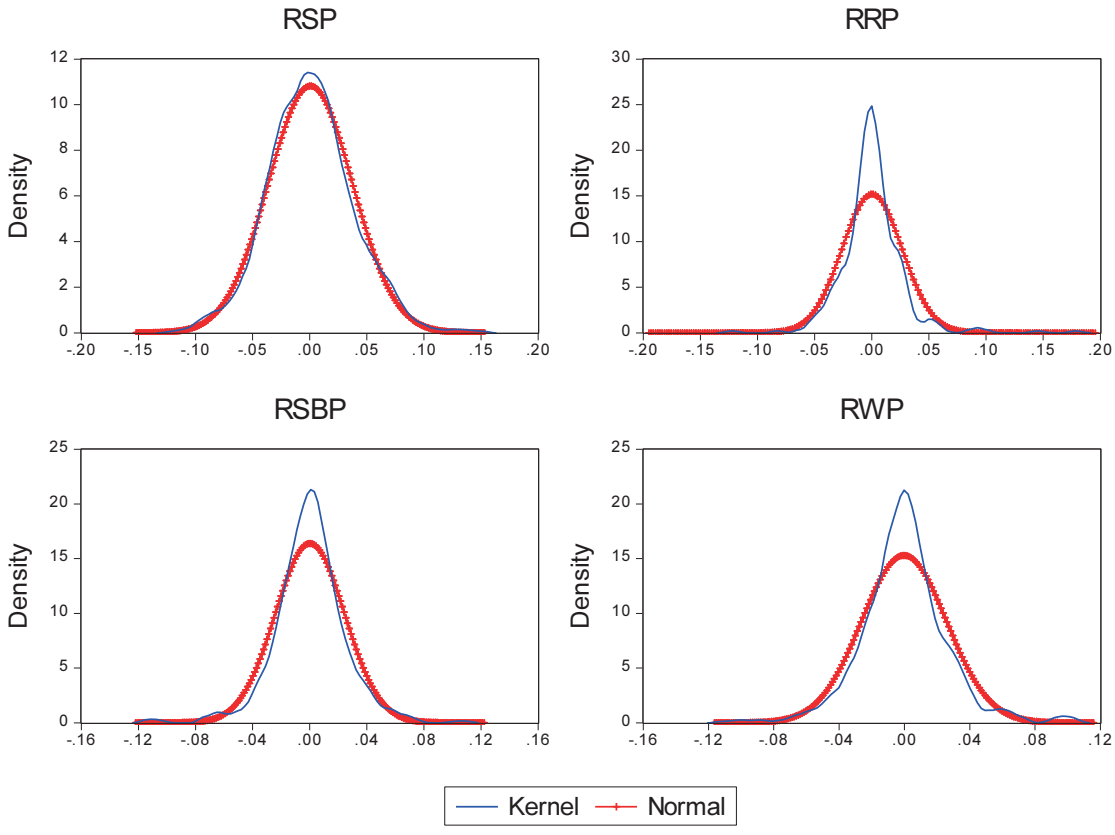


Figure 2: Empirical Distributions of The Return of Staple Food Prices (Sugar, Rice, Soybean, Wheat)

Augmented Dickey-Fuller (ADF) test is carried out to detect the stationarity of four variables, RSP, RRP, RSBP, and RWP before building the ARMA and GARCH models. The results of ADF tests show that all return series are stationary (Table 4).

Table 4: Stationarity Test Result of Augmented Dicky-Fuller

Variables	ADF Test	Mac Kinnon Critical Value	Orde Integration
RSP	-15.3763***	-3.446608	I(0)
RRP	-13.18414***	-3.446650	I(0)
RSBP	-14.56557***	-3.446608	I(0)
RWP	-15.45764***	-3.446608	I(0)

Information: significance 1%=***, test with intercept,

Table 5 shows the best fit for conditional mean equations for each of the return series. It also shows the best Model of ARMA-GARCH Dummy Variable model for Food Crisis. We chose ARMA (0,1) for RSP, RRP and RWP. Only RWP shows the conditional mean fit of ARMA (1,0) based on AIC, SC, HQ and Log Likelihood results. Then, we checked the squared residual of these models using ARCH test. The squared residual of all models are prolonged period of low volatility in certain period and supported GARCH effects. In other words, periods of low volatility tend to be followed by periods of low volatility for a long period, periods of high volatility tend to be followed by periods of high volatility for a long period. This suggests the existence of time-varying volatility in this model and it can be represented by GARCH model.

Table 5: Selected ARMA-GARCH Dummy Variable Model

No	Return of Food Price	Model
1.	Return of Sugar Prices (RSP)	ARMA (0,1) – GARCH(1,1)
2.	Return of Rice Prices (RRP)	ARMA (0,1) – GARCH(1,1)
3.	Return of Soybean Prices (RSBP)	ARMA (1,0) – GARCH(1,1)
4.	Return of Wheat Prices (RWP)	ARMA (0,1) – GARCH(1,1)

We build univariate ARMA-GARCH model to capture asymmetric volatility of the return series during the food crisis. Conditional variance equation in (2) has been modified by introducing a dummy variable to represent the food crisis period. The modified model is given below:

$$y_t = c_1 + \theta_1 y_{t-1} + e_t + \delta_1 e_{t-1} \quad (10)$$

$$\sigma_t^2 = c_2 + \alpha_1 e_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \gamma_1 (D_1 e_{t-1}^2) \quad (11)$$

where

$$D_1 = \begin{Bmatrix} 1 \; if \; Food \; Crisis \\ 0 \; otherwise \end{Bmatrix} \quad (12)$$

and γ_1 is the volatility effect during the food crisis. The effect of food crisis is incorporated in the model using a dummy variable D_1 which assumes a value of 1 during the *food crisis period* and a value of 0 otherwise. If γ_1 is positive and significant, it suggests that volatility during *period of food crisis* is bigger compared to the volatility during period *before* and *after food crisis*.

Table 6: Testing ARMA-GARCH Dummy Variable Model on Food Crisis

Particulars	RSP MA(1)-GARCH (1,1)	RRP MA(1)-GARCH (1,1)	RSBP AR(1)-GARCH (1,1)	RWP MA(1) - GARCH (1,1)
Mean Equation				
c_1	0.00004	-0.0002	0.00071	-0.0006
θ_1	---	---	0.325***	0.246***
δ_1	0.241***	0.344***	---	---
Variance Equation				
c_2	0.00005	0.00004***	0.0001*	0.0001***
α_1	0.102***	0.224***	0.071**	0.1306**
β_1	0.854***	0.698***	0.541**	0.534***
γ_1	0.036	0.083	0.291	0.321**
$\alpha_1 + \beta_1$	0.957	0.922	0.612	0.664

Note: ***,**,* represent the levels of significance of 1%,5%, and 10% respectively, Source: writer's calculation

The results in Table 6 show that the coefficients of the food crisis dummy (γ_1) are positive for all models, but statistically significant is only for wheat prices. The significance of the coefficients suggests that during the period of food crisis, the volatility increases more than it does when market is stable for wheat prices. Sugar, soybean and rice returns do not show any asymmetry in volatility during the crisis period.

We extend the univariate model to multivariate BEKK-GARCH(1,1) model to examine own-volatility spillovers and co-movement between sugar, rice, soybean, and wheat prices. The Multivariate set up allow us to examine sugar, rice, soybean, and wheat prices simultaneously. According to Schnepf (2013), these food prices tend to move together. However, a little research has been carried out in this framework for the underlying commodities. The estimated coefficients α_{ij} and β_{ij} for each i and j are assigned as follows: for *i,j*=1, 2, 3, 4, RSP denotes by 1, RRP denotes by 2, RSBP denotes by 3, and RWP by 4.

6. Discussion

6.1. Multivariate BEKK-GARCH for the Period Before Food Crisis

The multivariate diagonal BEKK-GARCH parameter estimations are summarized in Table 7 for the period *before food crisis*. The estimated model shows that α(1,1), α(2,2), α(3,3), and β(2,2) coefficients are significant in ARMA(1,1)-GARCH(1,1) models. Based on the log likelihood result and the number of the significant parameters, ARMA(1,1)-GARCH(1,1) can be considered as the best model to predict the volatility of food prices in the period *before food crisis* compared to other combination of ARMA-GARCH(1,1) model.

Table 7: Estimated Coefficients for Multivariate Diagonal BEKK-GARCH(1,1) for RSP, RRP, RSBP, and RWP Period Before Food Crisis

Parameter	ARMA(1,1) - GARCH(1,1)	
	Coefficient	Std.Error
α(1,1)	0.535424***	0.26137
α(2,2)	0.336656***	0.09098
α(3,3)	0.219733**	0.10366
α(4,4)	0.049799	0.1986
β(1,1)	0.00001	3.8096
β(2,2)	0.62037***	0.05241
β(3,3)	0.386661	3.0092
β(4,4)	0.217012	2.6121
Log Likelihood	-3470.854	
No. of Obs.	278	

Note: ***,**,* represent the levels of significance of 1%, 5%, and 10% respectively. (1,1)=RSP, (2,2)=RRP, (3,3)=RSBP, (4,4)=RWP.

The own-volatility spillover effect for sugar price (α(1,1) = 0.53) is the largest compared with other staple food prices. The *ratoon management harvesting method* in sugar cane may cause this condition. Most of the sugar cane harvest is using *ratooning method* which leaves the roots, the lower parts of sugar cane uncut and can be harvested again more than ten times (Latief et al., 2010). This method is not applied in other staple food except for a relatively small amount of rice production.

The own-volatility spillover effect for rice price (α(2,2) = 0.33) is the second largest compared with other staple food prices. According to Caballero-Anthony *et al.* (2016), rice is, without doubt, the single most important food/agriculture commodity in Asia. The relevant authorities give the best effort to maintain the volatility of rice price because it is relatively more important compared to other commodities in political point of view.

6.2. Multivariate BEKK-GARCH for the Period of Food Crisis

In Table 8, we summarized the parameter estimations of the multivariate diagonal BEKK-GARCH for the *period of food crisis*. In the *period of food crisis*, α(2,2), α(4,4), β(2,2), β(3,3) and β(4,4) parameters are significant in ARMA(0,0)-GARCH(1,1). Based on the log likelihood result and the number of the significant parameters, ARMA(0,0)-GARCH(1,1) can be considered as the best model to predict the volatility of food prices in the *period of food crisis* compared to other combination of ARMA-GARCH(1,1) model.

This indicates that the autoregressive and moving average effects have a relatively small contribution to predict the volatility of food prices during the *period of food crisis*. According to FAO (2011b), the unpredictable price movements have four types of negative impacts: poverty traps and reduced form-level investment at the microeconomic level, macroeconomic impacts and political processes impact.

The own-volatility of rice α(2,2) and wheat α(4,4) in the *period of food crisis* is significant and higher compared to the period *before food crisis*. This indicates that the past own-volatility effects during food crisis are relatively more difficult to predict because of the uncertainty and high price volatility (see Apergis & Rezitis, 2011; Abbott, 2009).

Table 8: Estimated Coefficients for Multivariate Diagonal BEKK-GARCH(1,1) for RSP, RRP, RSBP, and RWP Period of Food Crisis

Parameter	ARMA(0,0) - GARCH(1,1)	
	Coefficient	Std.Error
α(1,1)	0.000001	0.26721
α(2,2)	0.501983*	0.24630
α(3,3)	0.208063	0.15802
α(4,4)	0.419833*	0.22899
β(1,1)	0.283144	0.46509
β(2,2)	0.489526**	0.21045
β(3,3)	0.762716*	0.37767
β(4,4)	0.544795***	0.22755
Log Likelihood	-660.313	
No. of Obs.	48	

Note: ***,**,* represent the levels of significance of 1%, 5%, and 10% respectively. (1,1)=RSP, (2,2)=RRP, (3,3)=RSBP, (4,4)=RWP,

6.3. Multivariate BEKK-GARCH for the Period After Food Crisis

We can see in Table 9 that the multivariate diagonal BEKK-GARCH parameter estimations are summarized for the period *after food crisis*. The estimated model shows that α(2,2), β(2,2), β(3,3) and β(4,4) coefficients are significant in ARMA(1,1)-GARCH(1,1) models. Based on the log likelihood result and the number of the significant parameters, ARMA(1,1)-GARCH(1,1) can be considered as the best model to predict the volatility of food prices in the period *after food crisis* compared to other combination of ARMA-GARCH(1,1) model. Moreover, the own-volatility spillover effects for sugar price α(1,1), rice price α(2,2) and soybean price α(3,3) for the period *after food crisis* generally is higher compared to the period *before food crisis*. This indicates that after 2010, the own-volatility spillover for these 3 food commodity prices are stronger compared to the period before 2007. Similar to this finding, according Pop et al. (2013), after the significant volatility experienced in the midst of global (food) crisis, the world food price (especially sugar) continues to experience considerable volatility after 2009.

Table 9: Estimated Coefficients for Multivariate Diagonal BEKK-GARCH(1,1) for RSP, RRP, RSBP, and RWP Period After Food Crisis

Parameter	ARMA(1,1) - GARCH(1,1)	
	Coefficient	Std.Error
α(1,1)	0.663970	0.62242
α(2,2)	0.451545***	0.19896
α(3,3)	0.222088	0.20512
α(4,4)	0.047520	0.57439
β(1,1)	0.265990	0.22731
β(2,2)	0.475339***	0.13048
β(3,3)	0.714175***	0.11190
β(4,4)	0.590081*	2.5649
Log Likelihood	-853.81	
No. of Obs.	72	

Note: ***,**,* represent the levels of significance of 1%, 5%, and 10% respectively. (1,1)=RSP, (2,2)=RRP, (3,3)=RSBP, (4,4)=RWP.

6.4. Multivariate BEKK-GARCH for the Full Period

In Table 10, we summarized the parameter estimations of the multivariate diagonal BEKK-GARCH for the *full period*. Based on the log likelihood result and the number of the significant parameters, ARMA(1,1)-GARCH(1,1) can be considered as the best model to predict the volatility of food prices in the *full period* compared to other combination of ARMA-GARCH(1,1) model. This finding is in line with Yakubu (2016) that one of the best model to predict food price volatility is ARMA(1,1). In this *full period*, almost all parameters are significant in ARMA(1,1)-GARCH(1,1) model.

The own-volatility spillover of all commodity prices in *full period* is lower compared to period *before* and *after food crisis*. Then, the significant coefficient of own-volatility spillover of wheat α(4,4) in *full period* is lower compared to *period of food crisis*. This indicates that during *period of food crisis* in wheat market, the own-volatility spillover is higher compared to the regular condition. This result is in line with Jati (2015) because in the wheat market, during food crisis period, the volatility increases more than it does when there is a stable maket condition.

Table 10: Estimated Coefficients for Multivariate Diagonal BEKK-GARCH(1,1) for RSP, RRP, RSBP, and RWP Full Period

Parameter	ARMA(1,1) - GARCH(1,1)	
	Coefficient	Std.Error
α(1,1)	0.356678***	0.12456
α(2,2)	0.131527***	0.02475
α(3,3)	0.058486	0.21950
α(4,4)	0.021492**	0.010148
β(1,1)	0.499362*	0.29918
β(2,2)	0.815295***	0.079737
β(3,3)	0.901849***	0.16436
β(4,4)	0.975767***	0.018536
Log Likelihood	-5039.71	
No. of Obs.	398	

Note: ***,**,* represent the levels of significance of 1%, 5%, and 10% respectively. (1,1)=RSP, (2,2)=RRP, (3,3)=RSBP, (4,4)=RWP.

Most of the variables estimated in table 10 are statistically significant. Especially, the own-volatility spillover effects, namely α(1,1) α(2,2), and α(4,4) are significant. This result indicates that the past own-volatility effects are relatively strong for food prices (sugar, rice, and wheat).

6.5. Conditional Correlations of the Return of Staple Food Prices (Sugar, Rice, Soybean, Wheat) with Multivariate BEKK-GARCH Model

Figure 3 shows the conditional correlations between the return of staple food prices with multivariate BEKK-GARCH model. There are positive correlations between sugar (RSP) and wheat (RWP), sugar (RSP) and soybean (RSBP), also soybean (RSBP) and wheat (RWP) in the full period (co-movement exist). The argument is that the food commodity prices tend to move together (Pindyck & Rotemberg, 1990; Cashin et al., 1999; Savaşçin, 2012). Moreover, figure 3 also shows that the conditional correlation between rice (RRP) and soybean (RSBP) is relatively low *before food crisis* (1983-2006), then increased during *food crisis* (2007-2010), before declining again *after the crisis* (2011-2016).

The correlation between staple food prices is relatively low in overall, but show significant changes in some situations such as food crisis.

7. Conclusion

This paper applies multivariate BEKK-GARCH model to analyse the own volatility spillovers between sugar, rice, soybean and wheat Prices. This research provides a significant contribution by examining the behaviour of volatility spillovers of sugar, rice, soybean and wheat prices as these commodities are basic food commodities that are important and strategic in international commodity trade. These prices also influence the financial and commodity sectors in the food industry. The conditional variance equation of GARCH finds that the volatility increases more than it does during food crisis in the wheat market. Based on the BEKK-GARCH *full period* model, there is a strong past own-volatility effects for food prices (sugar, rice, and wheat). Although, own-volatility spillover effect for sugar price is bigger compared to other staple food prices. Future research in this area could look into the volatility spillover (transmissions) across international markets.

Several policy recommendations can be proposed based on the findings, which are: (1) relevant authorities need having a better trade agreement to the market leader, especially in food commodity trade so that the food trade can be more efficient and the price is not too volatile during food crisis, (2) international wheat market will get significant effect when the *food crisis* occurs compared to other food prices, so it is important to lower the dependence on wheat importation in Indonesia, (3) relevant authorities can make a better *early warning system* to predict the *food crisis* to minimize the risk of food price volatility.

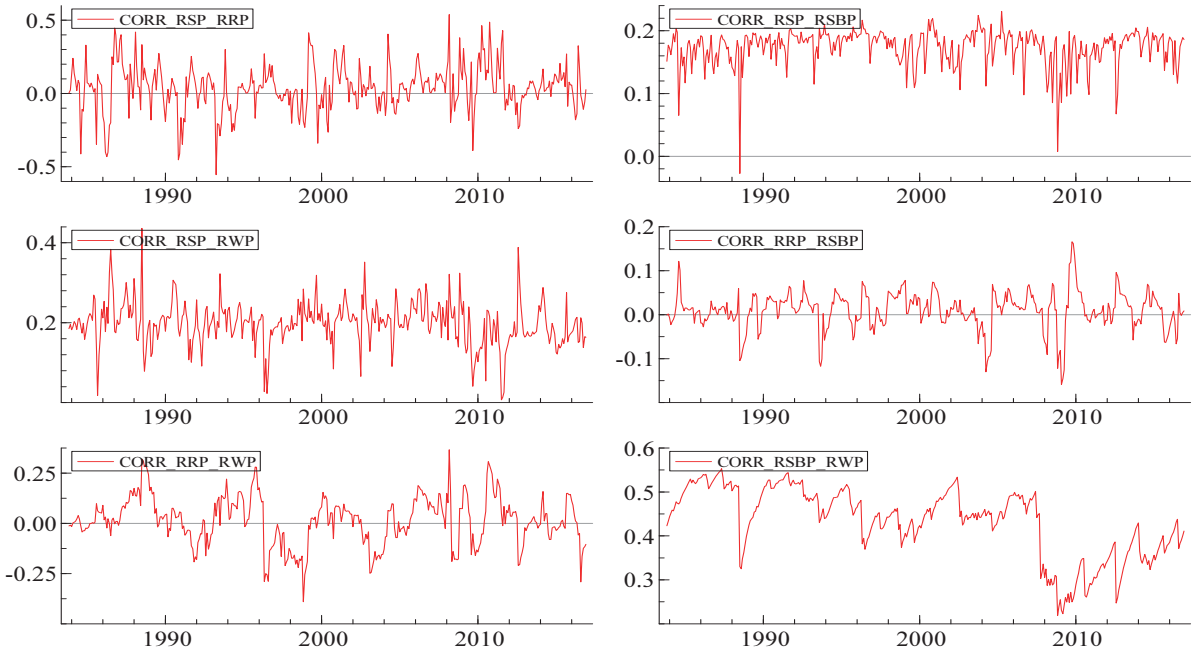


Figure 3: Conditional Correlations of The Return of Staple Food Prices (Sugar, Rice, Soybean, Wheat) with Multivariate BEKK-GARCH Model.

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Religious Oppression: Government Regulations and Social Hostilities*

Sotheeswari Somasundram [1], Abdalla Sirag [2], Ratneswary Rasiah [3], Muzafar Shah Habibullah [4]

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Abstract

Religious intolerance has become a common feature of many countries in recent times. Studies have revealed a worldwide increase in government regulations and social hostilities against religious beliefs and practices. The stifling impact of both government and society on the market for religion, warrants closer scrutiny. This study examines the relationship between government regulations and social hostilities towards religious beliefs and practices, for the period of 2001-2011 for a sample of 45 European countries. The Generalized Method of Moments dynamic panel estimation technique is employed to analyze the micro panel dataset of 45 European countries, to establish the possible relationships that may exist between these variables. The theoretical framework for this study is based on the Religious Economies Theory and the Supply Side Theory of Religion. The results of this study show evidence of the positive relationship between government regulations and social hostility. Interestingly, the study also revealed that the impact of social hostility on the level of government restrictions is smaller in magnitude compared to the reverse impact of government restrictions on social hostilities, indicating the dangerous role played by governments in inciting social hostilities, when they regulate or restrict religious beliefs and practices.

Keywords: Government restrictions, Social hostility, Religious economies theory, Supply side theory of religion.

JEL Classification Code: I31, N34, Z12, Z18.

1. Introduction

The key players in the economics of religion, comparable to that of the secular market, are equally sensitive to the forces of demand and supply, the "benefits of competition, the burdens of monopoly, and the hazards of government regulation" (Iannaccone, 1998, p.1478). Government actions in either regulating or deregulating religion can impact supply of religion and influence religious demand, and this is reiterated by Iannaccone, Finke and Stark (1997) that "government regulation can profoundly affect the producers' incentives, the consumers' options and the aggregate equilibrium" (p.351), aside from changing the religious landscape of a country. This situation was clearly evident in the many cases of religious oppression by the Chinese government, which had among others, carried out crackdowns on those who were perceived as expressing extremist religious views and behavior (such as those spotting a beard, or donning face covering veils), in an attempt to ensure that the Communist Party members

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[1] First Author and Corresponding Author. School of Business, Taylor's University Lakeside Campus, Malaysia. [Postal Address: No. 1, Jalan Taylor's, 47500 Subang Jaya, Selangor Darul Ehsan, Malaysia] E-mail: sothees@hotmail.com and sotheeswari.somasundram@taylors.edu.my

[2] Universiti Putra Malaysia, Malaysia. E-mail: siraga87@gmail.com

[3] Taylor's University Lakeside Campus, Malaysia. E-mail: Ratneswary.Rasiah@taylors.edu.my

[4] Universiti Putra Malaysia, Malaysia. E-mail: muzafar@upm.edu.my

rejected religion (USCIRF, 2016a). The stringent regulations enforced by the Chinese government has had a profound impact on the religious market, as out of the total of 1.1 billion global population who are unaffiliated with any religion, 700 million of them come from China (Pew Forum on Religion and Public Life, 2012).

The religious oppression manifesting in Europe is also particularly alarming, as the occurrences reported include both government restrictions as well societal hostilities. Some instances of governmental-led oppression in Europe reported by USCIRF (2016b) among others, include restrictions on wearing religious symbols such as the "Islamic headscarves, Sikh turbans, Jewish skullcaps, and Christian crosses" (p.221); the non-provision of non-pork alternative meal options to the French Jewish and Muslim students; and the delays in granting building permits for mosques. On the other hand, the instances of societal hostilities reported by USCIRF (2016b) include the anti-Semitic violence in the form of "verbal harassment, to vandalism of property, to violent attacks" (p.223) against Jews and Muslims. These illustrations of religious oppression are just a few examples of government and societal restrictions on the freedom to practice religion. These occurrences stress the importance of recognizing and acknowledging the impact that government regulations and societal hostilities have on the supply and demand of religion. Strong government and societal oppression can change the preference of religious consumers and place undue constrains on the supply of religion.

The present study is of the view that the impact of religious stifling on the market for religion by governments and society, warrants closer scrutiny. The USCIRF report highlights the bi-directional causality that exist between government regulations and societal religious intolerance, in which governments' impose tighter regulations in response to societal religious intolerance; or alternatively, with tighter government regulations, an environment of societal religious intolerance is created (USCIRF, 2016a). Therefore, the objective of this study is to determine whether government actions to curb religious freedom fuels societal hostilities; or alternatively whether the rise in societal hostilities forces the government to increase religious restrictions. This study will focus on Europe, as governments of European nations are mostly known to "value and protect human rights"(USCIRF, 2012, p.329), and it is therefore alarming to note that these so-called liberal countries are increasingly oppressing the freedom to practice alternative religions.

2. Literature Review

There are two theories that can be used to explain the regulation of religion. The first is the religious economies theory, where the proposition is that the unregulated religious economies will result in higher religious commitments (Grim & Finke, 2007). This theory states that religious restrictions tend to reduce the incentive for religious producers, by imposing a higher entry cost on religions not favored by the state (Finke, 1990). The restrictions on religion are dual faceted, coming either from the government or society or both. A study by Grim (2008) highlights that when fewer religious regulations are imposed, it leads to lesser conflict by providing a sense of security for the religious groups; while Grim (2012) revealed that in cases where government restricted religious conversion, social hostilities occurred in 83% of the countries; but in countries where there were no restrictions, social hostilities fell to 19%. These studies highlight the existence of a positive relationship between government regulations and social hostilities. Interestingly, Grim and Finke (2007) applied the religious economies theory to test whether social regulations had an indirect impact on religious persecutions, through government regulations. They concluded that societal pressure on religious issues does lead to increased government regulations, causing religious persecutions, which then further fuels social regulations. This circular causality between societal hostilities, government restrictions and religious persecution was termed as the 'religious violence cycle" (Grim, 2008, p.5).

There are also studies which have applied the supply side theory to explain regulated or unregulated religious economies. The supply side theory of religion posits that religious competition leads to an increase in participation, where

To the degree that a religious economy is competitive and pluralistic, overall levels of religious participation will tend to be high. Conversely, to the degree that a religious economy is monopolized by one or two state-supported firms, overall levels of participation will tend to be low (Stark & Iannaccone, 1994, p.233).

Finke and Stark (1988) applied the supply side theory to explain higher religious participation in the United States as a direct result of increased competition among religious institutions, which was supported by Finke (1990) stating that local churches in United States prospered with the decline in regulation. A conclusion supported by Iannaccone et al. (1997) that competitiveness was key in ensuring the vitality of the religious market. Froese (2001) applied the supply-side theory on religious revival in Hungary, and highlighted that the Hungarians expressed more religious enthusiasm during the early periods of the post communism but this religious enthusiasm decreased when the Hungarian government increased restrictions by favoring traditional religious groups.

Both theories emphasize the importance of an unregulated market, where the absence of government regulations on religion, or the lack of state religion or the lack of monopoly will allow the market for religion to prosper. However, it is also important to recognize the fact that restrictions on religion is not limited to its impact on the market for religion alone, but has a wider impact on the economic and social sphere as well. Dolansky and Alon (2008) highlighted that investment decisions by Japanese firms took into consideration the religious diversity of a nation, and as such, restrictions on religion could result in a decline in foreign direct investment. Grim, Clark and Snyder (2014) applied the religious economies theory to illustrate how religious freedom contributed to positive economic outcomes in regions where government regulations and social hostilities were low. In the social sphere, Grim (2008) highlighted religious freedom as a key component of a "bundled commodity" (p.6) which encouraged all religious communities to contribute positively to civil society.

Finke (2013) identified three reasons for religious restrictions, firstly the state's affiliation with the dominant religion, motivated by political support; secondly possible lack of will on the part of the government to ensure religious freedom, and finally, the social landscape which might be targeting and restricting the religious activities of minority communities. However, in certain countries, the cause of religious restrictions at home might be the direct response to what is happening in other countries. Grim (2013), in a cross-national study, highlighted that 73% of the 45 European countries (p.8) included in the study reported an increase in religious restrictions in response to foreign influence, resulting in the growing concern of rising government regulations and social hostilities in Europe.

In recent years, religious restrictions and freedoms have received considerable attention from the academic world. Fox and Akbaba (2014), in their study on restrictions imposed on religious minorities in 177 countries from 1990 to 2008, highlighted that minorities from certain Christian denominations faced the highest level of discrimination around the world, while in western countries, Muslims faced the highest level of discrimination. Rahman (2013), in a study on religious freedom of minorities in 175 countries, concludes that government intervention through instituting and subsidizing state religion, creates a monopoly in the religious market which provides political influence to state religion suppliers, which is subsequently used to curb freedom of minority denominations. However, religious restrictions do not always lead to the shrinking of religious markets. Interestingly in China, Yang (2010) highlighted how the government had failed to suppress religious freedom, where in a show of rebelliousness, many chose spirituality "without a religious label" (p.31). It was also highlighted that demand for religion continued to grow, which in turn stimulated supply, forcing the government to relax its regulations by allowing building of more temples and churches. In an earlier study by Yang (2006), it was highlighted that government regulations had resulted in a triple religious market[2] in China, and that the regulation of religion might not necessarily shrink the religious market, but instead drive religious consumers and suppliers into an underground religious economy.

Muller and Neundorf (2012) looked at the impact of religious restrictions under the communist rule on Europe's religious market, and found that the former socialist countries recorded a lower percentage of religious believers, compared to those in Western Europe. In another study by Cojoc (2010) on Eastern European countries that have imposed religious restrictions (such as restrictions of entry on nontraditional religions or providing favorable treatment for preferred religions), causing a reduction in the level of religious activities, and these findings are aligned with the religious economies theory. European countries, being an integral part of the western democracies, are perceived as advocates of human rights. In a study by Dowley and Silver (2011) on the perception of the minorities in Europe on the benefits of economic integration, it was revealed that they viewed the regional integration of European Union to safeguard their rights and welfare. In exploring whether this perception was aligned to actual practice, a review of different literatures found mixed results on the level of religious freedom in Europe. As far as the Swedish government is concerned, there is support for religious freedom, where the government has been open in handling religious issues and have exhibited constructive cooperation, rather than pursuing repressive measures (Alwall, 2000). Estonia and Latvia, on the other hand, are also for providing religious freedom (Sarkissian, 2009), while Poland displays religious tolerance towards minorities, but there were instances of variances in the group and nature of activity that they tolerated (Golebiowska, 2004). As for the Austrian government, it supports religious freedom but the same cannot be said on the social front, where there is a rise in religious discrimination (Gresch, Hadj-Abdou, Rosenberger, & Sauer, 2008). In Slovenia, on the other hand, although religious freedom is reflected in state legislations, it not fully applied in practice (Crnic & Lesjak, 2003).

The legislative methods adopted by European countries have raised concerns on the impact it would have on religious freedom. The banning of the use of hijab by

[2] A red market is the officially permitted religion, a black market is the officially banned religion, and a gray market is the religion with an ambiguous legal/illegal status (Yang, 2006: 93).

students and civil servants in France, and the outlawing of the use of niqab in public places by Italy, Netherlands, and Belgium (Byng, 2010) are stark examples of oppression of religious freedom. In conclusion, based on the review of literature and a glance of the headlines of major news channels around the globe, there is a clear indication that the current sentiments in Europe have not been favorable towards religious freedom of minorities, and this therefore justifies a need for this study to better understand the role of religious regulations in Europe. The current study adopts the framework by Grim and Finke (2007) to understand the relationship between government regulations and social hostilities. Grim and Fink's (2007) study looked at religious freedom of 143 countries in 2003 using structural equation modelling. The present study contributes to the existing body of knowledge, by applying a different estimation technique, the Generalized Method of Moments (GMM) and focusing on 45 European countries in the 2001-2011 period.

3. Methodology

3.1. Model Specification

The main objective of this paper is to investigate whether there exist a relationship between government regulations and social hostilities, as far as religion is concerned. The study will cover 45 European countries in the 2001-2011 period. The model specification for this study is based on the framework of Grim and Finke (2007) which focused on religious regulations as a cause for religious persecution. Grim and Finke's (2007) model was an extension of the clash of civilization thesis by Huntington (1993), which highlighted cultural and religious identities as the main cause of conflicts (Huntington, 1993). Grim and Finke (2007) in extending the clash of civilization analysis, incorporated the elements of the religious economies theory, namely government and social regulations, to understand religious persecution. Grim and Finke (2007) employed structural equation modelling to investigate the factors affecting government and social regulation of religion, and religious persecution, as well as the overall relationship between government regulation, social regulation and religious persecution.

Grim and Finke (2007) in modelling social regulations, considered the impact of government regulations on religious persecution which then resulted in a feedback effect on social regulations. For the case of government regulations, Grim and Finke (2007) hypothesized social regulation as having a direct impact on government regulation. In adapting this model, the present study will explore the relationship between government regulations of religion and social hostilities, controlling for other economic, political and demographic factors. Therefore, the two estimation models for this study are specified as follows:

$$SHI_{it} = \alpha_0 + \alpha_1 SHI_{it-1} + \alpha_2 GRI_{it} + \alpha_3 GDPPC_{it} + \alpha_4 HHI_{it} + \alpha_5 Percent\ Christian_{it} + \alpha_6 Percent\ Muslim_{it} + \alpha_7 Demo_{it} + \varepsilon_{it} \quad (1)$$

$$GRI_{it} = \beta_0 + \beta_1 GRI_{it-1} + \beta_2 SHI_{it} + \beta_3 GDPPC_{it} + \beta_4 HHI_{it} + \beta_5 Percent\ Christian_{it} + \beta_6 Percent\ Muslim_{it} + \beta_7 Demo_{it} + \nu_{it} \quad (2)$$

where SHI denotes social unrest and acts of religious violence measured by Social Hostility Index, GRI refers to government restriction on religious practices measured by Government Restriction Index, GDPPC denotes Gross Domestic Product per capita, HHI uses the Herfindahl – Hirschman Index to capture religious monopoly or homogeneity, Percent Christian denotes the percentage of Christians in country, Percent Muslim denotes the percentage of Muslims in the country, Demo denotes the level of democracy in the country, α_i and $\beta_i$are vector of estimated coefficients, and ε_{it} and ν_{it} are the residual terms.

3.2. Variables

This study considered two dependent variables, GRI and SHI. The data for these two variables were obtained from the Pew Research Centre's Forum on Religion & Public Life and the Association of Religion Data Archives. The data for 2001, 2003, 2005 is taken from the Association of Religion Data Archives, whereas the data from 2007-2011 is derived from Pew Research Centre's Forum on Religion & Public Life.

SHI quantifies the acts of religious violence which infringe and prevent particular religious groups from practicing their religion. The SHI was constructed by considering 13 items based on a 0 to 10 Likert scale, with 0 indicating very low social impediments to religious beliefs and practices, and 10 indicating extremely high impediments. The indicators captured the number and types of religious violence perpetrated by private individuals and social groups against religious groups in a country (Pew Research Center, 2016a, p.8). GRI was tabulated based on 20 items on a 0–10 Likert scale, where 0 indicates very low government restrictions on religion and 10 indicating extremely high restrictions. The twenty questions capture various aspects of government regulations, either imposed through national or local

governments in restricting religious practices through coercion and force[3] (Pew Research Center, 2016a,).

Grim and Finke (2007) in their model included various control variables such as gender inequality, implementation of religious law, percentage of Christians and Muslims, democracy longevity, population growth, economic strength and civilization divide. Civilization divide comprised of two measures, i.e. the composition of civilization within the country, and the Herfindahl-Hirschman Index (HHI) to measure religious concentration in a country. The present study only includes selected control variables due to data availability constraints. The control variables that this study employs are GDP per capita as a proxy for economic strength, democracy index to represent democratic longevity, percentage of Christians and Muslims; and Herfindahl-Hirschman Index (HHI) to measure civilization divide.

The HHI indicates the level of religious concentration that is whether a country is monopolized by one religion or if there is religious homogeneity. The HHI for the present study is calculated by summing up the squared market share of each of the top six religions: Christianity, Islam, Hinduism, Buddhism, Judaism and other religions in the country. The HHI ranges from zero to 10,000, in which a country with only one religion will have a HHI of 10,000 (i.e. square of 100). A higher HHI value indicates religious concentration or presence of religious monopoly in the country. The data on religious percentages was taken from the Association of Religion Data Archives (Brown & James, 2015) and Quality of Government Standard Dataset (Teorell et al., 2016). The data on GDP per capita was sourced from Quality of Government Standard Dataset (Teorell et al., 2016) as well as World Development Indicators from the World Bank.

The present study applies Voice and Accountability index as a proxy for democracy longevity, and the data is sourced from World Bank's Worldwide Governance Indicators. This index includes a set of items that captures the perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media (World Bank, 2016). The range of values lies between -2.5 and 2.5, where higher scores corresponds to stronger governance.

[3] For further details on methodology and specific items included in the measures of SHI and GRI, please refer to the following documents:

a) Pew Research Center. (2016b) Trends in Global Restrictions on Religion. Retrieved from www.pewresearch.org, b) Grim, B. J., & Finke, R. (2006). International Religion Indexes: Government Regulation, Government Favoritism, and Social Regulation of Religion. Interdisciplinary Journal of Research on Religion, 2(1).

3.3. Estimation Technique

The study uses a dynamic panel data estimation technique which yields a greater number of observations, higher degree of freedom, and reduces the problem of multicollinearity among the variables. This technique also explains the dynamic behavior by allowing the lagged-dependent variable to be one of the independent variables. In equations (1) and (2), the lagged-dependent variable is estimated on the right-hand-side, and it is included when there is an expectation that the current level of the dependent variable is determined by its past level. The justificaton is that countries having higher religious restrictions would likely be perceived unfavourably, as evidenced in the study by Grim et al. (2014), who highlighted that religious restrictions had an adverse impact on economic and business outcomes. Thus, the present study hypothesizes that GRI and SHI are determined by its past levels, as countries recording higher religious restrictions in the past years may be subjected to a decline in economic growth, thus forcing them to improve the GRI or SRI scores in the current year. The traditional estimators, such as pooled OLS and random effects (RE), and fixed effects (FE) are biased. Moreover, the potential endogeneity of the SHI and GRI regressors in equations (1) and (2), tend to make the estimates of these traditional estimators biased. To overcome this problem, Arellano & Bond (1991) suggested the use of Generalized Method of Moments (difference-GMM) as it relies on lagged-level instrumental variables (IV) for the regression of first-differences to reduce endogeneity problem. However, the difference-GMM (DIF-GMM) estimator produces downward bias, mainly in small sample size and in a series containing highly persistent-lagged dependent variable (Blundell & Bond, 1998). Consequently, Blundell and Bond (1998) proposed using system-GMM which is known to be superior in its estimation compared to first-difference GMM, since it performs better in small samples and in highly persistent-lagged dependent variable (Blundell, Bond, & Windmeijer, 2000; Soto, 2009).

To ensure the adequacy of the estimated GMM models, we perform some diagnostic tests. First, Arellano and Bond (1991) suggested a test for serial correlation that allows for the presence of first order autocorrelation AR (1), but the residuals must be free of the second order autocorrelation AR (2). Second, we test the validity of the instruments using Hansen over-identification test, to check if the p-value is greater than 0.05, as it indicates that the instruments are valid.

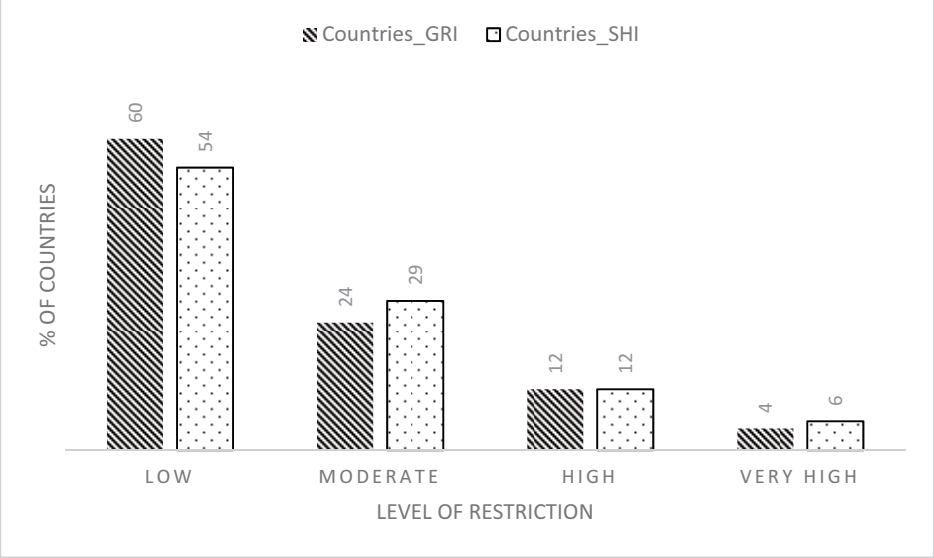
3.4. Analysis of the Data

The panel data that the study employed comprised of 45 countries from the years 2001, 2003, 2005, 2007, 2008, 2009, 2010 and 2011. The gaps in the years are due to unavailability of data. Based on Figure 1, as far as government regulations on religion was concerned, on the average, 60% of the countries recorded low, 24% recorded moderate, 12% recorded high and 4% recorded very high regulations. Other the other hand, for social hostility, 54% of the countries recorded low hostility, 29% recorded moderate hostility, 12% recorded high hostility, and 6% recorded very high social hostilities on religion.

Of the 45 countries, 85% had a population that was predominantly Christians, 4% predominantly Muslims, and the remaining 11% did not have a dominant religious affiliation. The HHI reflects the extent to which a country is dominated by one religion. The degree of market concentration indicates that countries with HHI less than 1500 are operating in a competitive market, whereas HHI values from 1,500-2,500 are moderately concentrated, and a value above 2,500 indicates high concentration (U.S. Department of Justice & Federal Trade Commission, 2010). Among the 45 countries, 91% of the countries have religious monopolies, 4% are moderately concentrated, and remaining the 4% are operating in a competitive religious environment.

The democracy index among the 45 countries indicate that on the average, 16% of the countries recorded an index of less than 0, 29% have an index between 0 to 1, and 54% of the countries fell under the category of more than 1. This indicate that a significant portion of the countries in the sample reflect relatively strong governance structure. In order to understand the economic strength of the 45 countries, the study utilized GDP per capita as a proxy. The majority (31 countries) are categorized as high income countries[4], 10 countries fall into the category of upper middle income and 4 in the category of lower middle income. The GRI and SHI for high income countries fall in the categories of low (18 countries for GRI and 23 countries for SHI) and moderate (12 countries for GRI and 5 for GRI).

Table 1 looks at the number of countries with different degrees of GRI and SHI based on religious majority, democratic index and religious concentration. Most of the 45 countries included in this study fall under the category of low GRI and SHI, where a majority of the population are affiliated with Christianity and leaning towards strong governance, but with the presence of religious monopoly.



Note: % of countries is an average for T=8.
Source: Authors' calculation, Pew Research Centre (2016) and Association of Religion Data Archives

Figure 1: Level of Government Restriction and Social Hostility

[4] Categorization by income is as defined by World Bank Income Classifications (as of December 2010).

Table 1: Cross tabulation between selected variables with GRI and SHI

			GRI				SHI			
	Variables	**Category**	[a]**L**	**M**	**H**	**VH**	**L**	**M**	**H**	**VH**
2001	Religious Majority	Christians	19	8	9	3	19	11	5	4
		Muslims	1	0	0	0	0	1	0	0
		No Majority	3	0	0	2	3	0	1	1
	Demo	Between 0 and 1	4	1	3	1	6	1	1	1
		Less than 0	3	2	2	4	3	3	1	4
		More than 1	16	5	4	0	13	8	4	0
	HHI	Competitive[b]	2	0	0	0	2	0	0	0
		Moderately Concentrated	1	0	0	1	1	0	0	1
		Monopoly	20	8	9	4	19	12	6	4
2003	Religious Majority	Christians	27	4	7	1	17	11	6	5
		Muslims	1	0	0	0	0	1	0	0
		No Majority	3	1	1	0	2	1	1	1
	Demo	Between 0 and 1	8	2	3	0	3	5	4	1
		Less than 0	1	2	4	1	2	2	0	4
		More than 1	22	1	1	0	14	6	3	1
	HHI	Competitive	2	0	0	0	1	1	0	0
		Moderately Concentrated	1	0	1	0	1	0	0	1
		Monopoly	28	5	7	1	17	12	7	5
2005	Religious Majority	Christians	24	4	6	4	13	12	8	5
		Muslims	1	0	0	0	0	1	0	0
		No Majority	4	0	1	1	2	1	1	2
	Demo	Between 0 and 1	6	1	3	2	2	5	4	1
		Less than 0	1	1	4	2	1	2	1	4
		More than 1	22	2	0	1	12	7	4	2
	HHI	Competitive	2	0	0	0	1	1	0	0
		Moderately Concentrated	1	0	0	1	0	0	0	2
		Monopoly	26	4	7	4	14	13	9	5
2007	Religious Majority	Christians	23	12	3	0	32	4	2	0
		Muslims	2	0	0	0	1	1	0	0
		No Majority	4	0	1	0	3	2	0	0
	Demo	Between 0 and 1	9	5	2	0	12	3	1	0
		Less than 0	2	1	2	0	1	3	1	0
		More than 1	18	6	0	0	23	1	0	0
	HHI	Competitive	2	0	0	0	2	0	0	0
		Moderately Concentrated	1	0	1	0	1	1	0	0
		Monopoly	26	12	3	0	33	6	2	0
2008	Religious Majority	Christians	21	13	4	0	22	15	1	0
		Muslims	2	0	0	0	1	1	0	0
		No Majority	4	0	1	0	3	1	1	0
	Demo	Between 0 and 1	8	6	2	0	8	7	1	0
		Less than 0	2	1	3	0	0	5	1	0
		More than 1	17	6	0	0	18	5	0	0
	HHI	Competitive	2	0	0	0	2	0	0	0
		Moderately Concentrated	1	0	1	0	1	0	1	0
		Monopoly	24	13	4	0	23	17	1	0
2009	Religious Majority	Christians	22	12	4	0	23	14	1	0
		Muslims	2	0	0	0	1	1	0	0
		No Majority	4	0	0	1	3	1	1	0
	Demo	Between 0 and 1	7	6	1	0	9	5	0	0
		Less than 0	2	1	2	1	0	5	1	0
		More than 1	19	5	1	0	18	6	1	0
	HHI	Competitive	2	0	0	0	2	0	0	0
		Moderately Concentrated	1	0	0	1	1	0	1	0
		Monopoly	25	12	4	0	24	16	1	0
2010	Religious Majority	Christians	17	18	2	1	23	11	4	0
		Muslims	2	0	0	0	1	1	0	0
		No Majority	4	0	0	1	3	1	0	1
	Demo	Between 0 and 1	6	7	1	0	7	6	1	0
		Less than 0	2	2	1	2	1	5	0	1
		More than 1	15	9	0	0	19	2	3	0
	HHI	Competitive	2	0	0	0	2	0	0	0
		Moderately Concentrated	1	0	0	1	1	0	0	1
		Monopoly	20	18	2	1	24	13	4	0
2011	Religious Majority	Christians	21	16	3	1	20	11	9	1
		Muslims	2	0	0	0	1	0	1	0
		No Majority	2	0	0	0	2	0	0	0
	Demo	Between 0 and 1	6	6	2	0	7	2	5	0
		Less than 0	3	2	1	1	2	2	2	1
		More than 1	16	8	0	0	14	7	3	0
	HHI	Competitive	2	0	0	0	2	0	0	0
		Moderately Concentrated	0	0	0	0	0	0	0	0
		Monopoly	23	16	3	1	21	11	10	1

[a] Categories of SHI and GRI are as defined by the Pew Research Center's Study 2012 Study where L indicates Low, M is moderate, H is High and VH is very high.

[b] Competitive, Moderately concentrated and Monopoly categories involving Herfindahl Hirschman Index are as defined by U.S. Department of Justice; & Federal Trade Commission

Source: Association of Religion Data Archives; Worldwide Governance Indicators (2016), World Bank; Pew Research Center, 2016a and Quality of Government Standard Dataset

4. Empirical Findings

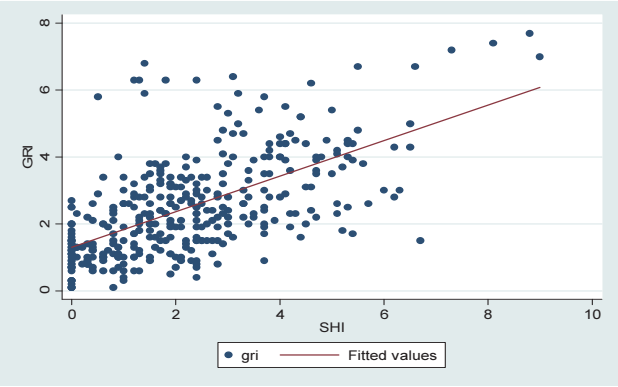
To examine the relationship between SHI and GRI in the selected European countries, we begin the analysis by presenting the summary statistics as shown in Table 2. The data shows a relatively large number of observations approximating to about 360 per variable. The indexes range between 0 (low) to 10 (high) level of social hostility and government restrictions. The data shows greater variation for SHI (between 0 and 10) compared to GRI which range within 0 to 9.17. In addition, the correlation results[5] reveal a

[5] The correlation analysis is not reported here, but the results is available upon request.

positive correlation between SHI and GRI. Moreover, Figure 2 represents the scatter plot that shows a positive link between the levels of restrictions imposed by governments and social hostilities, in European countries. This indicates that higher government restrictions on religious practices, increases the level of social hostilities. Similarly, the scatter plot shown in Figure 3 demonstrates the existence of a positive association between SHI and GRI. This implies that the increase in government restrictions is stimulated mainly by social hostilities based on religious motivation.

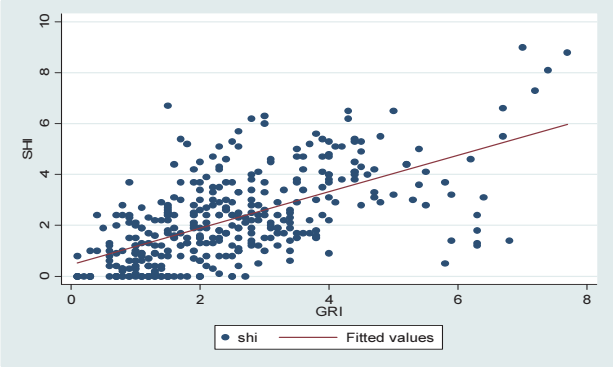
Table 2: Descriptive Statistics for Variables Used in the Analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
GRI	360	2.42	1.99	0.00	9.17
SHI	360	2.47	2.09	0.00	10.00
GDPPC	356	26,725	17,171	2,468	95,578
HHI	359	6080	2245	213	9876
Percent Christians	359	73.23	21.26	4.17	99.38
Percent Muslims	359	7.70	16.40	0.01	95.19
Demo Index	360	0.82	0.74	-1.77	1.77



Source: Authors' calculation, Pew Research Centre (2016) and Association of Religion Data Archives

Figure 2: Government restriction and social hostility



Source: Authors' calculation, Pew Research Centre (2016) and Association of Religion Data Archives

Figure 3: Social hostility and government restriction

The preliminary findings of our study reveals the possibility of a relationship between SHI and GRI. Furthermore, we allow for the dynamic feedback effect to be a determinant of GRI and SHI, in which the previous GRI and current SHI may likely affect the current level of GRI based on Model 1, whereas the current level of SHI is a function of previous SHI and current GRI, based on Model 2. The Generalized Method of Moments is employed to reduce the potential bias of the estimated coefficients. Table 3 presents the findings of system-GMM. We performed some diagnostic tests to ensure the adequacy and efficiency of the system-GMM estimator. The results revealed the existence of first order autocorrelation as we reject the null hypothesis of no serial correlation. As per the GMM requirement (Arellano & Bond, 1991), we fail to reject the null hypothesis of no second order autocorrelation at a 5% significance level. In addition, the Hansen over-identification test results reveal the consistency of the used instruments.

Table 3: Results of System-GMM

VARIABLES [a]	SHI	GRI
GRI (-1)	NA	0.771*** (0.066)
SHI	NA	0.140*** (0.039)
SHI (-1)	0.385** (0.147)	NA
GRI	1.222*** (0.195)	NA
Percent Muslims	0.031* (0.017)	-0.006 (0.006)
Demo_Index	1.253** (0.469)	-0.289* (0.148)
Constant	-2.483*** (0.910)	0.422 (0.307)
Countries	45	45
Instruments	32	30
AR (1)	0.009	0.000
AR (2)	0.066	0.119
Hansen p-value	0.170	0.095

Note: Figures in parentheses are standard errors and ***, **, * denotes significance at 1%, 5% and 10% respectively.

[a]As the explanatory variables GDP per capita, Percent Christians and HHI were insignificant for both equations the coefficients and standard errors are not shown.

The results show that the lagged dependent variable for both GRI and SHI are statistically significant. This supports the hypothesis that previous GRI and SHI have a positive and statistically significant impact on the current GRI and SHI respectively based on the two models in our study, indicating that a certain degree of persistency does exist in the restrictions imposed by both governments and society, thus justifying the dynamic assumption.

Grim and Finke (2007) identified the percentage of Muslims and civilization divide as significant variables in explaining SHI, while percentage of Christians, democratic

index and social regulation of religion explained the variations in GRI. The findings of the present study is that a one percentage increase in the share of Muslims in the country led to 0.031 unit increase in social hostilities index which are aligned with findings of past studies (Grim & Finke, 2007; Strabac & Listhaug, 2008). In addition, our findings also reveal that democratic index to be statistically significant in explaining changes to both social hostilities and government regulation of religion, where a one unit increase in democratic index leads to a 0.29 unit decrease in government regulation of religion. Previous studies have reported similar findings of democratic regimes exhibiting less restrictions on religion (Grim & Finke, 2007; Potter, 2003).

The main objective of this paper was to investigate whether a relationship existed between government regulations and social hostilities on religion and the findings confirm this relationship. However, the magnitude of impact of SHI on GRI is much lower than that of GRI on SHI. A one unit change in social hostility index lead to small change in government restriction index by only 0.14 unit; as compared to a one unit change in government restrictions which lead to a 1.2 units change in social hostilities. These findings are in contrast with those found by Grim and Finke (2007) who revealed that "social regulation has the strongest effect on increasing government regulation" (p.650). However, we need to be mindful that Grim and Finke (2007) did not test for the impact of government regulation on social regulation. Thus, the present study, while concurring with Grim and Finke (2007) on the impact of social hostilities on government regulation, further highlights that the restrictions imposed by a government has a higher impact on social hostility, compared to the reverse on how government restrictions are affected by the level of social hostility.

5. Conclusion

The motivation for the current study on regulations on religion was based on the issues relating to the ever increasing religious intolerance that has been trending throughout Europe (Pew Research Center, 2016b; USCIRF, 2014, 2016b), either in the form of government restrictions or social hostilities. The present study revealed the existence of a positive relationship between government restrictions and societal hostilities. It was further revealed that government regulations had a greater impact on societal hostilities, as opposed to the impact societal hostilities had on government regulations. The conclusion of the present study is aligned to the findings by Grim (2012), in that government restrictions on religion are instrumental in fueling societal hostilities, and the findings of this study flag a number of concerns.

In principal, countries recognize the importance of ensuring human rights, where the Universal Declaration of Human Rights was embraced by the United Nations General Assembly in 1948, articulating the rights that all individuals are entitled to. One such human rights is depicted in Article 18 on religious freedom (United Nations, 1998), and countries have reaffirmed their commitment to the principal and purpose of this charter (Hannum, 1995). Our main concern is that, given the obligation of a state is to protect and support religious freedom as an expression of human rights, the act of implementing policies that suppresses religious freedom and subsequently forces hostile reactions from society, reflects the lack of commitment on the part of the state.

Secondly, governments have justified the use of religious restrictions by stating reasons such as alignment with secular requirements (USCIRF, 2016b), or for national security purposes, or for and reducing religious extremism from abroad (Grim 2013); however the findings show that instead of creating a protective and harmonious environment that the state is hoping to achieve with restrictions, on the contrary these restrictions are causing the very conditions needed for religious social conflicts to occur.

The third concern is related to the surge in immigrant population in Europe, where the immigrant share of the population in Sweden, Hungary, Austria and Norway increased by at least 1% from July 2015 to May 2016 (Connor & Krogstad, 2016). Against this backdrop, is the social hostilities findings by Grim, (2012) who highlights that the increase in social hostilities in Europe is mainly due to difficulties in assimilating new immigrants. The increasing trend of immigrants coming into Europe is likely to continue in the near future with the rise of asylum seekers, and other categories of immigrants. Therefore, government policies that place restrictions on the practice of religion is likely to result in negative reactions leading to greater social hostilities.

The final concern is linked to the demand for religion, where studies have shown that religious restrictions do impede the growth of the religious market (see among others, Finke, 1990; Finke & Stark, 1989; Froese, 2001; Iannaccone et al., 1997). The rising religious restrictions and the resulting societal hostilities could possibly impact the number of religious adherents, especially among the minority religions. The impact of restrictions on the minority as well as state supported religions in Europe could be a possible area for future research.

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The Impact of Workers' Remittances on Household Consumption in India: Testing for Consumption Augmentation and Stability

Harridutt Ramcharran [1]

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Abstract

India is the top recipient of workers' remittance flows; recent data indicate that the Remittances/GDP ratio has increased from 2.7% in 2000 to 3.36% in 2015. We apply a consumption behavior model, based on the "permanent income hypothesis", to estimate the consumption augmentation and the stability impact for the period of 1989-2014. The independent variables are: (i) real per capita income (exclusive of remittances) is the measure of "permanent income", (ii) remittances is the measure of "transitory income", and (iii) real interest rate as the indicator of consumers' ability for intertemporal consumption. The economic ramifications are important since current global risk factors could decrease flows in the future. The results indicate the significance of all three variables; there are: (i) evidence of significant consumption augmentation, (ii) consumption responds higher to remittances than to real income, the remittance elasticity is 0.571 and the income elasticity is 0.31, and (iii) evidence of pro-cyclical effect. The VAR model indicates some linkages and causality in the series that result in small response to the shocks. Policies to increase or stabilize remittance flows and to leverage remittances for economic development are important.

Keywords: Remittances, Transitory income, Permanent income, Consumption smoothing, India.

JEL Classification Code: E20, E21, E44.

1. Introduction

The impact of remittance flows on the economy of recipient countries continues to stimulate current research, for example, Barajas et al. (2009), Fajnzylber and Lopez (2008), and Goldberg and Levi (2008).[2] Appendix Table A1 shows that remittances to developing countries are expected to rise by about 4% in 2016-2017 after a fall from 3.2% in 2014 to 0.04% in 2015. Recent studies focus on several issues: (i) UNCTAD (2011) and Adams and Page (2005) on poverty level (ii) Aggarwal et al. (2006) on financial sector development, (iii) Lueth and Ruiz-Arranz (2006) on the determinants of flows, (iv) Neagu and Schiff (2009) on the stability, cyclicality and stabilizing impact, and (v) Yang (2006) and Yang and Choi (2007) on consumption smoothing. Recent studies, World Bank (2006) and Adams (2006), are supportive of the consumption-increasing and poverty-reduction effects of remittances, these results, however, are based on survey data and the analysis of descriptive statistics. An issue with such important economic ramifications requires a more analytical methodology. The World Bank (2015) examines/discusses ways remittances can help promote consumption stability.

Of the developing countries, the largest recipients in 2014 are India ($71 bil), China ($64 bil), Philippines ($28 bil), and Nigeria ($21 bil). This study, using data from 1989-2014 and an improved methodology based on applied consumer behavior, empirically estimates the impact of remittances on consumption in India. The focus is on consumption augmentation, cyclicality, and smoothing. The model is specified within the framework of the "permanent income

[1] Corresponding Author, Professor of Finance and International Business, Department of Finance, College of Business Administration, The University of Akron, United States [Postal address: 185 E. Mill Street, Akron, OH 44325, United States] Email: Ramchar@uakron.edu

[2] Migrant remittances are defined as the sum of workers' remittances, compensation of employees, and migrants' transfers. Workers' remittances, as defined by the International Monetary Fund (IMF) in the Balance of Payments Manual, 6th edition (IMF 2010a), are current private transfers from migrant workers who are considered residents of the host country to recipients in the workers' country of origin.

hypothesis" (PIH), articulated by Friedman (1957) and Modigliani (1976); it is justified on the basis of several studies including Willassen (1978), Hall and Mishkin (1982) and Kreuger and Perri (2008). They apply (and test the validity of) the PIH to analyze consumption behavior using different measurements of income (transitory and permanent). Our model includes variables that provide better estimates of the consumption-augmentation and consumption-smoothing effects. The independent variables are: (i) real per capita national income (exclusive of remittances) as the measurement of "permanent income", (ii) remittances as "transitory income" and (iii) real interest rate (the opportunity cost of money). We justify the use of these variables within the framework of the PIH later in the paper. The interpretation of the results is as follows: (i) the coefficient of remittances (transitory income) measures the consumption augmentation effect; (ii) the correlation between remittances (transitory income) and real per capita income (permanent income) indicates the cyclical effect; a low (or negative) correlation is considered counter cyclical and a positive (or high) correlation pro-cyclical; also a negative correlation is indicative of the consumption smoothing effect of remittances, and (iii) the real interest rate indicates the ability of households (recipients) to make intertemporal substitution in consumption through savings, and the accumulation of financial and physical assets. We also estimate the dynamic aspect of the model using VAR and IRF techniques.

The findings/results have important policy ramifications regarding the leveraging of remittance flows for the improvement in economic wellbeing and poverty reduction in India. This is consistent with the achievement of the Sustainable Development Goals (World Bank, 2015) of eradicating poverty and hunger. In recent years India has implemented several policies to leverage remittances for social and economic development, they include: (a) the development of bank deposits for non-resident Indian (NRI) with competitive interest rate, (b) the issuance of diaspora bonds with competitive yield, (c) economic and exchange rate policies to encourage the inflow of remittances, (d) the lowering of transmitting fees, and (e) other avenues for investments including start-up or small business and real estate. The downside risks include: (a) in 2015, remittances decrease by 2.1% to $68.9 billion, the first decrease in several years, (b) slow economic growth in USA and Europe (the main remittance-source regions) could have a negative impact on remittance flows, (c) the decrease in the price of oil has decreased flows from the Gulf country areas, and (d) current immigration policy reform in the United States and Europe could decrease the number of working visas available to skilled foreign workers.

The rest of the paper includes the following: Section 2 reviews the relevant literature, the PIH; Section 3 discusses some empirical studies related to the PIH; Section 4 examines remittance flows and consumption pattern; Section 5 analyzes the pattern of flows to India; Section 6 discusses the impact of remittance in India; Section 7 analyzes the data and statistical properties; Section 8 outlines the specification of the model; Section 9 provides a discussion of the results; Section 10 discusses the results of the dynamic models, VAR and IRF; and Section 11 provides the summary and conclusion.

2. Relevant Literature: Permanent Income Hypothesis and Consumption

This paper encompasses the large literature (originally articulated by Friedman (1957) and Modigliani (1976)) on the determinants of household consumption. The main independent variables of these studies include: (i) current income, (ii) expected future income, (iii) wealth, and (iv) interest rate. The PIH assumes that consumers: (i) prefer a smooth pattern of consumption, (ii) are farsighted and have a clear vision (no uncertainty) about future income, and (iii) are able to borrow. On the basis of this set of assumptions, they are able to maximize "lifetime" or permanent consumption. According to the PIH, the observed value of consumers income (YO) comprises two components, permanent income (YP) and transitory income (YT); YP includes current income plus expected income from various forms of assets, YT is windfall gains measured by (YO - YP). Consumers form an estimate of YP and assign an appropriate fraction for consumption; YT does not affect consumption since its expected value equals zero; also YT and YP are uncorrelated. The life cycle hypothesis (LCH) is partly built on the PIH and focuses on consumption planning over life time, i.e. the choice between current consumption and future consumption. If consumers' current income (YC) is relatively higher (YC > YP), there is saving to be used for future consumption; borrowing occurs if (YC < YP) thus consumption smoothing takes place through borrowing and saving which are determined by the real interest rate.

The role of transitory income on consumption is crucial to the PIH which assumes that it is "windfall gains" (the random variation from average income) and is non-correlated with consumption.[3] Earlier studies, Doenges

[3] The PIH postulates the following: (i) non-correlation between the transitory and permanent component of income, (ii) non-correlation between transitory consumption and permanent consumption, (iii) non-correlation between transitory consumption and transitory income.

(1966) and Kreinin (1961), examine the marginal propensity to consume (MPC) between transitory income and permanent income, they have arrived at different conclusions. Other studies articulate the rationale for a positive MPC of transitory income; Willassen (1978) argues that if the "windfall gains" (transitory income according to PIH) are anticipated, they should be incorporated in recipients' budget plans and should not be regarded as a random variable. A common problem with these studies is how to estimate or separate the transitory component of income. Hall and Mishkin (1982) examine the sensitivity of food consumption to transitory-income; they report the significance of transitory income measured by a stochastic component of real lifetime income. Their major findings are: (i) consumption responds much more strongly to permanent rather than to transitory movement in income, (ii) the response to transitory income is vigorous if the interest rate is included in the model, and (iii) a rejection of the pure life-cycle/PIH hypothesis. The World Bank (2006, p.125) notes that remittances are viewed by households as transitory income rather than permanent and should be saved rather than currently spent.

3. Empirical Studies of the PIH

Several studies, including Laumas (1969) and Holmes (1974), have documented the measurement of YP and YT as a significant problem in the empirical estimation of the PIH. Hall (1978) notes "the major problem in empirical research based on the hypothesis has arisen in fitting the part of the model that relates current and past observed income to expected future income" (p.971), additionally, "much empirical research is seriously weakened by failing to take proper account of the endogeneity of income when it is the major independent variable in the consumption function." (p.972). Lucas (1976) argues that there is no theoretical reason for expectations formed by reasonably intelligent economic agents about future variables to be adequately explained by past data in a stable manner. Carlin and Soskice (2006) contend that it is necessary to relax some of the assumptions of the PIH in order to account for the empirical behavior of consumers' expenditures because of the uncertainty about future income and the limited access that some households have to financial markets.

The conventional practice in the literature, as noted by Hayashi (1982), has been to proxy permanent income by current or past disposable income. Hall and Mishkin (1982) and Kreuger and Perri (2008) use values for YP and YT that are different from those discussed in the theoretical PIH. The data that we use satisfy the general definition of YP and YT; furthermore, the model is applied to countries with inadequate published data on consumers' ownership of different forms of assets (wealth) and imperfect financial and labor markets.

Our methodology contributes to the current empirical literature by identifying two different sources of income flows that could be clearly classified as YP and YT. It provides results, unlike those of previous studies, that enable us to: (i) analyze consumption smoothing, (ii) determine whether remittances flows have countercyclical or pro-cyclical effects on consumption (and the economy), and (iii) examine the extent to which remittances contribute to savings and investment. The impact of real interest rate which allows for saving and borrowing, a la the Life Cycle Hypothesis (Modigliani, 1976) is also examined since it is an extension of the consumption smoothing effect.

4. Studies of Remittances and Consumption Stability

A recent study in Global Economic Prospects (World Bank, 2015) uses an econometric model to estimate the impact of remittances on the volatility in economy growth and consumption. The dependent variable is country-specific consumption growth and the independent variables are (i) country GDP growth and (ii) remittances/GDP ratio. A negative coefficient for the remittances/GDP ratio indicates the extent to which remittances help lower the volatility in country-specific consumption and output growth. The results show negative coefficients (of different magnitude) for all the regions studied, indicating that remittances have reduced the volatility in consumption and growth. Despite the rigor of this model, there are two possible concerns: (i) whether the definition/measurement of GDP already includes remittances, and (ii) the possible multicollinearity between the two independent variables since both have GDP. The virtue of our methodology is that consumption and remittances are discussed within the framework of established theory of consumer behavior.

5. Flows to India

Remittance flows are the fastest growing category of total private financial flows to developing countries. As a percentage of total flows (FDI, ODA, private debt and equity), it has increased steadily from 24.78% in 1990 to 25.79% in 2014. Several studies, Lueth and Ruiz-Arraz (2006) and Freund and Spatafora (2005), have examined the determinants. Three main drivers of remittance flows to India are: (a) the Indian migrant stock abroad, (b) economic

conditions in remittance sending countries, (c) economic, institutional, and regulatory factors in India, and (d) relative wage rate in India.[4] Flows to India started to increase in the early 1990s, from $2,382 million in 1990 to a high of $70,389 million in 2014 followed by $68,910 million in 2015. The pattern is shown in Figure 1. In terms of remittance dependency, the remittance/GDP ratio has reached a high of 3.4% in 2014.

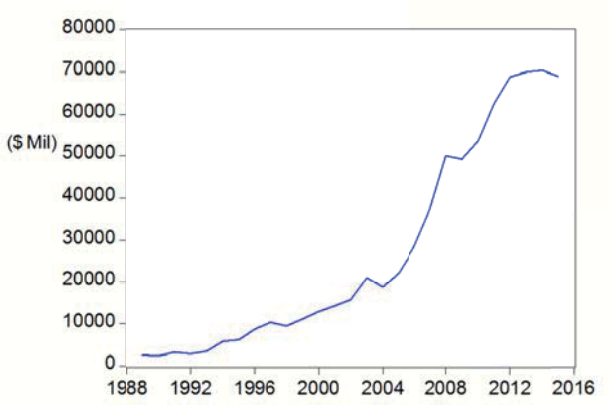

Figure 1: Remittance Flows to India: 1989-2015

Singh and Hari (2011) identify this era as the "globalization phase" of India's emigration pattern which is associated with: (i) the growth of the global information technology industry and the outsourcing of India's information technology companies, (ii) the emigration of skilled professionals (computer engineers, software designers, etc.) from India to the USA, Canada, and Europe. Liberalization policies of the Indian economy in the 1990s also made significant contribution: (i) opening the economy to foreign capital, (ii) government policies to attract remittances through NRI deposits and diaspora bonds, (iii) the introduction of market determined exchange rate and current account convertibility, and (iv) encouraging the shift from "informal" channels (unregulated hawla network) to "formal" channels (authorized dealers, money transfer companies, and money chargers); this has partially eliminated the problem of understating the value of remittances.

In terms of the geographical sources of remittance flows, the main regions are (a) North America, 44% (b) Gulf countries, 24% (c) Europe, 13% and (d) East Asia, 12%. The main risk factor is associated with the economic and political problems in these regions.[5] It is interesting to note that remittance flows are evenly distributed across the different regions/states of India. Kerala is one of the top remittance receiving states enjoying around 20% of total officially recorded estimates. Many studies have pointed out to the very high remittance dependency of Kerala.

6. Studies of the Impact of Remittances in India

A plethora of studies have focus on the impact of remittances. Chami et al. (2008), Faini (2005), Ekanayake and Mihalis (2008), and Spatafora (2005) focus on the linkages between remittances trade investment and economic growth. Adams (2006) and UNCTAD (2010) examine the consumption/expenditure pattern of remittances. Most Studies of India are descriptive with conventional data analysis. Singh and Hari (2011) analyze the contribution of remittances to the Indian economy by examining the pattern of several ratios derived from macro-economic time series data. Some of these ratios are (a) remittances/GDP, (b) remittances/FX reserves, (c) remittance/private consumption expenditure, (d) remittances/gross savings, (e) remittances/gross capital formation, and (f) remittances/trade deficit. Most of these ratios indicate an increasing trend which they infer as positive contribution to the economy. They also compare remittance flows with other forms of capital flows (foreign direct investment, official development assistant, etc.) and conclude that remittance flow is the cheapest, largest, and least volatile source of external financing.

UNCTAD (2011) uses an econometric model to examine the impact of remittances on poverty in India. The dependent variable is POV (poverty ratio in India) and the independent variables are PCY (per-capita income), INEQ (income equality as measured by the Lorenz ratio) and REM (remittances to GDP ratio). The results show that

[4] The World Bank (2016) provides information on India's emigration: (a) Stock of emigrants, 2013: 13,885.1 thousands (b) Stock of emigrants as percentage of population, 2013: 1.1 percent (c) Top destination countries, 2013: the United Arab Emirates, the United States, Saudi Arabia, Pakistan, Nepal, the United Kingdom, Kuwait, Oman, Canada, Qatar (d) Tertiary-educated as a percentage of total emigrants in OECD countries, 2011: 58.7 percent (e) Tertiary-educated women as a percentage of total women emigrants in OECD countries, 2011: 55.9 percent (f) Number of refugees, 2014: 10,393 (g) Second generation diaspora in Australia, Europe, and the United States, 2012: 1,023.6 thousands

[5] Singh & Hari (2011) also note that in the mid-1970s during the oil boom, the Gulf region was a main destination of many Indian emigrants; most of them were semi-skilled workers earning low income.

remittances have a negative impact on the poverty ratio, specifically; a 10% increase in the remittances/GDP ratio will lead to a fall of 1.7% in the poverty ratio.

Our model adds significantly to the literature by using a methodology that is rigorous and has a strong theoretical foundation. The emphasis on consumption-led growth is associated with the economic liberalization reform in India beginning in the early 1990s; the growing middle class is expected to be the engine of growth. Appendix Table A2 shows that India has comparable private consumption expenditure/GDP ratio to that of the advanced countries in Asia.

7. Data Sources and Distributional Properties

The main sources of the data are (i) Migration and Remittances Factbook (World Bank, 2016), and other editions, (ii) International Financial Statistics Yearbook (International Monetary Fund, 2016), and (iii) Migration and Remittances Brief #26 (World Bank, 2016). Real per capita national income (RGDI) is derived from deflating Gross National/Disposable Income (GNI) by population and the GDP deflator (2005=100). GNI is GDP less primary income from abroad, this lends to the accuracy of separating transitory income (remittances) from permanent income (RGDI). COM is per capita household consumption expenditures deflated by the CPI (2005=100). INT is real deposit interest rate. Remittances (REMIT) are denominated in US dollar; we adjust RGDI and COM to US dollar values using the appropriate exchange rate; this minimizes any problem in interpreting the regression coefficients.

7.1. Descriptive Statistics

The descriptive statistics are presented on Table 1; they are measured in terms of logarithmic values. In terms of variability, the standard deviation of LREMIT is 0.9237; this is higher than that of LCOM (0.671). This has important implications in terms of analyzing consumption stability and the volatility of remittances. The distributional properties of the data show non-normality; this is indicated by (i) positive skewedness for LRGDI, and negative skewedness for LCOM, LREMIT, and LINT, and (ii) platykurtic (coefficient of kurtosis < 3) for LCOM, LREMIT, and LRGDI and lepokurtic (coefficient of kurtosis > 3) for LINT. Based on the values of the Jarque- Bera statistics and the corresponding ρ-values (prob), we do not reject the null hypothesis of normality (skewness = 0, excess kurtosis = 0) for all four variables. Despite non-normality of the data, the other tests (to be discussed next) reveal their suitability for econometric estimation.

Table 1: Descriptive Statistics (Based on logarithmic values)

	LCOM	LREMIT	LRGDI	LINT
Mean	9.535036	9.497955	2.292767	2.572321
Median	9.553359	9.515166	2.188139	2.547705
Maximum	10.67784	10.91509	2.802089	2.940220
Minimum	8.403487	7.824046	1.908395	2.119864
Std. Dev.	0.670486	0.923709	0.313250	0.193272
Skewness	-0.022677	-0.180779	0.476131	-0.078103
Kurtosis	2.023516	2.185830	1.675804	3.096943
Jarque-Bera	0.796315	0.661331	2.216914	0.028165
Probability	0.671556	0.718445	0.330068	0.986016
Sum	190.7007	189.9591	45.85533	51.44641
Sum Sq. Dev.	8.541488	16.21154	1.864390	0.709730
Observations	25	25	25	25

7.2. Test of Unit Root

To avoid the problems of "spurious regression" in empirical studies using time series data, we test for the stationarity of the data, using the ADF (Augmented Dickey-Fuller) test which corrects for uncorrelated error terms. There are several tests discussed in the literature (Gujarati & Porter, 2009; Enders, 2010), however, the unit root test is very prominent. The results, shown in Table 2, indicate that for all the variables the null hypothesis of the existence of unit root (non-stationarity of the data) is rejected at the first difference level and the second difference level in the three cases that allow for (i) an intercept, (ii) an intercept and deterministic (linear) trend, and (iii) none.

Table 2: ADF Test of Unit Roots

Variable	Test in	Included in Test	Coefficient	t(tau) Value	Prob	Decision*
LREMIT	level	Constant	-0.0451	-1.0933	0.2895	Do not reject Ho
		Constant & Trend	-0.5228	-2.5796	0.0202	Reject Ho
		None	0.0167	4.3077	0.0004	Reject Ho
	1st Difference	Constant	-1.2476	-4.9764	0.0001	Reject Ho
		Constant & Trend	-1.4034	-3.1176	0.0081	Reject Ho
		None	-0.5784	-2.6246	0.0178	Reject Ho
	2nd Difference	Constant	-2.3465	-5.7881	0.0001	Reject Ho
		Constant & Trend	-2.3372	-5.5900	0.0001	Reject Ho
		None	-2.3399	-5.8761	0.0000	Reject Ho

LINT	level	Constant	-0.2076	-0.9331	0.3708	Do not reject Ho
		Constant & Trend	-0.8989	-2.7231	0.0185	Reject Ho
		None	-0.0158	-1.6374	0.1189	Do not reject Ho
	1st Difference	Constant	-1.7530	-2.6403	0.0216	Reject Ho
		Constant & Trend	-4.9265	-3.1657	-0.0158	Reject Ho
		None	-0.5288	-1.4881	0.1550	Do not reject Ho
	2nd Difference	Constant	-0.9778	-3.3922	0.0040	Reject Ho
		Constant & Trend	-1.0700	-2.1248	0.0551	Reject Ho
		None	-0.9658	-3.4501	0.0033	Reject Ho
LRGDI	level	Constant	0.0174	0.2375	0.8151	Do not reject Ho
		Constant & Trend	-0.3007	-2.5735	0.0204	Reject Ho
		None	0.0137	1.4966	0.1518	Do not reject Ho
	1st Difference	Constant	-0.9009	-3.7513	0.0017	Reject Ho
		Constant & Trend	-1.0253	-3.8870	0.0015	Reject Ho
		None	-0.7848	-3.3668	0.0037	Reject Ho
	2nd Difference	Constant	-1.6423	-8.1764	0.0000	Reject Ho
		Constant & Trend	-1.6532	-8.1291	0.0000	Reject Ho
		None	-1.6374	-8.3958	0.0000	Reject Ho
LCOM	level	Constant	0.0006	0.0445	0.9650	Do not reject Ho
		Constant & Trend	-0.6771	-3.7391	0.0039	Reject Ho
		None	0.0126	15.6108	0.0000	Reject Ho
	1st Difference	Constant	-0.6599	-2.6844	0.0163	Reject Ho
		Constant & Trend	-0.3479	-1.1446	0.2730	Do not reject Ho
		None	-0.0043	-0.0658	0.9484	Do not reject Ho
	2nd Difference	Constant	-1.5993	-7.6699	0.0000	Reject Ho
		Constant & Trend	-1.6043	-7.6090	0.0000	Reject Ho
		None	-1.5984	-7.9070	0.0000	Reject Ho

*Ho: unit root exists. Decision based on the Augmented Dicky-Fuller test statistic, MacKinnon (1996)

7.3. Test of Cointegration

The importance of a long run stable relationship among the variables used in time series econometric models is widely documented in the literature (Maddala & Kim, 1998; Enders, 2010, Johansen, 1988). The results of a model derived from cointegrating variables are stable over the period analyzed and are valid for statistical inferences. Granger (1986) avers that the test of co-integration can be thought of as a pre-test to avoid the problems of 'spurious regression'. We examine two versions of the unrestricted rank test using (a) "trace" statistics test, and (b) Max Eigen statistic each under the assumption of (i) no deterministic trend, and (ii) linear deterministic trend. The results, presented on Table 3, indicate cointegrating relationship among all four variables for both tests in most cases.

Table 3: Results of Johansen Cointegration Test

1. Trend assumption: No deterministic trend				
Unrestricted Cointegration Rank Test (**Trace**)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.883497	68.80698	40.17493	0.0000
At most 1 *	0.649316	30.10986	24.27596	0.0082
At most 2	0.464665	11.24819	12.32090	0.0751
At most 3	3.66E-05	0.000659	4.129906	0.9872
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level,				
* denotes rejection of the hypothesis at the 0.05 level				
Unrestricted Cointegration Rank Test (**Maximum Eigenvalue**)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.883497	38.69712	24.15921	0.0003
At most 1 *	0.649316	18.86166	17.79730	0.0345
At most 2 *	0.464665	11.24753	11.22480	0.0495
At most 3	3.66E-05	0.000659	4.129906	0.9872
Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
2. Trend assumption: Linear deterministic trend				
Unrestricted Cointegration Rank Test **(Trace)**				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.886521	75.70981	47.85613	0.0000
At most 1 *	0.687763	36.53928	29.79707	0.0072
At most 2 *	0.451318	15.58742	15.49471	0.0484
At most 3 *	0.233356	4.783185	3.841466	0.0287
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
Unrestricted Cointegration Rank Test **(Maximum Eigenvalue)**				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.886521	39.17054	27.58434	0.0011
At most 1	0.687763	20.95185	21.13162	0.0529
At most 2	0.451318	10.80424	14.26460	0.1643
At most 3 *	0.233356	4.783185	3.841466	0.0287
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

The distribution of the data thus indicates the existence of stationarity and cointegration, thus they are appropriate for econometric modeling.

8. Model Specification

The model specified relates real per capita consumption (COM) as a function of three independent variables (i) the real interest rate (INT), (ii) remittances (REMIT), and (iii) real per capita national income (RGDI). A positive relationship is hypothesized between COM and RGDI, and between COM and REMIT, while a negative relationship between COM and INT. A decrease in INT encourages current consumption (by borrowing) while an increase in INT motivates savings (less current consumption). The model is specified in double logarithmic form (ln) as:

$$\ln COM_t = a_1 + a_2 \ln INT_t + a_3 \ln REMIT_t + a_4 \ln RGDI_t + \mu_t \quad \text{(Eq.1)}$$

$t = 1989\text{-}2014,\ a_2 < 0;\ a_3 > 0;\ a_4 > 0$

9. Analysis of Regression Results

Each coefficient estimate is the elasticity of the respective independent variable. The results, presented in Table 4, indicate the significance of all three independent variables (at $p < 0.05$).

Table 4: Regression Results of Equation 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.376651	0.615148	7.114790	0.0000
LREMIT	0.571654	0.040683	14.05143	0.0000
LINT	-0.373820	0.140163	-2.667046	0.0169
LRGDI	0.301130	0.088035	3.420565	0.0035
R-squared	0.891549	Mean dependent var		9.535036
Adjusted R-squared	0.889965	S.D. dependent var		0.670486
Log likelihood	27.86427	F-statistic		625.7788
Durbin-Watson stat	2.150735	Prob(F-statistic)		0.000000

An R^2 of 0.89 and DW = 2.1 (indicating no autocorrelation) attest to the validity of the model and the reliability of the results. Also, with $R^2 < DW$, there is no evidence of spurious regression (Granger & Newbold, 1974); this also supported by the results of the unit root test and the cointegration test. The results indicate that the response of consumption to remittances is higher than that of income, the remittance elasticity is 0.571 and the income elasticity is 0.31. This is evidence of significant consumption augmentation effect. This finding, like Hall and Mishkin (1982), does not support the PIH that transitory income (remittances) does not impact consumption. The World Bank (2006, p.125) also notes that remittances are viewed by households as transitory income rather than permanent and should be saved rather than currently spent. There is also the saving effect since only 57% of remittances is used for consumption. This percentage (57%) is lower than that of the 70% for countries in Asia and Africa, reported by UNCTAD (2010).

Another aspect of consumption augmentation is further examined to determine the cyclical effect, i.e. to determine whether there is a smoothing impact. There is (data available upon request) high correlation (0.856) between remittances and national income (LREMIT and LRGDI), suggesting that there is a pro-cyclical impact or no consumption smoothing effect. This conclusion could be further supported by the data on Table 1 indicating that the standard deviation (volatility) of LREMIT is higher than that of LCOM. Neague and Schiff (2009) address the issue of the stability, cyclicality and stabilization impact of remittance flows in comparison with other external flows; they find, inter alia, that remittance flows are pro-cyclical, and have destabilizing effect. Singh and Hari (2011) contend that in recent years, remittances to India have been switched from consumption purposes to investment purposes; this is indicative of the amount of remittances spent for speculative purposes mainly in the stock market and investments in the booming real estate market.

The coefficient of interest rate (-0.373) indicate the ability of households (recipients) to make intertemporal substitution in consumption through savings, the accumulation of real and financial assets (bank deposit), improved access to financial services. Acosta et al. (2008) refers to this behavior as the ex-ante risk coping mechanism, part of remittances must be saved and sources of income must be diversified to enable consumption smoothing. India has implemented several financial and economic reform policies beginning in the early 1990s; interest rate liberalization was a top priority (Mohan, 2005). The results of this paper must be interpreted within the period of our study that is associated with rapid increase in remittance flows.

10. Dynamic Models: VAR and IRF

The dynamic model, focusing on lead-lag relationship between the variables in the series, is estimated using VAR technique; evidence of significant lead-lag relationship indicates causality. The importance of this test is whether the endogenous variables could be treated as exogenous. Finally, we examine the shock effects on the adjustment of the variables using the impact response function, IRF (Carter Hill et al., 2011, Ch. 15).

10.1. VAR Estimates

Table 5 shows the VAR estimates (with two lags) for each variable as the dependent variable. The result shows some significant lead-lag effects in the series for our model the dependent variable LCOM, positive LCOM(-1), positive LREMIT(-2), negative LINT(-1). Based on these results, there is some evidence of causality. Of importance to our study is the lead-lag relation of the dependent variable LCOM which is our model specification.

Brooks (2008) make some interesting comments regarding the concept of causality.[6] Gujarati and Porter (2009, Ch.12, p.789) also note that since the individual coefficients in the estimated VAR models are often difficult to interpret, the practitioners of this technique often estimate the so-called IRF. The IRF traces out the response of the dependent variable in the VAR system to shocks in the error terms.[7]

10.2. Impulse Response Function

The IRF shows the effects of the shock on the adjustment path of the variables. Carter Hill et al (2011) note that an advantage of examining IRF (and not just the VAR coefficients) is that it shows the size of the impact plus the rate at which the shock dissipates. Two considerations are important for the IRF analysis; (a) the sign (+ or -) of the responses to individual variables, and (b) whether the response dies down and after how many periods. Given the results of some linkages between the series and the Granger Causality results, the response to shocks are very small as indicated in Figure 2. Also there is no clear indication of the shocks dissipating; see top panel (row), LCOM response to LREMIT; LCOM response to LINT; and LCOM response to LRGDI.

Table 5: Vector Autoregression Estimates; t-statistics in [ ]

	LCOM	LREMIT	LINT	LRGDI
LCOM(-1)	0.904789	1.932815	0.238370	1.420033
	[3.38831]*	[1.16826]	[0.27966]	[2.44185]*
LCOM(-2)	-0.385850	-0.847640	-0.619679	-1.081085
	[-1.71369]	[-0.60763]	[-0.86223]	[-2.20474]*
LREMIT(-1)	0.038532	0.165788	0.271417	-0.345414
	[0.68127]	[0.47311]	[1.50339]	[-2.80427]*
LREMIT(-2)	0.211537	-0.066946	-0.219190	0.084144
	[2.81987]*	[-0.14404]	[-0.91539]	[0.51505]
LINT(-1)	-0.202590	0.255264	0.548906	-0.681047
	[-1.82580]*	[0.37131]	[1.54980]	[-2.81837]*
LINT(-2)	0.104473	-0.444834	-0.806494	-0.231770
	[1.14985]	[-0.79022]	[-2.78087]*	[-1.17133]
LRGDI(-1)	0.135018	-0.045090	-0.296341	0.140562
	[1.10954]	[-0.05981]	[-0.76293]	[0.53040]
LRGDI(-2)	0.129671	0.168040	0.423563	0.676438
	[1.33545]	[0.27933]	[1.36661]	[3.19887]*
C	1.970130	-1.497147	5.970931	1.974910
	[2.68996]	[-0.32993]	[2.55408]	[1.23818]
R-squared	0.899143	0.881315	0.884629	0.886552
Adj. R-squared	0.858382	0.864706	0.782076	0.874597
F-statistic	1312.307	59.08409	8.626113	82.52769

Note: * denotes statistically significant

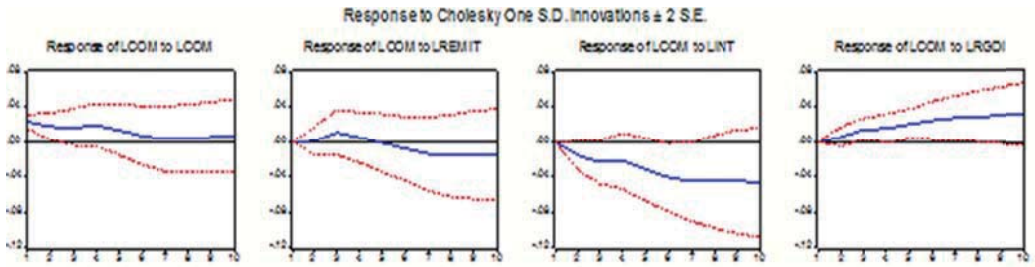

Figure 2: Impulse Response Function

[6] Regarding the interpretation of Granger-causality in the VAR model, Brooks (2008, p. 311) make the following observation, "It is worth also noting that the term 'Granger-causality' is something of a misnomer since a finding of 'causality' does not mean that movements in one variable physically cause movements in another…. rather, causality simply implies a chronological ordering of movements in the series." It could validly be stated that movements in one variable appear to lead another.

[7] A shock to the i th variable not only affects the i th variable but it is also transmitted to all other endogenous variables through the dynamic (lag) structure of the VAR. An IRF traces the effect of a one-time shock to one of the impulses/innovations on current and future values of the endogenous variables (Eviews manual #5, page 713).

11. Summary and Conclusion

This paper extends the literature on the impact of remittances on household consumption; it focuses on India which is the largest recipient of remittances and has experienced a spurt in flows beginning in the early 1990s. An empirical model, based on the PIH, is applied. There is evidence of consumption augmentation with remittances responding faster to consumption than real income; however there is little evidence of consumption smoothing. The results indicate a pro-cyclical impact, similar to the results of ECLAC (2014) on Latin America and Caribbean countries.

India has been able to successfully leverage remittances for social and economic development as discussed earlier in the paper (Ratha, 2007). However, potential risk in remittance flow could occur by the slow recovery in the United States and Europe, the drop in oil prices and restrictive immigration policies for skilled workers. How significant is this risk depends on one factor; among the developing countries India is the largest recipient country but it must be noted that its remittance dependence is low, about 4.5% of GDP in 2014.

This study uses aggregate data, the only kind available. With the availability of the published data at the regional/state level, further investigation of the spatial impact of remittances could be done given the economic diversity across India. It must be noted that the results of this study (as well as others) are based on official estimates of remittance flows. Several analysts have noted the existence of an "informal" channel for flows; the use and impact of these flows are not documented.

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CO_2 Emission, Energy Consumption and Economic Development: A Case of Bangladesh

Md. Zahidul Islam [1], Zaima Ahmed [2], Md. Khaled Saifullah [3], Syed Nayeemul Huda [4], Shamil M. Al-Islam [5]

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Abstract

Environmental awareness and its relation to the development of economy has garnered increased attention in recent years. Researchers, over the years, have argued that sustainable development warrants for minimizing environmental degradation since one depends on the other. This study analyzes the relationship between environmental degradation (carbon emission taken as proxy for degradation), economic growth, total energy consumption and industrial production index growth in Bangladesh from year 1998 to 2013. This study uses Vector Autoregression (VAR) Model and variance decomposition of VAR to analyze the effect of these variables on carbon emission and vice-versa. The findings of VAR model suggest that industrial production and GDP per capita has significant relationship with carbon emission. Further analysis through variance decomposition shows carbon emission has consistent impact on industrial production over time, whereas, industrial production has high impact on emission in the short run which fades in the long run which is consistent with Environmental Kuznets Curve (EKC) hypothesis. Carbon emission rising along with GDP per capita and at the same time having low impact in the long run on industrial index indicates there may be other sources of pollution introduced with the rise in income of the economy over time.

Keywords: Energy consumption, CO_2 emission, Environment degradation, Economic development, Bangladesh.

JEL Classification Code: O13, P48, Q56.

1. Introduction

Researchers have argued that the development of an economy is directly related to environmental awareness which gained significant attention in recent years (Teodorescu, 2012; Muhyidin, Saifullah, & Fei, 2015). In the long run, development of an economy may have significant impact on environment. On the other hand, environmental changes are also expected to have impact on the economy. Energy has been one of the driving force of economic development. A number of researchers have argued that the growing consumption of energy has been the core reason of increased carbon emission, thus resulting in environmental degradation. Hence, climate change and its impact has been a growing concern all over the world.

In a recent report by International Energy Agency (2016) it was mentioned China alone contributes 28% of global carbon emission and sector wise electricity and heat contributes 42% of the carbon emission. CO_2 emission in Bangladesh has increased from 9,123 (kt) in 1984 to 57,070 (kt) in 2011 which places the nation at 53rd position among the top 60 with CO_2 emissions from gaseous fuel consumption country (The World Bank, 2017). If the trend persists, Bangladesh may continue to move up the ranking despite the implementation of new green energy policies since the nation still largely depend on fossil fuels (crude oil, natural gas, coal and coke) energy sources.

[1] First Author. Research and Monitoring & Evaluation. Development Alternative Incorporation (DAI). Bangladesh.
E-mail: zahidul92islam@gmail.com

[2] Corresponding Author. School of Business, Independent University, Bangladesh [Postal Address: Plot 16, Block B, Bashundhara R/A, Dhaka-1212, Bangladesh]
E-mail: zaima.ahmed@iub.edu.bd Phone: +8801716845228

[3] Department of Economics, Faculty of Economics and Administration, University of Malaya, Malaysia

[4] Department of Economics, School of Business, Independent University, Bangladesh

[5] Department of Economics, School of Business, Independent University, Bangladesh

There has been enormous demand for electricity, oil gas and natural resources in the agriculture, industry, service sector alongside the daily life of people in Bangladesh. According to Ministry of Finance (2016) currently 76 percent of the total population of the country has access to electricity (including renewable energy) and, natural gas has almost met 72 percent of the country's total commercial use of energy. The share of gas, hydro, coal, import and oil based energy generation were 68.63 percent, 1.84 percent, 1.62 percent, 7.32 percent and 20.58 percent respectively.

From historical data, it is found that in FY1995-96 maximum electricity generation was 2,087 MW which has increased to 9,036 MW on 30st June 2016. With increasing industrialization, extensive urbanization, growing population and rising standard of living - demand for electricity has been growing extensively. However, to what extent consumption of electricity has detrimental effect on the environment is yet to be measured. In recent years there has been growing concern regarding this relationship between energy consumption and environmental awareness and sustainable economic development.

Consumption of energy depends mostly on the stage of economic development. This paper attempts to investigate the long-run relationship between environment degradation (emission of CO_2, responsible for climate change), income, energy consumption and industrial production index growth in Bangladesh from year 1998 to 2013. One of the main limitation of this study is the availability of data beyond the selected time period.

2. Literature Review

As world population is increasing, industrialization is spanning - a number of studies have been carried out to see the linkages between CO_2 emission, energy consumption and economic growth around the world. Energy consumption plays an important role in economic growth. Kraft and Kraft (1978) were the pioneers in this field of study where they investigated the relationship between energy consumption and economic growth by using various econometric methods for different time periods. The pioneering work of inverted U-shaped relationship between economic growth and income inequality has been later reformulated to test similar inverted U-shaped relationship between economic growth/income and environmental quality (Kuznets, 1955). According to the reformulated hypothesis, as initial per capita income rises, there is increasing environmental degradation. However, after reaching a critical level of economic growth it tends to decrease. Thus, on a similar note, Rothman and De Bruyn (1998) argue that economic growth may become a solution rather than a source of the problem.

Dinda (2004) in his report reviews some of the empirical studies on Environmental Kuznets Curve (EKC) hypothesis. He found that the evidences of EKC are questionable with different types of pollutants. The study proposed that further studies on income level and pollutant emission to incorporate proper economic modeling. Structural and decomposition analysis is promoted to have better results than reduced-form model analysis. Also, the addition of time series analysis is to complement existing panel data analysis - as it provides a better understanding of a country's development and its pollution level over time.

Chen (2009) detected the existence of co-movement between environmental degradation and income in China. China's economic growth and export trade significantly elevated its carbon emissions, and the rapid economic growth is the main determinant of increased carbon emissions (Yue, Long, Chen, & Zhao, 2013; Wang, Fang, Guan, Pang, & Ma, 2014). Investigation by Lee (2005) found long-run and short-run causalities from energy consumption to GDP, however there no evidence of reverse causality. This finding suggested that economic growth might have adverse effects on energy conservation, which may be a temporary or a permanent trend in developing countries. Halicioglu (2009) found bidirectional Granger causality in the long run and short run between economic growth and carbon emissions while Soytas, Sari, and Ewing (2007), and Soytas and Sari (2009) found unidirectional Granger causality running from energy consumption to carbon emissions in the long run.

Zhang and Cheng (2009) analyzed causality between economic growth, energy consumption and carbon emission. In their analysis, they found uni-directional causalities running from economic growth to energy consumption and energy consumption to carbon emissions in the long run. A study by Belke, Dobnik, and Dreger (2011) provides a new insight on the relationship between total energy use by the population and income development level for 25 OECD countries. Cointegration analysis and dynamic panel causality method was applied in their study indicating a two-way causality through Granger method testing between total energy use by the population and income development level. Stolyarova (2009) established short-run relationship between CO_2 emissions and its determinants by analyzing the relationship between CO_2 emissions and economic growth, using a panel data set of 93 countries for 1960-2008. In her analysis, it was found that the growth rate of per capita GDP has a strong positive impact on the growth rate of per capita CO_2 emissions while it has an inverse relationship with the growth rate of the energy mix. According to Islam, Shahbaz, Ahmed, and Alam (2013)

research on the effect of South Africa's economic growth and coal consumption on CO_2 emissions over the period 1965–2008 showed that with increasing economic growth energy emissions also increases, coupled with coal consumption, making a significant contribution towards deterioration of the environment.

In an analysis by Al-mulali, Fereidouni, Lee, and Sab (2013) it was found that about 60% of Latin American and Caribbean countries maintained a positive bidirectional long-run relationship between energy consumption, CO_2 emissions, and economic growth, the remaining 40% yield mixed results. Further study by Saboori, Sapri, and bin Baba (2014) explores the long-run causality among the total energy use by transportation industry, environmental degradation and income development level for OECD countries. The authors conduct a fully modified OLS estimation to explain the cointegration equation in the series. Also, shock to total energy use by transportation industry, environmental degradation and income development level are analyzed in the study through impulse response function. A study by Islam et al. (2013) also incorporated financial development in their study. They found evidence indicating that an advancement in financial sector lead to a decline in pollution level due to increase in efficiency within the industries. They employed the VECM estimation to estimate the Granger causality between the variables. Results from their two-time period estimation indicate that total energy use by the population in Malaysia is influenced by its financial development and GDP growth. In a more recent study, Muhyidin, Saifullah, and Fei (2015) suggested that the economic sustainability will not be affected by pollution abatement policies for CO_2 emission. Moreover, current energy use policies should be complimented with renewable energy resources such as, wind, bio-fuel and solar energy.

Industrial outputs are known to emit high level of pollution especially from developing countries. Chen (2009) conducts a test between industrial output and input of Chinese industries, income development level, pollutant emission and total energy use by the population. The author found a positive relationship between total energy use by the population and capital to the industrial production index growth. However, industrial production index growth is negatively affected by pollutant emission and employment level. The author suggests technology-driven policies to control for emission while maintaining positive income development.

3. Research Methods and Data Source

This research adopts a similar technique used by Islam et al. (2013) and Muhyidin, Saifullah, and Fei (2015) to study the relationship between per capita CO_2 emissions (E), per capita gross domestic product (GDP), per capita energy consumption within the country (EC) and industrial production index growth (IPI).

Where,

$$E = f(GDP, EC, IPI)$$

$$Et = \alpha 0 + \alpha 1GDPt + \alpha 2ECt + \alpha 3IPIt + \mu t$$

This study uses data from the year 1998 to 2013 of Bangladesh economy from the World Bank Data Bank. In this study, all variables are transformed into log-linear forms except industrial production index growth (IPI) because IPI data is already in percentage. This study uses Phillips-Perron (PP) test for unit root test. Followed by Johansen cointegration test. To study the relationship between the variables this study used VAR model and variance decomposition of VAR.

4. Result Analysis and Discussion

Unit root tests are conducted for the full sample period with two lags in order to determine the stationarity characteristics of the individual variables. These test results are summarized in Table 1. The result of PP unit root test indicates that all selected variables are stationary and integrated at 2nd difference, and the result is not consistent with Azlina and Mustapha (2012), Saboori and Sulaiman (2011), and Muhyidin, Saifullah, and Fei (2015). However, those studies also used PP unit root test.

Table 1: Phillips-Perron (PP) unit root result

	Level	1st difference	2nd difference
Variable	P-value	P-value	P-value
EC	0.9972	0.0140**	0.0001***
E	0.9840	0.0182**	0.0001***
GDP	1.0000	0.7534	0.0947*
IPI	0.0371**	0.0005***	0.0003***

Notes: *** indicates 1%, ** indicates 5% and * indicates 10% level of significance.

The evidence of cointegration in the series is analyzed by applying the Johansen cointegration test. Table 2 summarized the result from trace statistics and maximum eigenvalue of Johansen cointegration test with null hypothesis of no presence of cointegrating equations among the variables.

Table 2: Johansen cointegration tests result

Hypothesized No. of CE(s)	Trace Statistics	Maximum Eigenvalue
r = 0	90.12667***	46.04756***
r ≤ 1	44.07911***	21.53421**
r ≤ 2	22.54490***	16.75833**
r ≤ 3	5.786564**	5.786564**

Notes: *** indicates 1% and ** indicates 5% level of significance

The result shows that at every rank for the both trace statistics and maximum eigenvalue values are significant at 5% level. Therefore, there is no evidence of cointegrating equation among the four variables. Since there is no cointegration, study proceeds to unrestricted VAR model (Ali, Saifullah, & Kari, 2015).

4.1. VAR Model Estimates

The VAR model is estimated by using E, GDP, EC and IPI. Unrestricted VAR in level has been performed to understand the effects and relationships. In the vector autoregression estimates, two lags have been used with a constant for each variable. Table 3 shows the regression result of the model. The high values of adjusted R-squared suggest that the fit is good for each variable of the model. The F-statistic is very high for each variable of the model which means it is a good fitted model and independent variables of each model explains the variation of dependent variable. Table 3 also shows that both lag of GDP and 1st lag of IPI is significant at 5% confidence level. Hence, CO_2 emissions in Bangladesh are stimulated by its per capita gross domestic product and industrial production growth. The VAR result is consistent with Stolyarova (2009), Yue et al. (2013) and Wang et al. (2014), however, in Malaysian industrial production growth and economic growth stimulates energy consumption (Muhyidin, Saifullah, & Fei, 2015).

Table 4 shows the variance decomposition results for the VAR model for the next 10 years. Variance decomposition of E shows that, GDP has a weak effect on E in the short run, but in the long run GDP has stronger effects on Lee (2005) came to a similar conclusion; on the other hand, Stolyarova (2009) found that E has a stronger relationship with GDP in short run. The table shows that GDP has a weak effect on E until year three, but it increases to 55.58 in year five. Then it drops slightly over the next two years to 51.62 and eventually go up to 55.68 by the 10th year. Similar analysis shows the effect of E to GDP is very small but somewhat consistent over time. The results indicate higher emission associated with rise in income. On the other hand, IPI has a strong short run effect to E and the effect is weaker in long run and the effect of E to IPI is weak but consistent over time which is supported by the hypothesis of EKC (if the assumption of development reliant on industrialization is taken); environmental degradation occurs in the early stage of development and subsequent turning point which leads to better environmental condition (Grossman & Krueger, 1991; 1995; Galeotti, Lanza, & Pauli, 2006; Fodha & Zaghdoud, 2010; Puzon, 2012). In case of Bangladesh increased carbon emission (having weak relation with Industrial production) with increase in GDP could possibly arise from other sources created, which calls for attention. Further investigations can be undertaken to identify the potential sources and mitigate the problems to achieve sustainable development.

Similarly, variance decomposition shows the impact of EC on E does not vary much between short and long run. The effect of E on EC is observed to decrease with passage of time. The findings differ slightly with Soytas, Sari and Ewing (2007), Soytas and Sari (2009), Zhang and Cheng (2009).

Table 3: VAR Estimates

	E(-1)	E(-2)	GDP(-1)	GDP(-2)	EC(-1)	EC(-2)	IPI(-1)	IPI(-2)	C
	0.07	0.63	-0.76**	1.43**	-0.23	-0.35	0.00**	-0.00	-1.23
R-squared	0.996								
Adj. R-squared	0.989								
Sum sq. resids	0.000								
S.E. equation	0.008								
F-statistic	147.74								
Log likelihood	54.96								
Akaike AIC	-6.56								
Schwarz SC	-6.16								
S.D. dependent	0.076								

Notes: ** indicates 5% level of significance

Table 4: Variance Decomposition of VAR Models

Variance Decomposition of E					
Period	**S.E.**	**E**	**GDP**	**EC**	**IPI**
1	0.007159	100.0000	0.000000	0.000000	0.000000
2	0.009993	63.24150	3.357793	22.55720	10.84350
3	0.011589	51.86421	2.876199	23.97942	21.28018
4	0.015201	33.36009	31.24760	21.76006	13.63225
5	0.020475	19.11642	55.58323	17.76950	7.530845
6	0.021557	18.13781	52.12301	22.74510	6.994077
7	0.022954	20.21424	51.62206	20.33861	7.825088
8	0.024960	17.44065	56.43903	18.33459	7.785734
9	0.026089	17.08192	57.65971	17.99305	7.265317
10	0.026958	16.11901	55.67884	21.37719	6.824957
Variance Decomposition of GDP					
Period	**S.E.**	**E**	**GDP**	**EC**	**IPI**
1	5.616059	1.187668	98.81233	0.000000	0.000000
2	10.97521	1.261428	97.41281	1.211638	0.114125
3	15.04684	0.738519	98.28302	0.878488	0.099974
4	17.94862	0.836717	97.86867	1.224148	0.070461
5	20.01408	1.523960	97.30595	1.113415	0.056671
6	21.40629	1.739825	96.71840	1.486746	0.055024
7	22.91618	1.980732	96.43068	1.528995	0.059589
8	24.99818	1.776210	96.53650	1.631834	0.055458
9	27.53206	1.628940	96.84087	1.484424	0.045763
10	30.19821	1.468346	96.86606	1.627099	0.038499
Variance Decomposition of EC					
Period	**S.E.**	**E**	**GDP**	**EC**	**IPI**
1	2.220639	42.70781	13.33983	43.95236	0.000000
2	3.159622	31.75171	8.622308	51.41105	8.214940
3	3.500724	30.28786	8.922192	44.03496	16.75500
4	4.794142	19.16561	42.52552	28.37014	9.938728
5	6.267350	12.29160	60.57490	21.31578	5.817724
6	6.604486	11.51221	57.42904	25.57063	5.488119
7	7.012896	13.98678	56.95170	22.95560	6.105912
8	7.554786	12.32021	60.48140	21.07629	6.122102
9	7.956735	12.17877	62.23006	19.93094	5.660230
10	8.276817	11.37905	61.17443	22.16797	5.278551
Variance Decomposition of IPI					
Period	**S.E.**	**E**	**GDP**	**EC**	**IPI**
1	2.729765	7.656510	43.37781	32.60065	16.36503
2	2.845250	8.264732	41.08499	31.37828	19.27200
3	2.960043	8.866042	38.53278	30.97897	21.62220
4	3.608757	7.644613	50.57110	25.15140	16.63288
5	3.755104	7.546043	52.43489	23.38325	16.63582
6	4.424155	6.649095	60.26395	18.15001	14.93695
7	4.475845	6.552753	61.00946	17.74522	14.69256
8	4.737869	6.165267	60.82359	19.20238	13.80876
9	4.855905	6.086262	60.74827	19.95025	13.21521
10	4.890160	6.660286	59.90107	19.77527	13.66337

5. Conclusion and Recommendation

This paper investigates the relationship between environmental degradation (through carbon emission), income, energy consumption and industrial production index growth in Bangladesh. This topic deserves special attention since the growth of any developing economy is associated with degradation of the environment due to heavy reliance and consumption of pollutant emitting energy sources (Ueta & Mori, 2007). At the same time, substantial economic growth can help achieve better quality of the environment which could ensure sustainable economic development.

Findings from VAR analysis suggest that in the case of Bangladesh, GDP per capita and industrial production have significant relationship with CO_2 emission. Further analysis through variance decomposition shows carbon emission has consistent impact on industrial production over time, whereas, industrial production has high impact on emission in the short run which fades in the long run which is in consistence with EKC hypothesis (Grossman & Krueger, 1995; Galeotti, Lanza, & Pauli, 2006; Fodha & Zaghdoud, 2010; Puzon, 2012). This is an indication that Bangladesh may be nearing the turning point where further development could be achieved with low carbon emission if other sources of emission can be tackled.

CO_2 emission rising along with GDP per capita and at the same time having low impact in the long run on industrial index growth indicates that there may be other potential source of carbon emission created with development which can be looked into in further studies. Also, consistent impact of CO_2 emission on energy consumption indicates that investment in environment friendly technology is something which can be addressed with more importance to ensure sustainable development.

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Factors Impacting on the Supply Chain Collaboration of the Furniture Industry in Vietnam*

Huynh Thi Thu Suong [1]

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Abstract

The purpose of this research is to explore the factors affecting on Supply chain (SC). In fact, the collaborative supply chain (CSC) concept in Vietnam is quite new. Apart from obvious differences of doing business between Western versus and most of developing countries such as Vietnam, the literature suggests that collaboration in the supply chain (SC) of the furniture industry are quite low. The primary reason for such low adoption rates is low awareness of enterprises. In order to achieve the purpose of this study, a literature survey related to SC, CSC was carried out, and an empirical analysis was conducted among 276 manufacturers in this industry with the results analyzed. Using Cronbach's alpha analysis, Explore Factor Analysis (EFA) and Regression Analysis (RA) with primary data collected 276 valid samples from 393 samples in Vietnam, this paper explores and confirms that there are existed six basic factors affecting the collaboration in supply chain including: (i) Trust; (ii) Power; (iii) Maturity; (iv) Strategy; (v) Culture; and (vi) Frequency. Results of the research show strong evidences for policy makers and enterprises for management the supply chain collaboration in furniture industry as well as its contribution to literature review of supply chain management.

Keywords: Furniture industry, Supply chains, Collaboration, Vietnam.

JEL Classification Code: L10, L21, M10, M11.

1. Introduction

Regarding to restructure the business activities towards escalating competitiveness and added values, SC is considered as a key strategy for the survival and development of any enterprise, especially in furniture industry. The furniture industry in Vietnam has a great deal of potential growth demonstrating during the past decade by increasing of numbers's enterprise and export rate. In 2016, Vietnamese funiture industry was ranged as the 4th exporter in the world after China, Germany, Italy (2016) and the 2nd in the Asean just behind Malaysia, this industry has made significant progress in various aspects such as decent packaging or more efficient/time-saving assembling process. The Voluntary Partnership Agreement (VPA) on Forest Law Enforcement, Governance and Trade (FLEGT) between Vietnam and the European Union (EU) has enacted already. This is considered as a great opportunity for the Vietnam wood industry to expand competitiveness in export market. However, this industry has been showing many weaknesses whether not improving, causing substantial challenges for the development of the industry in the coming time including spontaneous production and distribution, lack of connection among stakeholders, and failure in meeting sustainability requirements for both objective and subjective reasons. To deal with this matter, the CSC should be conducted for this industry as soon as possible.

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[1] Corresponding Author, University of Finance and Marketing, Ho Chi Minh City, Vietnam. [Postal Address: 2/4 Tran Xuan Soan, Tan Thuan Tay Ward, District 7, Ho Chi Minh City, Vietnam]
E-mail: h.thusuong@gmail.com

2. Literature Review

2.1. Overview of Supply Chain Collaboration

2.1.1. Supply Chain Collaboration

SC is a network of production and distribution which performs the functions of purchasing raw materials, converting raw materials into finished products, and distributing them to customers (Ganeshan & Harrison, 1995). It means the SC consists of relevant, direct or indirect stages, to meet customer needs. SC not only includes manufacturers and suppliers, but also carriers, warehouses, retailers and customers themselves (Chopra & Meindl, 2001). In general, SC is considered as connections between suppliers, customers, manufacturers and service providers involved in the business process. In other words, SC is a process that starts from raw material until the end product which is made and delivered to consumers in order to achieve two basic objectives: (i) Establishing relation between suppliers of suppliers and customers of customers as they affect results and efficiency of the supply chain; (ii) Gaining effective and efficient throughout the supply chain. Therefore, building collaborative relationship is necessary to improve the business efficiency in the SC.

CSC is widely studied from many different points of view and collaboration concepts began to be widespread thorough in the areas of SC in the mid-1990s (Barratt, 2004). Collaboration is defined as a cooperation of two or more members by working together to create a competitive advantage through information sharing, joint decision making, and sharing the benefits from greater profits by satisfying the customer needs than acting alone (Simatupang & Sridharan, 2002). Simatupang and Sridharan (2005a) explain that collaboration is one what between independents but related companies to share their resources and their abilities to meet the needs of customers. Simatupang and Sridharan (2005b) defines the term of collaboration is two or more companies share responsibility to exchange information, management, implementation, and performance measurement plans. The cooperation can be described as a reciprocal relationship type, in which participants agree on investment in resources, along with achieving goals, sharing information, resources, rewards and responsibility as well as to make decisions and solve problems together. In conclusion, CSC helps a business organization to coordinate and operate efficiently, such as supply chain management, cost–saving and inventory, increasing the level of customer satisfaction (Hadaya & Cassivi, 2007; Lambert & Gardner, 2004; Bäckstrand, 2007).

2.1.2. Types of CSC

The relations of SC are mostly active vertically or horizontally. Vertical relations cover all of the relations within the enterprises, between components in difference classes. While horizontal relations are within the same class. A vertical relation completely connects the first provider in many ways to final customer. These relations occur when central factors increase influence on other factors in many different classes. Vertical alignment is always directed at both the relationship between the manufacturer and the first supplier and between the manufacturers and the final customer (Christopher & Towill, 2001). There are three forms building supply chain collaborations including vertical collaboration, horizontal collaboration and multi-dimensional cooperation (Benita, 1997; Suong, 2012).

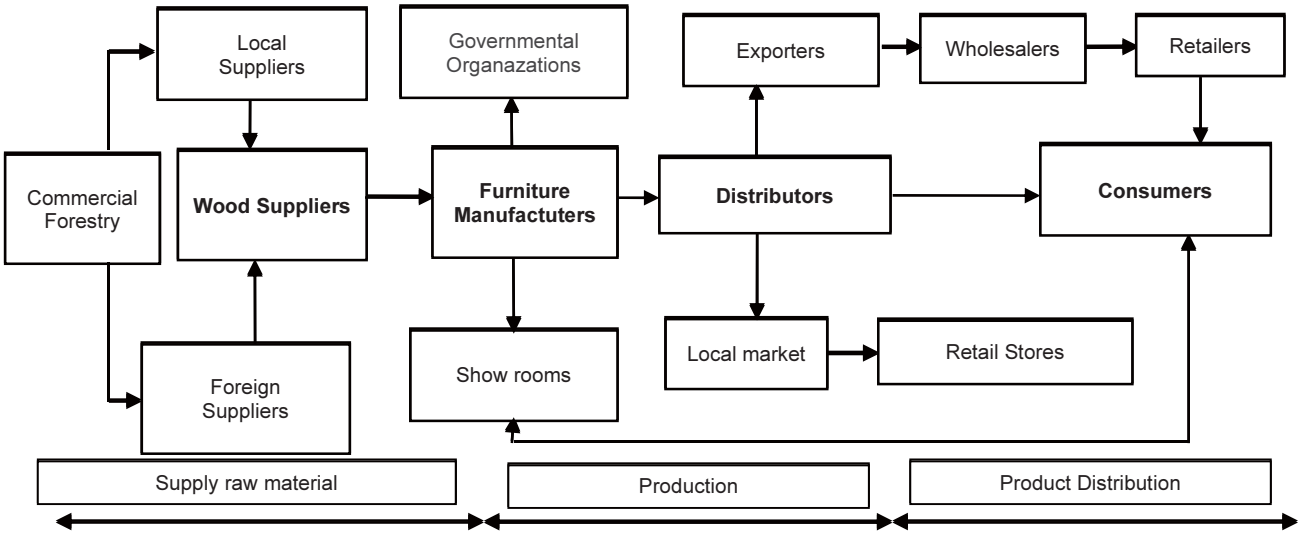
2.1.3. Levels of CSC

The interaction in the supply chain including three main components or more, referred to transaction activity, collaboration and relationship (Suong, 2012). Each level of interaction contains a continuum type of relations as following, (i) Transaction is generally understood as the exchange or transfer of goods, services or finance to each other. A transaction relationship means the activity of exchanging discrete value, especially about price (Bäckstrand, 2007). The commercial transactions that involved price negotiation when the relationship with suppliers is a rival relationship and the goal is to increase personal profit of a member in the chain; (ii) Cooperation is like working together or cooperate with a partner to whom cannot connect immediately. In other word, cooperation can be beneficial for all of actors among SC. The types of collaborative relationships are rival cooperation or non-rival cooperation (Cox, Sanderson, Watson, & Lonsdale, 2001), partners and the cooperation between manufacturer and supplier (Harland, 1996); (iii) Linking form is often viewed as an union of the two entities into one entity for a business progress between two actors, the affiliate relationship consists of vertical link, buy back and venture, and full-ownership or merged (Togar & Sridharan, 2002).

2.2. Framework of the Factors Affecting Supply Chain Collaboration

2.2.1. Structure of Furniture Supply chain in Vietnam

Depend on each industry, there are differrent actors in its SC. In the furniture industry, there are three major actors within SC including wood supplier – manufacturer – distributor in figure 1 as below



Source: Based on Surveyed and Synthesized by Suong(2011a&b, 2013)

Figure 1: Furniture supply chain of Vietnamese enterprises

Surveying characteristics of enterprises within the furniture industry including three major actors are material suppliers, manufacturers and distributors. It was found that these enterprises do not have a close connection (both vertical and horizontal) among them. For example, they have not yet been aware of using the same technical production from raw material standards, in compliance with specification and quality standards. This reveals actors' activities in this SC are spontaneous and scattered, prefer Short-term interests than Long-term benefits. To be better understood role and relations among actors in the CSC, this paper focuses on analyzing the role of each actor as follows:

- **Suppliers**: Almost wood materials for processing has still relied on imported source and planted timber. There are two types of suppliers which are foreign (81%) and local (19%). The supplier, after reaching agreement on the price, payment method, delivery conditions, quantity and quality of the material, will deliver the goods. To supplying, foreign suppliers are often selected by the enterprises through referrals from partners or self-seeking. This relationship is rarely formed under the assistance of association or organization of government. Until now, Vietnam has not had an offical importer of wood materials. Vietnam's wood importers can be divided into three categories: (i) self-importing timber for production, (ii) imported enterprises timber for production and for sale to other domestic enterprises, (iii) timber importer for domestic production and retailing.

Although the volume of imported wood is very large, Vietnam has not a large import organization and a large-scale wood market for furniture for involving companies to make transactions so far. In reality, wood is imported in different countries in terms of custom regulations and procedure, however, the knowledge of this sector of Vietnamese timber importers is limited. Due to increasing freight leading to a high cost in wood importing, these problems reveal weaknesses of Vietnamese furniture enterprises regarding consolidation for negotiation, large-volume imported shipment, supply and inventory for production continuously.

- **Manufacturers**: All of most manufacturers' size are small and medium enterprises with basic characteristics such as: (i) Limited in capital management; (ii) Lack of long-term vision due to limited capital, technology and management capacity and lack of awareness of the logistics role in their operations; (iii) Limited ability to design product designs, most of which are ordered; (iv) Restrictions on trade promotion capacity; (v) Businesses are not actively linked together to be able to meet orders in large volume and is unwilling to share information for exploiting the market each other.

The habit of manufacturers is to order raw materials when needed, they rely less on demand forecasts for efficient inventory management. Timber is imported mainly from abroad through agents in Vietnam or signed contracts to import directly from the trading companies or sawmills. Over 80% product volume is indirect exported under agents or brokers from Taiwan, Hong Kong, China. Less than 20% remained products delivered to local market. Research of theories and realities show that Vietnamese wood

processing enterprises do not have a real linkage between manufacturers and suppliers, manufacturers and distributors in the real sense of specialization. The main relationships between the manufacturer and the supplier, manufacturer and the distributor are all not set up in the same way. As a result, each manufacturer can both import and distribute, causing a low efficiency due to lack of experience in many fields as well as limited financial capacity. And inevitably leads to a low competitiveness of enterprises compared to FDI enterprises originating from China and Taiwan.

- Distributors: Distribution of furniture is still entangled in a number of contradictions and temporary manufacturers, consumers have to accept. Specifically: (i) for export: after manufacturing process, enterprise will sell their goods with pre-approved export contracts (orders from overseas), first through a home wholesale, then to the retailers or retailers' shops, and few businesses have showrooms overseas; (ii) for local market: some enterprises are both manufacturing and retailing through their agents and showrooms and/or their products are distributed with the products of other competing manufacturers through the same distributor.

In brief, this study focused on the collaborative supply chain in which there are three basic actors: suppliers, manufacturers, distributors. Thus, the purpose of this research is to aim at the relationship between manufacturers and suppliers; manufacturers and distributors which are displayed as the diagram below Figure 2.

Source: Based on Research approach by Suong (2011a&b, 2012)

Figure 2: Relationship in the basic actors of the Vietnam Furniture supply chain

2.2.2. Factors Affecting Collaboration of Furniture Supply Chain in Vietnam

Focus on analyzing relationships among components within the supply chain, the research has shown eight basic factors affecting the supply chain collaboration as following:

- Trust (TRU): A positive belief, attitude, or expectation of one party concerning the likelihood of action or outcome of another will be satisfactory. This factor therefore affects positively on CSC (Handfield & Bechtel, 2001; Bäckstrand, 2007; Lambert & Gardner, 2004; Suong, 2012).

- Power (POW): When designing a SC and cooperating with other companies, one has to consider the other actor's size, impact, and status. If the other actor is larger in size, which generate greater impact and higher status, it will have more power in that relation. With greater power, comes the ability to force a weaker actor to make decisions that are merely favorable for the powerful actor (Maloni & Benton, 1999; Cox et al. 2001; Handfield, 2004b; Bäckstrand, 2007; Suong, 2012).

- Maturity (MAT): - Maturity (MAT): Increasing SC interaction maturity leads to reduced uncertainly of what improved business performance, and is the best route to follow to achieve competitive advantage. The characteristics of maturity process are predictability, capability, control, effectiveness, and efficiency (Towill & Childerhouse, 2002; Handfield, 2004a; Bäckstrand, 2007; Suong, 2012).

- Frequency (FRE): Frequency refers to how often a transaction occurs. More transactions suggest greater routinization of interaction and are hence, an implication/ incitement to form a closer relationship to make sure that transactions run smoothly (Simatupang & Sridharan, 2005b; Bäckstrand, 2007; Suong, 2012).

- Distance (DIS): Distance between the partners in the SC refers as geographical distance, cultural distance and organizational gap between partners through the SC (Cooper, Lambert, & Janus, 1997; Togar & Sridharan, 2002; Suong, 2012).

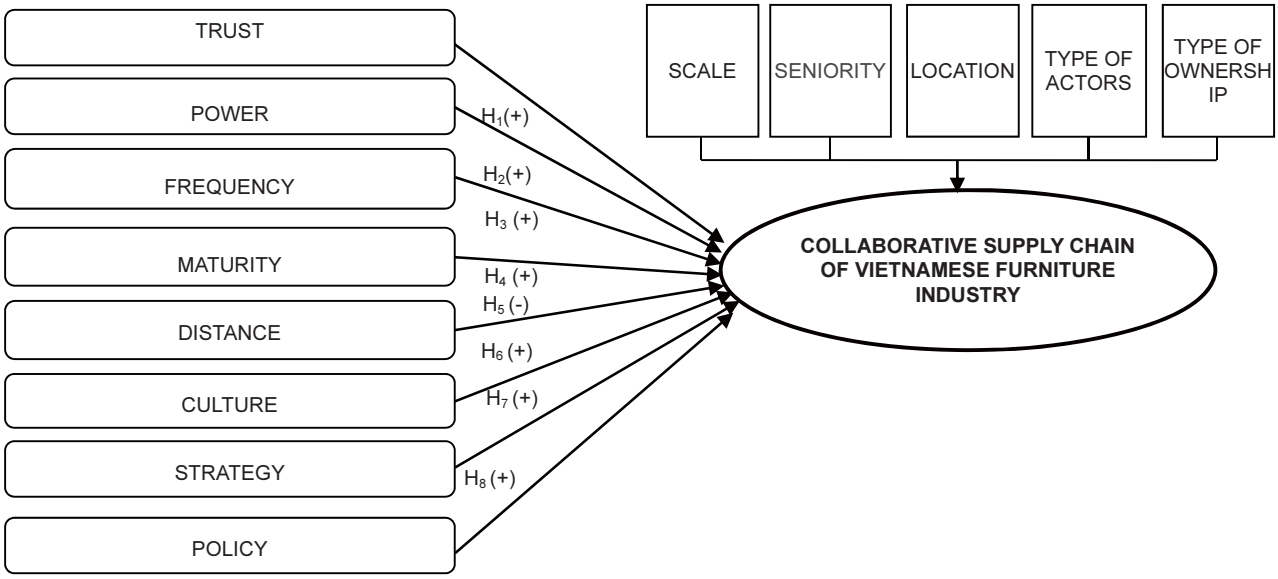
- Culture (CUL): Defined as shared values and belief that can help enterprises of SC to understand organizational functioning process and provide behavioral norms. The collective programming of their mind which distinguishes the members of one group or category of people from others. Differences in organizational or social level could create differences in opinion or conflicts of interest (Togar & Sridharan, 2004; Barratt, 2004; Suong, 2012).

- Strategy (STR): Collaborative planning refers to collaborations among trading partners to develop various plans such as production planning and scheduling, new product development, inventory replenishment, promotions and advertisement. Decision synchronization refers to a process in which SC partners orchestrate decisions in SC planning and operations that optimize the SC benefits (Simatupang & Sridharan, 2005a,b; Suong, 2012).

- Policies (POL): Governmental intervention in business activities. Local governments exert more direct influences by implementing formal and informal policies related to economic activity (Whipple & Russell, 2007; Suong, 2012).

2.3. Proposed Research Model

From the study of published research concerning, CSC showed that lots of factors affecting CSC in different industries. In this study, combining literature review and experimental basis, eight factors enable to create a model research for Vietnamese furniture industry. From the initial proposal model, the author uses survey data to process and inputs exploratory factor of analysis to identify factors that affect CSC before having final research model.



Source: Qualitative research results by Suong (2013)

Figure 3: Initial research model for furniture supply chain in Vietnam

This study examines the furniture supply chain collaboration. Hence, the following hypotheses will be tested:

H1: The degree of trust between partners affects positively on the collaboration in the supply chain of furniture enterprises in Vietnam, (H1, +).

H2: The power of partners affects positively on the collaboration in the supply chain of furniture enterprises in Vietnam, (H2, +).

H3: The degree of maturity in the relationship between the partners affects positively on the collaboration in the supply chain of furniture enterprises in Vietnam, (H3, +).

H4: The frequency of transactions between partners affects positively on the collaboration in the supply chain of furniture enterprises in Vietnam, (H4, +).

H5: The distance between partners affects negatively on the collaboration in the supply chain of furniture enterprises in Vietnam, (H5, -).

H6: The policy of the government affects positively on the collaboration in the supply chain of furniture enterprises in Vietnam, (H6, +).

H7: The collaborative culture affects positively on the collaboration in the supply chain of furniture enterprises in Vietnam, (H7, +).

H8: The collaboration strategy of partners affects positively on the collaboration in the supply chain of furniture enterprises in Vietnam, (H8, +).

3. Research Methodology

This research was conducted basing on two methods: (1) Qualitative research aims to construct, calibrate the component scale: the trust rate among the partners; the power of partner; the maturity level of the relationship among partners; the frequency of transactions among partners; the distance among partners; the policy of the government; the cultural cooperation, them and cooperation strategy; (2) Quantitative research aims to collect, analysis survey data, as well as testing the component scale, measuring the research theory model and the hypothesis. Preliminary research is built and calibrated by scale and added the observation variables through qualitative and quantitative methods. Preliminary qualitative research is done by expert with great consideration and group discussions with furniture enterprises by the sampling method. The content of the discussion related to the factors that influence collaboration of actors in the SC which relates to factors influence on collaboration of SC's actors; comment on; give out the research model for the discussion group to comment on the factors that affect the CSC and the draft scale built up by the author group and corrected by the discussion group. After exchanging of ideas, the discussion group agreed with the proposed model. The discussion group is also recommended to calibrate some of the names in the scale components, and proposed to amend the scale, modify some observed variables. From that, the research group has agreed about the factors that affect the furniture

CSC, including: (1) the degree of trust among partners; (2) the power of partner; (3) the degree of maturity in the relationship among partners; (4) the frequency of transactions among partners; (5) the distance among partners; (6) the policy of the government; (7) collaborative culture; (8) collaboration strategy of partners. The scale of the research model included 39 observation variables measured by Likert scale 5 in which points with 1-completely disagree to 5 – completely agree.

4. Results and Discussion

The data collection instrument used a questionnaire which was administrated into a sample of 393 manufacturers who are classified in terms of business size, capital ownership, and location. Respondents are from Ho Chi Minh, Dong Nai, Binh Duong (Southern of Vietnam); Bac Ninh, Ha Tay, Thanh Hoa (Northern of Vietnam) and Binh Dinh, Gia Lai (Central, Highland of Vietnam). Datasets are cleaned after 276 samples which enough for the conditions of EFA and RA. Characteristics of sample includes Enterprise with foreign capital = 14.8%; Domestic enterprise = 85.2%; Enterprises with large capital = 8.6%, 62.7% SMEs and 28.7% super small; 81.3% enterprises form Southern, from central 10.6% and 9.1% from Northern.

4.1. Reliability Analysis

The distance factor (DIS) consists of five observation variables, which run the reliability test of this factor prior to the introduction of an EFA factor analysis. Testing DIS for Cronbach's alpha = 0.445 is less than 0.5 and all 5 observed variables including DIS_1, DIS_2, DIS_3, DIS_4, DIS_5 are also less than 0.5. Using the method of trying gradually to diminish the observation variables in the DIS factor, the result is still less than 0.5. This proves that the DIS factor is not reliable because in practice it shows the gap does not significantly affect the co-operation among the actors in the flat world today. Enterprises are interested in efficient collaboration rather than geographical proximity. Similarity in organizational culture and scale of activity but not effective so this study eliminates the DIS factor and 2 observation variables TRU_1, TRU_2 are not accepted as well. Thus, the reliability of analysis results for 8 scales (7 factors influence one collaboration on the furniture supply chain in Vietnam) are achieved from acceptable level or good level. This demonstrates the scale of measurement concepts in order to achieve reliability studies, and the data collected through this achieve scale internal reliability for the next in-depth analysis.

Table 1: Cronbath's Alpha Result

Variables	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
TRUST (TRU), alpha = 0.805				
TRU_1: Trust of enterprise basing on financial ability	24.34	34.000	0.470	0.809
TRU_2: Trust of enterprise basing on size	24.57	34.712	0.489	0.808
TRU_3: Trust of enterprise basing on commitments' implementation	23.05	38.220	0.692	0.771
TRU_4: Trust of enterprise basing on brand	23.23	37.679	0.655	0.778
TRU_5: Trust of enterprise basing on partners' shared information	23.26	37.915	0.588	0.787
TRU_6: Trust of enterprise basing on ability to flexibly respond to changing needs	23.20	37.878	0.596	0.786
TRU_7: The more trust enterprise put on partner, the greater possibility of cooperation	23.12	37.500	0.601	0.784
POWER (POW), alpha= 0.868				
POW_1: The larger the size of the enterprise, the higher power of the business	13.17	12.733	0.847	0.777
POW_2: Enterprise that has large influence in the industry has more power than partners	13.30	14.832	0.655	0.856
POW_3: The higher the position of the enterprise, the more powerful the business is	13.17	14.668	0.670	0.850
POW_4: The more power an enterprise has, the greater its ability to cooperate with a partner	12.89	13.087	0.716	0.834

MATURITY (MAT), alpha= 0.860				
MAT_1: Enterprise has ability to predict the needs of partners	13.12	12.361	0.634	0.853
MAT_2: Enterprise has ability to control their partners	13.13	12.647	0.686	0.829
MAT_3: Contracts are only formalistic between enterprise and partners due to the degree of familiarity	13.08	13.319	0.705	0.825
MAT_4: The more familiar business transaction/partner is, the higher the possibility of cooperation	13.07	10.824	0.818	0.771
FREQUENCY (FRE), alpha= 0.874				
FRE_1: Enterprise and partners basically have many similarities in their business strategies	13.48	13.659	0.747	0.832
FRE_2: Enterprise and partner have an interdependent relationship of inputs - outputs in the industry	13.46	15.541	0.681	0.858
FRE_3: Enterprise maintain regular transactions with partners whenever demand arises	13.30	14.407	0.682	0.859
FRE_4: The more frequent the transaction, the higher the possibility of cooperation	13.31	13.731	0.819	0.803
DISTANCE (DIS), alpha = 0.445				
DIS_1: Enterprise often buy raw materials from local suppliers	17.36	12.013	0.354	0.288
DIS_2: Enterprise often buy raw materials from foreign suppliers	16.79	10.860	0.367	0.267
DIS_3: Enterprise focus on distribution of the domestic market	16.28	13.332	0.423	0.270
DIS_4: Enterprise focus on distribution foreign market (Export oriented)	16.05	12.428	0.409	0.257
DIS_5: Geographic distance hinders the cooperation of enterprise with partner	18.15	21.731	-0.345	0.658
CULTURE (CUL), alpha = 0.844				
CUL_1: Enterprise has the capacity and conditions to cooperate with partner	13.01	10.153	0.720	0.788
CUL_2: Enterprise is willing to cooperate with partners to offer customers effective solutions	12.86	10.567	0.589	0.840
CUL_3: Enterprise is aware of the benefits of cooperating with partners	12.92	9.173	0.695	0.798
CUL_4: The higher cooperative culture of the enterprise, the higher the possibility of cooperation	12.78	9.772	0.728	0.782
STRATEGY (STR), alpha= 0,853				
STR_1: Companies are ready to make acquisitions or mergers for efficiency purposes	12.01	13.065	0.677	0.821
STR_2: Businesses always aim to rationalize capital and production	12.16	13.955	0.685	0.817
STR_3: Businesses actively plan to introduce new products to the market	11.99	13.423	0.652	0.832
STR_4: The more suitable the strategy, the higher possibility of cooperation is	12.11	13.254	0.772	0.782
POLICY (POL), alpha= 0.896				
POL_1: International trade policy of the government on tariffs affects cooperation ability of enterprise with partners	11.79	15.401	0.689	0.802
POL_2: International trade policy of the government on non-tariffs affects cooperation ability of enterprise with partners	11.61	17.508	0.679	0.812
POL_3: The government regulations such as FSC, CoC, Lacey, Flegt affect the cooperation ability of enterprise with partners.	11.23	14.389	0.792	0.755
POL_4: The more favorable the government regulations and policies of partners are, the higher the possibility of cooperation and vice versa	11.31	16.060	0.596	0.845
COLLABORATION (COL), alpha = 0.883				
COL_1: Supply chain collaboration helps businesses increase competitiveness	7.96	3.991	0.711	0.870
COL_2: Supply chain collaboration helps businesses to be active in business	7.83	3.485	0.823	0.766
COL_3: Supply chain collaboration helps businesses improve business efficiency	7.88	3.909	0.736	0.838

4.2. Explore Factor Analysis and Regression Analysis

The Cronbach's alpha was conducted to assess the reliability of each scale. Alpha values contains over 0.8 for one dependent variable and the other seven independent variables without Distance. This indicates all scales can be considered reliable (Creswell, 2002). For each of the item scales, factor analysis was used to reduce the total number of items to manageable factor. Principal components analysis is used to extract factors with eigenvalue greater than 1. Varimax rotation is used to facilitate interpretation of the factor matrix. Sampling adequacy measurement tests are also examined via the KMO statistics to validate the use of factor analysis. The composition of independent variable scales, with sig. = 0.000 and KMO = 0.769, the variables converge to 7 differentiating factors such as the original hypothesis and the total deviation of 60.89% for the deduction of 60.89%. Measurement variables with weighting factors of variables are greater than 0.5. Similar to dependent variables, gives the result KMO = 0.717, the variables converge to an original factor with a total deviation of 68.21% for the meaning that extracted 68.21% of variables and weights Variable factor variables are greater than 0.5. From the above results, the weighting factors of variables and the total deviation satisfy the theoretical conditions so it can be concluded that the appropriate EFA model, the variables will continue to be included in the regression analysis.

Table 2: Results of Exploratory Factor Analysis with six-factor model

Concept	Variables	Observers	Cronbach's alpha	Cumulative Variance (%)
Collabolation (COL)	Trust (TRU)	5	0.805	75.605
	Power (POW)	4	0.868	
	Frequency (FRE)	4	0.874	
	Maturity (MAT)	4	0.860	
	Policy (POL)	4	0.896	
	Culture (CUL)	4	0.844	
	Strategy (STR)	4	0.853	
Furniture Supply Chain Collabolation (COL)		3	0.883	78.413

Using Pearson's correlation coefficient to analyze the correlation between independent variables, including Power, Frequency, Maturity, Culture, Strategy, and Policy. The results show the correlation between independent variables and dependent variables were positive, except for Policy. Next, conducting a regression analysis, results of the model confirmity assessment are as follows:

Table 3: Model Summary[b]

Model	R	R Square	Adjsted R Square	Std. Error of the Estimate	Durbin-Watson
1	.810[a]	.653	.641	.696	1.684

a. Independent Variable: POW, TRU, MAT, FRE, POL, CUL, STR

b. Dependent Variable: COL

Table 4: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.222	8	27.370	153.759	.000[b]
	Residual	107.338	267	.488		
	Total	149.560	276			

a. Independent Variable: POW, TRU, MAT, FRE, POL, CUL, STR

b. Dependent Variable: COL

Using F test for the fit of the model in variance analysis with Sig. = 0.000 (< 0.05), thus rejecting the hypothesis that all regression coefficients are zero (0) in which it shows the overall suitability of the regression model. In addition, 1 < Durbin-Watson (= 1.684) < 3 showed no first-order self-correlation and the VIF coefficients were less than 2 indicating that the independent variables are not closely related.

Table 5: Result of Regression Analysis by Entering Method

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Constant	1.018E-14	0.032		0,000	1.000		
TRU	0.305	0.042	0.415	9.508	0.002	0.216	1.463
FRE	0.241	0.029	0.138	7.525	0.003	0.243	1.291
POW	0.540	0.028	0.590	16.855	0.000	0.427	1.905
MAT	0.483	0.024	0.403	15.075	0.001	0.186	1.726
CUL	0.037	0.032	0.165	1.145	0.253	0.293	4.539
STR	0.144	0.048	0.234	4.488	0.008	0.175	1.274

a. Dependent Variable: COL

The results showed that all six independent factors have positive impact on the statistical significance of Furniture supply chain collabolation (Sig. < 0.05) and collaboration to the level of impact from the strong to the weak as follows: Power (0.59), Trust (0.415), Maturity (0.403), Strategy (0.234), Culture (0.165), and Frequency (0.138). In addition, if hypotheses are determined at the significant level of 5%, six independent variables will reach statistical significance in this model. Consequently, 6 independent variables have

statistical significance for this regression model. Therefore, we can conclude that 6 above variables have a strong relationship with the dependent variable. Basing on unstandardized Beta column, variables can be explained by the following linear equation:

COL = 1.018E-14 + 0.54 POW + 0.483 MAT
+ 0.305 TRU + 0.241 FRE + 0.144 STR
+ 0.037 CUL

5. Policy Implication

5.1. Policies Implication for Manufacturers

Empowering and the capacity of enterprises to consolidate power for the partners: Building up enterprises image to enhance the degree of trust in their dealings with partners: through the implementing measures, enterprises maintain and develop their capacity. If the enterprise always focuses on developing these above aspects, its capacity will have a high evaluation and through that, the enterprises are eligible to consolidate and increase its power to partners in order to attract the collaboration voluntarily. Thanks to power, manufacturer can have pressure the partners to be proactive in cooperation with enterprises within the chain. Vietnamese furniture industry efforts to affirm the brand value by applying advanced technology, improving production capability, and improving the quality of the product, diversifying the design. Thus, manufacturer will be active in sourcing, processing and selling as well.

The manufacturers must be maintained regularly trading activities with partners in order to enhance the level of maturity, and making convenience to promoting collaborating relationship: through the relation between the enterprises and partners in the industry reaching the maturity in the relationship means that enterprises have the ability to predict supply and demand and therefore firm could control effectively partners through aspects such as the habits, customs transactions regarding the method of payment, terms of delivery. Therefore, it would help the relations of enterprises getting economic efficiency.

The manufacturers must proactively enhance the frequency of transactions among the actors in the supply chain: Enhancing the frequency means to increase the number of transactions between enterprise and partner in the chain. Once the transaction takes place regularly, it is able to reinforce the level of cooperation between enterprise and partner.

The manufacturers have to plan an appropriate cooperation strategy in order to cope with new business conditions: first of all, enterprises in the industry have to identify their goals when participating in the transactions. To determine this goal, enterprises should analyze the benefits which they aim to achieve. Merging and requisitioning enterprises can take place with difference scale and forms based on the structure of the enterprises, purpose, and the relationship among the parties.

5.2. Policies Implication for Government and Other Authorities

Recommendations for the Government: Authorities need to enact legal soon for the enterprises to be convenient in business activities.

Recommendations for furniture industry association: The Association must be a real bridge for the enterprises in the industry to talk, share information as well as give feedback about obstacles, hardship of the enterprise during business process. The Association will certainly be the playground of any enterprise in the industry whatever their size is. With that, the Association will truly become a forum for enterprises to share information with each other as well as to share and bind information with each other. Besides, it creates the base for the enterprises to increase the cooperation to grow together. At the same time, the Association will also really become a bridge of the enterprises reflecting their distress to the Government Administration in time as the implementation.

6. Conclusion and Research Limitations

Overall, Vietnamese furniture industry has grown in size, export turnover and quality as well. However, this industry has been shown many weaknesses without improving causing a lot of challenges for the development of the industry in the coming time. It is the spontaneous manufacturing and distribution. Due to objective and subjective reasons, this industry reveals there has weak connection between the actors in the supply chain and this matter hardly matches sustainable development. Therefore, the effective relation of factors involved in the production process is an indispensable trend to enhance the vitality in the context of international economic integration today. It is a big challenge for this industry to compete and meet the strict requirements of the global market.

This research has mainly used qualitative research methodology to simulate the model of the Vietnam furniture industry of the supply chain, thoroughly research on supply chain collaboration which is through a cooperative relationship among 3 major actors as above mentioned

while a supply chain has lots of actors in multi relationship. Besides, these research samples are mainly manufacturing enterprises instead of supplying enterprises and distributors. So the multidimensional picture of cooperative relationships among actors in the furniture supply chain has still not really covered yet.

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An Exploratory Treatise on Jay-customers Behavior in the Banking Industry in India: A Dyadic Perspective*

Rajasekhara Mouly Potluri [1], Lohith Sekhar Potluri [2]

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Abstract

The purpose of this research is to examine reasons and evaluate strategies implemented by the Indian banking industry in tackling jay-customers in general and in light of the recent demonetization in particular. After a thorough germane literature and theoretical framework on jay-customers and Indian banking industry, researchers framed a well-structured questionnaire for collecting banking employees opinions along with a set of questions framed to conduct in-depth personal interviews with banking customers. The collected data were summarized, coded, and controlled by using Software R and the selected hypotheses were analyzed by the observance of percentile values. More than 90 percent of banking employees said lack of proper supply of cash from the Reserve Bank of India is the major reason for this kind of customer behaviour and shockingly 95 percent of banking customers expressed backdoor preference given by banking employees to some big customers is the major reason. The research confined only two state capitals Amaravati and Bangalore in India and covered only two largest banks one in public and private sector. The research provides useful insight into the crucial reasons for jay-customers' behaviour from the dyadic perspective of both employees and customers of the Indian banking industry.

Keywords: Jay-customers, Customer satisfaction, Demonetization, Banking, India.

JEL Classification Code: C12, D10, G21, M31, N15.

1. Introduction

The success or failure of any service organization particularly comprehensively depends on how effectively the front-line employees have involved in service encounters. The service interaction has paramount importance in every service encounter which needs the attention of both service provider and receiver. Most of the businessmen have adopted the premises that the "The customer is king and can do no wrong" and "the customer is always right" as part of their commitment to market their products and services and satisfaction. Along with the above premises, another notable one is that market is filled with horrible individuals who cannot be trustworthy to behave in ways that self-respecting services firms and its delivery of services. This is high time to rethink on these premises because even though business community have strongly committed to proffer maximum satisfaction, in these days it's highly difficult to maintain loyal customer base because of tempting offers from your competitors one side and another side most of the customers may not only be wrong, but downright rude, aggressive, violent, vengeful, destructive, drunk, fraudulent and dangerous just for a some trivial reasons.

In 1994 Christopher Lovelock originated and popularized the term "jay-customers". Jay-customers are defined as

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[1] First Author and Corresponding Author. Associate Professor of Management/Marketing, School of Business & Entrepreneurship, The American University of Nigeria [Postal Address: Lamido Zubairu Way, Yola Township By-Pass, PMB. 2250, YOLA, Adamawa State, Nigeria] E-mail: raja.potluri@aun.edu.ng and prmouly24@gmail.com

[2] Amrita University, Bangalore-560035, Karnataka, India. E-mail: lohithpotluri@gmail.com

"ones who act in a thoughtless or abusive way, causing problems for the firm, employees, or other customers (Lovelock, 2001)". Irrespective of the magnitude and variety of business they are doing from any part of the globe, every entrepreneur has a responsibility to enhance the quality of business or service encounters among your front-line employees and customers in general and all entrepreneurs has to spend considerable amount of their time on controlling, managing and prescribing the actions of jay-customers. And another side, predominantly entrepreneurs have to train their employees in general and front-line employees in particular to tackle this kind of customers who spoils business and sometimes leads to physical damage also. People may have plenty of reasons for misbehaving towards an organization or its staff - sometimes reasons may be candid in nature but most of the times frustration, revenge, financial gain, alcohol-fueled fun etc.

Any organization whether they are in product or service business has to design a separate mechanism to handle this kind of customers with annoying behaviour. Here, entrepreneurs or managers have to look into the issue in a dyadic perspective which means they have to suspect on their employees along with customers for this kind of misbehaving. The same also highlighted by the authors Ackroyd and Thomson (1999); Greenberg (2010); Robinson and O'Leary-Kelly (1998); Thau, Bennett, Mitchell and Mars (2009) as management based insights into the dark side of organizational dynamics awesomely focus on the employee as "deviant" and responsible for committing a range of misbehaviors aimed at disrupting exchange and organizational activities.

The Government of India vides their Notification No. 2652 dated November 8, 2016 have withdrawn the Legal Tender status of □ 500 and □ 1,000 denominations of banknotes of the Mahatma Gandhi Series issued by the Reserve Bank of India till November 8, 2016 (Killawala, 2016) with an objective to tackle counterfeiting Indian banknotes, effectively nullify black money hoarded in cash and most importantly curb funding of terrorist organizations with fake notes. But this most crucial decision has led to severe pandemonium situation throughout the country. Due to this, a large number of customers were standing in queues to deposit their old notes in their bank branches and also to get the new currency notes issued by the local commercial banks at the operational level. These kilometres long queues under daylight with too much spending of time have led to severe inconvenience to millions of Indian public. This situation has given severe stress and strains one side to banking employees and another side to the customers' community in every part of the world's second largest populated country in the world. So many areas of the country, customers reacted angrily and some untoward incidents took place against the bankers. This situation has given the authors an opportunity to explore reasons for this kind of jay-customers' behaviour and strategies implemented by the bankers in general and in particular to minimize the tension mounted atmosphere in the last six months due to demonetization in India.

2. Literature Review

2.1. Overview of Jay Customer Behavior

The term jay-customer is derived from jaywalkers in the UK for those who walk across the street irresponsibly (Michaud, n.d.). Around the world, so many marketing theorists, practitioners, and the academic world have devoted much of their attention on the customers' perceptions of service quality (Brady & Cronin, 2001), customer satisfaction (Potluri, Narayana, & Srinivas, 2016) and customer loyalty and so on. Yet, no one has considerably concentrated on this jay-customers behaviour through their research, particularly in the developing and underdeveloped world. This is also one of the major reasons for inspiring the researchers in choosing the topic for an extensive research along with most recent turmoil established in the Indian banking industry. After the introduction of the term in the year 1994, succeeding research has mainly focused on the individual, extreme, or unusual forms of such "inappropriate customer behaviour" (Strutton & Pelton, 1994) and extensive research had taken place in the developed world. Studies include customer vandalism (DeMore, Fisher, & Baron, 1988; Levy-Leboyer, 1984); retaliation (Huefner & Hunt, 1994; 2000); violence (Boyd, 2002; Farrugia, 2002); illegitimate complaining (Jacoby & Jaccard, 1981; Kowalski, 1996); and compulsive consumption (Hirschman, 1992; O'Guinn & Faber, 1989) has introduced range of extensive novel perceptions on different forms, effects and behavior of jay-customers.

Surprisingly, some more popular terms have received considerable research attention from different researchers in the world. In this process, most popular terms used by the researchers are "deviant consumer behaviour" (Moschis & Cox, 1989), "aberrant consumer behaviour" (Fullerton & Punj, 1993), and "consumer misbehaviour" (Tonglet, 2001). Along with the above, fewer public terms include "problem customers" (Bitner, Booms, & Mohr, 1994), "dysfunctional customer behavior" (Harris & Reynolds, 2003), and "inappropriate behavior" (Strutton & Pelton, 1994) also received the attention of researchers from different parts of the world. Whatever may be the terms used by the researchers whether those may be the popular or most

commonly used, replicates the multiplicity of viewpoints and positions that have explored this phenomenon. Harris and Reynolds (2003) defined this type of customers as who intentionally or unintentionally, overtly or covertly, act in a manner that, in some way, disrupts otherwise functional service encounters" and also refer to covert acts of customer deviance in their definition of dysfunctional customer behavior (Harris & Reynolds, 2004). Bitner, Booms and Mohr (1994) called these as problem customers and defined as customers who are "unwilling to cooperate with the service provider, other customers, industry regulations, and/or laws".

Studying jay-customer behaviour is a relatively new area of research which has received considerable attention only in recent years from both industry and academia. This increasing trend of studying jay-customer behaviour is emphasized in research which highlights the thoughtful and omnipresent consequences of jay-customer behaviour. In recent years, most of the entrepreneurs in different industries have identified increasing number of this class of customers who create severe damage to their business and has thrown a panoramic view on these to find the best solution and minimizing all kinds of losses.

Numerous researchers have given diverse reasons for jay-customer behaviour, as per the opinions of Zemke and Anderson (1990) and Lovelock (1994), jay-customer behaviour is typically based on anecdotal evidence, are less common, purely conceptual in nature (Fullerton & Punj, 2004). This gray area understanding and dealing with jay-customers is most vital to the success of any kind of business from any part of the globe and dealing with this class of customers with common sense and great patience is mandatory to reduce the effect on the remaining customers along with minimizing all sorts of loss. A broad review of the germane literature on jay-customer behaviour reveals that some sociological (Caruana, Ramaseshan, & Ewing, 2001), psychological (Albers-Miller, 1999; Cox, Cox, & Moschis, 1990) and customer dissatisfaction. At the same time, Godwin, Patterson and Johnson (1999) concentrated on his research on the comebacks of consumers' dissatisfactory and stressful service exchanges which sometimes turns into angry responses with physically hostile manner. Peculiarly, the extensive blame game is going on in this kind of service exchanges between front-line employees and customers whose attention is mandatory to the delivery of service with an expected level of quality by the customers. But the majority of the times in the developing world even the candid rights of the customers also severely affected by the conflicts among these two parties.

Thus, the jay-customers behaviour is not at all always irrational and business people clearly identify the thin line between the rational and irrational approaches of the customers, they have to take an amicable solution which minimizes the loss for both. Based on the type of jay-customer and his/her behavioural disposition, managers' community has to take a genuine decision without any disturbance to the normal business hours, physical or financial loss, and most significantly retaining the customer also.

2.2. Forms of Jay-customers Behavior

Contemporary studies on jay-customers behaviour have identified different types of customers based on the activities they have taken up with the interaction of front-line employees of the business. Within a service-specific context, Lovelock (1994; 2001) offers six types of jay-customer behaviour. First are "vandals" are the hooligan type of customers who intentionally spoil or damage organizational possessions. Second are "thieves" involve in steal or theft items in the showrooms, and paying bills with stolen credit cards, and sometimes no intention of paying bills also whereas "belligerents" characterizes customers who argue in an aggressive manner, angry drunk people towards front-line staff. The fourth is "deadbeats" who reluctant to pay bills for the service they have already received while "family-feuders" who quarrel with family members and other customers in the service delivery area.

Finally "rule breakers" are another type of jay-customers who fails to conform to the unwritten rules and norms of service encounters. Bitner, Booms and Mohr (1994) have identified "rule breaker" as one of the four types of problem customers. According to him, further three types of problem or jay-customers are "problem customers", "uncooperative", and "verbal or physical abusers". First, problem customers are mostly drunken customers who behave aggressively towards service staff and other customers that consequently disrupt the ambience of the service establishment and the second uncooperative customers represent those generally exhibit rude and demanding behavior towards front-line staff and finally customers who verbally and physically abuses both company employees and other customers in an abrupt manner.

Broadly the above-mentioned types of jay-customers behavioural tendencies have to clearly understand by the business staff in advance and better to face them with an appropriate strategy for which they need some support from the think-tank of the companies. One strategy is not at all suitable to tackle the situation in handling different types of jay-customers in different situations. Based on the situation, type of customer behaviour, the front-line staff has to develop unique skills and knacks to tackle the situation with their interactive or conversational abilities.

2.3. Hypotheses

Based on the above literature and theoretical framework, the researchers have chosen the following six hypotheses:

H1: Bank employees in India very frequently identified jay-customers in their experience.
H2: Bank service failure and employees' frustration and fatigue are the major reasons for jay-customer behaviour.
H3: Customers are the main reason for the jay-customer behaviour.
H4: Enlighten customers about bank rules and regulation is the best strategy to tackle the jay-customer.
H5: The majority of customers are satisfied with the bank's response in solving their problems.
H6: Indian bank customers are totally against for the demonetization introduced by the Central Government.

3. Research Methodology

3.1. Sampling and Survey

The core objective the research is to explore diverse reasons for jay-customers behaviour and the strategies adopted by the Indian banking industry in general and especially in light of the recent demonetization. The researchers administered both quantitative and qualitative approaches to research to garner the opinions of both bank employees and customers who stood in the long queues. A well-structured and self-administered comprehensive questionnaire has designed for 300 hundred bank employees who were equally selected from both public and private sector banks from the two states viz. Andhra Pradesh and Karnataka in India. The questionnaire targeted for the bank employees has two parts in which part one concentrated on the demographic profile of the subjects and part two garners the information about reasons for jay-customers, strategies implemented to tackle them etc. While preparing a questionnaire on this novel topic, the researchers offered specific options under different questions which were identified in consultation and thorough discussion with the senior retired bank officials. Along with the above, conducted a pilot survey with just 30 samples based on which the final questionnaire designed and administered with confidence to garner the opinions of 300 bank employees.

Regarding the bank customers, the researchers conducted very brief informal personal interviews with a sample of just 100 again equally selected from the type and region of their existence and questions raised for gathering information on demonetization, reasons for their inconvenience, a possible solution for solving the problem and aftermath effects etc. The researchers applied stratified random sampling method and stratified the data by region and type of banks. The collected data were summarized, coded, and controlled by using Microsoft Excel and the selected hypotheses were proved by the observance of percentages.

3.2. Demographic Profile of the Sample

This portion of the research comprehensively presents the demographic profile of the subjects, diverse reasons for jay-customers behaviour, strategies implemented by the Indian bank officials, and finally the opinion of bank customers towards demonetization. The researchers collected the opinions of total 300 bank employees which were equally chosen from both public and private banks and from the two states viz. Andhra Pradesh and Karnataka. Regarding the garnering of data from bank customers, the researchers failed to collect data due to the aggressive mood of the respondents. The demographic profile has mentioned in Table 1.

Table 1: Demographic Profile of the Respondents

S. No.	Demographic Feature	Andhra Pradesh (150)		Karnataka (150)	
		Public Sector Banks (75)	Private Sector Banks (75)	Public Sector Banks (75)	Private Sector Banks (75)
1.	Age (in years)				
	20-29	12	26	17	36
	30-39	31	38	22	29
	40-49	23	11	32	10
	50 Above	09	00	04	00
2.	Gender				
	Male	56	46	64	41
	Female	19	29	11	34
3.	Education				
	Bachelor's Degree	23	36	29	21
	Master's Degree	52	39	46	54
4.	Work Experience (in years)				
	1-5	06	21	04	34
	6-10	29	35	33	26
	11-15	24	14	27	11
	16-20	14	05	09	04
	20 Above	02	00	02	00

3.3. Descriptive Statistics of the Sample

Regarding jay-customers, the researchers raised a wide range of questions to the bank employees mostly related to types of jay-customers banks has identified, reasons for their odd behaviour, strategies opted by the bank employees, the outcome of the strategies implemented etc. At the same time, researchers collected information from bank customers only regarding their opinion towards demonetization, reasons for their problems in demonetization period.

Out of the chosen sample of total 300 (Table 2), 68 percent of bank employees have come across jay-customers in their working experience and in that mostly 34 percent are the belligerents and 24 percent are cheaters who are typically involved in the submission of fake documents for collateral, forged signatures, fake notes etc. Surprisingly, 19 percent customers are always delayed in paying their load instalments or attempting to avoid payment of bank loans. As expected by the researchers, the bank employees unreservedly said that customers are the main reason for the abnormal behaviour in the bank as against just 13 percent bank employees.

Regarding the strategies implemented by the banks, 22 percent of bank employees perfectly implementing the strategy i.e. identify the root cause for conflict and extended their support to the customer and another 16 percent bank employees also opted the strategies like refer case to customer care officers, trying to enlighten customers with bank rules and regulations, and accept their flaws by offering accurate service. The researchers also raised a question to the bank employees on the outcome of their strategies implemented, in which 66 percent said that customers are totally satisfied with their response and astonishingly 77 percent of bank customers irrespective of their satisfaction, they are continuing their banking with the same branches.

Table 2: Bank Employees Opinion on Reasons for Jay-customer Behavior (In Percentage)

S. No.	Reasons for Jay-Customers Behavior	Percentage
1.	Bank service failure	14
2.	Misunderstanding of bank rules and regulations	18
3.	Customers' lack of knowledge	24
4.	Bank employees' frustration and fatigue	03
5.	Bank ambience	01
6.	Fight with other customers/ family members	03
7.	Procedural delays	18
8.	Customers expect preference in getting service by cutting queues	15
9.	Failure of technology	03
10.	Any other reasons include assessment staff, goldsmiths etc.	01

The researchers also conducted very brief personal informal interviews and collected the opinions of bank customers particularly on demonetization, reasons for their problems in demonetization period, and possible best solutions for their problems (Table 3). Astoundingly, 92 percent customers absolutely in favour of demonetization which is mostly targeted black money holders, controlling fake note gangs, most significantly curb funding of terrorist organizations with fake notes. The majority of the customers said that at the branch level, bank manager and senior employees are the major reason for the problems in demonetization period because they are diverting the large quantity of cash to the premium customers, some of their kith and kin and selling new currency notes to big customers with a larger quantity. Customers never hesitate to react angrily and complaining over bank managers over the irrational distribution of cash and utterly said that bank managers are moving cash on a commission basis to some black marketers.

Table 3: Strategies Implemented by the Bank Employees to Tackle the Jay-customers (In Percentage)

S. No.	Strategies Implemented	Percentage
1.	Try to spot them ahead of time and invite them for discussion	18
2.	Refer case to a well-trained customer care officer	16
3.	Identify root cause for conflict and help customers to resolve swiftly	22
4.	Bank officials visit customers in their doorsteps	07
5.	Enlighten customers about bank rules and regulations	16
6.	Say sorry- Provide customer expected service	16
7.	Calling security	03
8.	Any other strategy…support from senior staff, calling customer care etc.	02

4. Results

H1: Regarding hypothesis 1, 68 percent of bank employees in India have identified very frequently the jay-customers in their work experience. Therefore, the selected hypothesis is valid (Table 4).

H2: Customers' lack of knowledge, misunderstanding of bank rules and regulations, and procedural delays took place in banks are the major reasons for the jay-customer behaviour when compared to the bank service failure and employees fatigue and frustration. So the selected hypothesis is not valid.

H3: 74 percent Indian bank employees have opined that customers are the core reason for the jay-customers' behaviour. Hence, the hypothesis 3 is absolutely correct.

Table 4: Testing of Hypotheses

S. No	Hypotheses	Observance of Percentile Values	Validity
1	Banking employees in India very frequently identified jay-customers in their experience.	Yes with 68% No with 32%	Valid
2	Bank service failure and bank employees' frustration and fatigue are the major reasons for jay-customers' behaviour.	Customers Lack Knowledge - 24% Bank Service Failure - 14% Bank Employees frustration and Fatigue - 03%	Invalid
3	Customers are the major reason for this kind jay behaviour.	Customers with 74%	Valid
4	Enlighten customers about bank rules and a regulation is the best strategy to tackle Jay-customers.	Enlighten customers about bank rules and regulations - 16% Identify root cause for conflict and help him to resolve with an immediate effect - 22%	Invalid
5	The majority of customers are satisfied with the bank's response in solving jay-customers' problems.	Yes with 77% No with 23%	Valid
6	Indian bank customers are totally against demonetization introduced by the central government.	In Favor with 92% Against with 08%	Invalid

H4: Identify root cause for conflict and help to resolve with an immediate effect is the best strategy to tackle jay-customers as per 22 percent of bank employees have expressed positive towards this strategy. So, the chosen hypothesis 4 will be an invalid one.

H5: The customer's satisfaction for banks response in solving their problems is at higher percent value (66%) results in this as a valid hypothesis.

H6: The central government's demonetization is widely accepted by Indian bank customers with a thumping 92 percent which concludes this as an invalid hypothesis.

5. Managerial Implications

The comprehensive findings of this study lead to a series of vital implications to the entire banking industry in the country. This study provides a broader outlook of customers to both bank managers and executives on the services and strategies introduced by banks to solve diverse problems encountered by customers. First of all, as proud prime researchers on jay-customers in Indian banking industry, we offer profound and pervasive implications to marketing departments of banks for which once again review their interactive marketing strategies and gives the service encounter process a more confident and trouble-free process with careful supervision.

Another implication of the study is emphasizing that jay-customers' behaviour is perceptual, relative, and informative to bank officials to develop more comprehensive knowledge on reasons and effectiveness of strategies targeted at solving these troubles. This study exposes different types of jay-customers and their behavioural tendencies based on which there will be a great chance to customize the strategies to be implemented. Furthermore, analysis of data collected through questionnaires and personal interviews from both employees and customers has identified bank staff always pointing customers and their lack of knowledge on right banking and customers are not at all happy with the banking services. The majority of customers' opined that genuine service requests also straight away rejected by the banks by showing some rules and regulations which are exclusively meant for lower-end customers whereas higher-end customers got required service at their door-steps.

This survey useful to banks to once again review their existing service delivery process and service recovery tactics based on the perceptions and dissatisfaction levels of their customers. Likewise, societal trends in consumerism and consumer activism have led to inadvertently inspiring this kind of behaviour. Whatever may the reason, both managers and executives have the responsibility and suppress this kind of jay-customer behaviour by offering flawless services to the customers in a timely manner. The study also indicates a number of implications for, not only, marketing and service managers of the banking industry but also general service managers and executives first to identify the loopholes in the existing service process and also to design a trouble-free servicescape to minimize the dysfunctional behaviour disposition from customers.

Finally, it is advisable to all front-line employees or executives who are regularly dealing with customers has to develop competent dexterities and knacks and other ins and outs on service delivery with an exact step-by-step process and competent product and service knowledge.

6. Conclusion and Limitations of Study

To encapsulate, through this exploratory research on jay-customer behaviour proffers invaluable information and clarifies diverse reasons and strategies implemented along with satisfaction levels on the implementation of troubleshooting measures in the Indian banking industry. The research clearly identifies both bank employees opinion on whether they encountered jay-customers in their work experience or not; types of jay-customers; reasons for and strategies implemented for solving problems related to jay-customers. And this research also attempted to identify customers' opinion and possible solutions for solving problems in demonetization, reasons for inconvenience and strategies adopted during demonetization, aftermath effects with demonetization.

This research proffers invaluable and first-hand information on the novel topic jay-customers and their behavioural disposition to the Indian banking industry. The same implications also can be useful and possible to implement in other service sector areas to find amicable solutions to this kind of unique behavioural customers. There is a mammoth scope for further research with elaborate sample size, by covering the entire country and especially to know the opinions of rural customers. And the world of academia has to concentrate to study the behaviour of dysfunctional customers in other sectors like retailing, manufacturing, and other service sector areas like telecom, insurance, hospitality, civil aviation including education.

This research particularly limited or concentrated only on two South India state capitals viz., Andhra Pradesh and Karnataka. The survey covers only two major banks one in public and private sectors. The selected sample size also very meagre due to time and resource constraints and researchers failed to garner any information on the demographic profile of the customers whom the researchers mostly met whenever they were on queues for currency exchange.

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Appendix

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