MULTI-DIMENSIONAL ANALYSIS OF PUBLIC TRANSFER PAYMENT POLICY IN MALAYSIA

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MULTI-DIMENSIONAL ANALYSIS OF PUBLIC TRANSFER PAYMENT POLICY IN MALAYSIA

ABSTRACT

The impact of public transfer payment is dynamic, whereby it has shown separately that it can affect the income of the poor, aggregate consumption, economics outputs, education level of the poor and unemployment. However, there is a gap in previous public transfer payment analysis where all previous literature used *Ceteris Paribus* assumption that means "other things equal" as the central assumption when conducting the study. Nonetheless, *Ceteris Paribus* assumption is unable to capture the complex economic phenomena of the real world since it assumes other variables constant when analysing the selected variables. Hence, the introduction of *Omnia Mobilis* assumption that means "everything is moving" may address its limitation. With the help of multi-dimensional graphs such as Inter-Linkage Coordinate Space that was introduced in Econographicology, visualising public transfer payment and its impacts with *Omnia Mobilis* assumption is made possible where it allows us to analyse multiple endogenous and exogenous variable simultaneously. The completed Inter-Linkage Coordinate Space for public transfer payment policy through this dissertation showed the domino-effect or "Ripple-Effect" of the public transfer payment policy through graphical representation with the real-time data. The result of this dissertation showed a temporary spike in the Bottom 40 (B40) household income level and it is an indicator that public transfer payment policy will only work for a short term. This dissertation provides an alternative view to scrutinising public transfer payment as a policy in Malaysia and contributes to the application in the field of Econographicology.

Keywords: Public Transfer Payment, Malaysia, Multidimensional, Econographicology, Policy Modelling

ABSTRAK

Kesan Pembayaran Pemindahan Awam (PPA) adalah dinamik, yang mana ia boleh mempengaruhi pendapatan orang miskin, permintaan agregat, pengeluaran ekonomi, tahap pendidikan orang miskin dan pengangguran setiap satunya secara tersendiri. Walau bagaimanapun, terdapat jurang dalam analisis PPA sebelumnya di mana semua kajian terdahulu telah menggunakan anggapan *Ceteris Paribus* yang membawa maksud literal "perkara lain sama" sebagai andaian pusat ketika menjalankan kajian. Walaupun begitu, anggapan *Ceteris Paribus* tidak dapat menangkap sepenuhnya fenomena ekonomi yang kompleks dari dunia nyata kerana ia berteraskan andaian bahawa pemboleh ubah lain bersifat tetap apabila menganalisis pemboleh ubah yang dipilih. Oleh itu, pengenalan anggapan *Omnia Mobilis* yang membawa maksud "semuanya bergerak" dapat mengatasi batasan *Ceteris Paribus*. Grafik pelbagai dimensi seperti *Inter-Linkage Coordinate Space* yang telah diperkenalkan dalam *Econographicology* akan memberikan gambaran visual mengenai impak PPA yang menggunakan anggapan *Omnia Mobilis*. Ruang Koordinat *Inter-Linkage* yang telah siap untuk dasar PPA melalui disertasi ini menunjukkan kesan domino atau "*Ripple-Effect*" hasil dari dasar PPA melalui perwakilan grafik dengan data masa nyata. Hasil dari disertasi ini menunjukkan lonjakan sementara pada tahap pendapatan isi rumah Bawah 40 (B40). Hal ini menunjukkan bahawa dasar PPA hanya akan berfungsi untuk jangka pendek. Disertasi ini memberikan pandangan alternatif untuk meneliti PPA sebagai sebuah polisi di Malaysia dan menyumbangkan kepada penerapan dalam bidang *Econographicology*.

Kata Kunci: Pembayaran Pemindahan Awam, Malaysia, Pelbagai Dimensi, *Econographicology*, Pemodelan Dasar

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LIST OF SYMBOLS AND ABBREVIATIONS

AgC	:	Percentage change of aggregate consumption
B40	:	Bottom 40% of income group
BR1M	:	Bantuan Rakyat 1 Malaysia (1Malaysia People's Aid)
CSG	:	Child Support Grant
Edu	:	Percentage change of secondary school enrollment rate
EPU	:	Economic Planning Unit
FeA	:	Familias en Actión
GDP	:	Gross Domestic Product
ID	:	Infinity-Dimensional
KISS	:	Kasih Ibu Smart Selangor
MD	:	Multi-Dimensional
MF	:	Multi-Functional
NEP	:	New Economic Policy
P	:	Period
PTP	:	Percentage change of Public transfer payment distributed
U	:	Percentage change of the number of unemployed person
W	:	Windows Refraction
Y	:	Percentage change of GDP at current price
Yp	:	Percentage change of the level of B40 household income

CHAPTER 1: INTRODUCTION

1.1 Introduction to the Study

Public finance is one of the fields in economics that helps us to understand how the government earns its revenue and where they spend it in the economy. McConnell, Brue, Flynn, and Grant (2012) denoted that the government would make purchases in providing public goods and services such as education, health, national defense, the welfare of the public and interest on the public debt. Besides delivering public goods and services, the government also offers a public transfer payment. Public transfer payment is a part of government's purchases where the recipient of the transfer payment does not make any contribution to the local economy in return for the payment (McConnell et al., 2012).

Public transfer payment per se is an economic policy employed by the government to redistribute income and wealth in the economy (Dastrup, Hartshorn, & McDonald, 2006). According to Ruiz Estrada (2011b), the policy is defined as "a theoretical or technical instrument that is formulated to solve specific problems affecting societies - directly or indirectly - across different periods of time and geographical spaces" (p. 524). Consequently, economic policy can be defined as an economic tool that is formulated to solve economic problems.

For example, in Malaysia, public transfer payment has been used as an economic policy since the 1970s at the state level in the form of *Zakat* (Saad & Abdullah, 2014). *Zakat* is an Islamic term which carries the definition of purifying wealth (Qardawi, 2011). Ahmad (1989) explained that *Zakat* is a tool used by previous Islamic rulers since the eighth century as an economic tool to redistribute income from the rich to the poor and needy. Further discussions on *Zakat* will be done in chapter 2. *Zakat* has been an

economic tool used by Malaysia's state government to redistribute excess wealth to the specific *Zakat* recipients such as the poor and needy. Although *Zakat* itself is not an economic policy in the modern understanding of economics, Malaysia's state government managed to utilise *Zakat* as an economic tool in addressing the poverty problem in the state economy. In 2009 alone, Malaysia collected a total of MYR1,196,871,798.6 from *Zakat* collection and spent about MYR8,334,406 or 0.696% of the total on the destitute and the poor (Saad & Abdullah, 2014). Albeit the small percentage of utilization, the state government has been using *Zakat* money as a mode of transfer payment to help the poor and needy in the country.

Meanwhile, in 2012, the federal government of Malaysia introduced another form of transfer payment for the low-income group called 1Malaysia People's Aid (BR1M) (Nixon, Asada, & Koen, 2017). BR1M is a form of transfer payment in terms of monetary assistance to uplift the household income of the poor (Lagarde, Haines, & Palmer, 2009). Ministry of Finance Malaysia (2017) reported that the federal government had allocated a total of MYR6.8 billion for the BR1M program in the 2018 budget speech.

1.2 Background of the problem and Problem Statement

Classical literature argued that public transfer payment would redistribute income and eliminate poverty (McConnell et al., 2012; Dastrup et al., 2006). However, the impact of public transfer payment policy is not limited to ones addressed as thus far. Various components will be affected when public transfer payment policy occurs such as on economic growth (Yusoff, 2010, 2011), aggregate consumption (Suprayitno, Kader, and Harun, 2013; Rawlings and Rubio, 2005), unemployment rate (Soares, Ribas, & Osorio, 2010), income (Soares, Osorio, Soares, Medeiros, & Zepeda, 2009), savings (Danziger, Haveman, and Plotnick, 1981), healthcare (Fernald, Gertler, & Neufeld, 2008), and other

macroeconomic indicators. These studies proved that the effects of public transfer payment policy are dynamic.

Nevertheless, all the studies above were made based on the assumption of *Ceteris Paribus*, where it is assumed that all other things remain constant to understand the causal relationship between public transfer payment and selected macroeconomic variables. In reality, the economy is complex in nature. It is because multiple economic agents are involved, whose behaviour and knowledge is continuously evolving and re-shaping their actions and decisions (Thaler, 2000).

Ceteris Paribus is a vital assumption to policy modelling for the past 40 years (Ruiz Estrada & Park, 2018). Ruiz Estrada, Yap, and Nagaraj (2008) explained that *Ceteris Paribus* allows researchers, academicians and policymakers to analyse complex economic problems by part where the aggregate of each part can be an approximation of the reality. In other words, Ruiz Estrada et al. (2008) reasoned that *Ceteris Paribus* only considers the effect partially of each dependent variable in a set of the independent variable(s). When research is based on *Ceteris Paribus* assumption, that research is able to capture the underlying relationship between the independent variable(s) and one dependent variable by assuming that the other independent variables (s) will remain unchanged. However, *Ceteris Paribus* limitation begins when it fails to explain a real-world phenomenon when all related variables are changing at the same time (Ruiz Estrada, 2007). For instance, given the principle theory of demand where negative correlation happens between prices and quantity demanded of specific goods and services, *Ceteris Paribus* assumption plays a crucial role in fixing this idea where quantity demanded can only be affected by changes in price negatively. However, in the real world, this theory can be contended where, in some cases, a higher price does not

guarantee a lower quantity demanded. It happens because the changes in quantity demanded have various factors affecting it and price is only one of them. Therefore, *Ceteris Paribus*, per se, is simplifying human behavior to understand the complexity of human behavior.

The notion of policy modelling with *Ceteris Paribus* will have difficulties in explaining the real-world situations because it does not take into account all affected variables to move simultaneously. Although the development of most economic theories are based on *Ceteris Paribus* assumption, it is vital to acknowledge the limitation of *Ceteris Paribus* assumption. As the world moves in a more sophisticated manner, there is a need to analyse the real-world economic problem by considering all possible variables that are changing at the same time. By doing so, policymakers will possess holistic clarity of the problem and consequently formulate a better policy to counter the issue before it gets worse than before. This research will be echoing Ruiz Estrada et al. (2008) and supports the premise that moving beyond *Ceteris Paribus* is essential to comprehend and elucidate complex economic phenomena.

Complex economic phenomena occur when it involves complex behavior. Like any other economic policy, public transfer payment policy has a complicated behavior since the impact is not as simple as achieving its policy objective such as redistributing income (Dastrup et al., 2006) and eradicating poverty (Soares et al., 2010). Many variables will be affected simultaneously when public transfer payment policy occurs, and thus *Ceteris Paribus* assumption will limit our understanding of public transfer payment policy. Since previous literature on public transfer payment is based on *Ceteris Paribus* assumption, all the previous analysis did not take into consideration all variables that affected by public transfer payment concurrently.

Stirring away from the limitation of *Ceteris Paribus* made Ruiz Estrada et al. (2008) introduce *Omnia Mobilis* assumption which instead based on the premise that "everything is moving" to explain the complexity of economics marvels where every variable is indeed moving instantaneously in the economy whenever there are any changes on related variables. *Omnia Mobilis* assumption was introduced to analyse economic policy that can connect multidisciplinary areas, so researchers and policymakers can investigate any economic policy through utilisation of a more dynamic approach (Ruiz Estrada, 2011b).

Once policymakers are able to take into consideration all affected variables simultaneously with *Omnia Mobilis* assumption, researchers and policymakers will have the ability to visualise multi-dimensional graphs surpassed the traditional approach of 2-Dimensional and 3-Dimensional graphs due to its inclusivity in the analysis which takes into account a wide range of variables without neglecting any relevant variables (Ruiz Estrada, 2007, 2011a). Hence, analysing public transfer payment policy with *Omnia Mobilis* assumption would be meritorious in eliminating the limitation of *Ceteris Paribus* assumption that was widely used in previous literature in explaining the impacts of public transfer payment policy.

In summary, the research's problem statement is as follows:

Public transfer payment has been used as an economic policy by both the state and federal governments (Saad & Abdullah, 2014). However, *Ceteris Paribus* assumption in analysing public transfer payment in the previous literature has limited the understanding of the holistic impact of public transfer payment policy towards economics and socio-economic aspects because it considers only the partial effect of each dependent variable in a set of the independent variable(s). Replacing *Ceteris Paribus* assumption is essential to comprehend the complex economic phenomena as suggested by Ruiz Estrada et al.

(2008), in order to holistically appraise public transfer payment policy. The general problem is to analyse all affected variables simultaneously when public transfer payment occurs with *Omnia Mobilis* assumption. Since the development of Econographicology as a new analytical tool emerged by Ruiz Estrada (2007), replacing *Ceteris Paribus* assumption with *Omnia Mobilis* assumption is made possible. Therefore, to examine public transfer payment policy with *Omnia Mobilis* assumption, one needs to evaluate and examine public transfer payment policy using Inter-Linkage Coordinate Space that was introduced by Ruiz Estrada (2011a) to improve the understanding of public transfer payment as an economic tool.

1.3 Research Objectives

Omnia Mobilis assumption will assist policymakers and researchers in investigating public transfer payment policy through multidimensional perspectives. To my knowledge, there are none on studying public transfer payment policy in Malaysia with *Omnia Mobilis* assumption through multidimensional standpoints to explain the multifaceted economic phenomena of public transfer payment policy. Thus, the research objectives are as follow:

1. To improve the understanding of the complex economic events that happen when a public transfer payment policy takes place through multi-dimensional analysis.
2. To examine the impacts of public transfer payment policy on the Malaysian economy by relaxing *Ceteris Paribus* assumption and complementing it with *Omnia Mobilis* assumption.
3. To investigate the effects of *Zakat* and BR1M with *Omnia Mobilis* assumption from the multi-dimensional way.

4. To appraise Econographicology as a tool to construct multidimensional graphs that was introduced by Ruiz Estrada (2007, 2011a) to analyse the impacts of public transfer payment policy with *Omnia Mobilis* assumption.
5. To investigate the limitation of Econographicology as a tool in analysing public transfer payment policy.

1.4 Research Questions

With *Omnia Mobilis* assumption, policymakers and researchers will able to study public transfer payment policy such as *Zakat* and BR1M in Malaysia from multi-dimensional angles. Every endogenous variable that includes both economics and socio-economic aspects may be captured through Inter-Linkage Coordinate Space. Therefore, the proposed research questions are as follows:

1. How to improve the understanding of public transfer payment policy through Multi-Dimensional analysis?
2. What are the consequences of public transfer payment policy analysis when *Ceteris Paribus* assumption is complemented with *Omnia Mobilis* assumption?
3. What are the impacts of *Zakat* and BR1M distribution on the Malaysian economy and socio-economic aspects with *Omnia Mobilis* assumption?
4. What is the most suitable analytical tool to analyse public transfer payment policy with *Omnia Mobilis* assumption through multidimensional graphs?
5. What are the limitations of Econographicology tool in analysing public transfer payment policy?

1.5 Significance of the Study

Given the above research objectives and questions, this research intends to comprehend the complex economics marvels when public transfer payment policy occurs in Malaysia. Ruiz Estrada (2007) argued that Econographicology would enable us to evaluate economics theories and use it as analytical tools in the research and teaching-learning process of economics, finance and business. He further explained that the purpose of multiple-dimension representations is to give more insight to an economist to understand better regarding economic phenomena from the general view. He then reasoned that Econographicology would be able to provide academics, researchers and policymakers an alternative analytical tool.

Having said so, the significance of this research is not limited to only giving an alternative view to scrutinising public transfer payment policy that goes beyond traditional analysis; it will assist policymakers in Malaysia to improve understanding of the complex economic phenomena of public transfer payment policy in Malaysia from the multidimensional point of view. When policymakers in the government manage to understand the impact of public transfer payment policy towards the country's economy through the multidimensional graph, it will increase their awareness and understanding of public transfer payment policy.

Policymakers will be able to utilise these economic tools in the most efficient ways to detect if the marginal benefit exceeds the marginal cost before deciding to deploy public transfer payment policy. More emphasis will be given by the decision-makers in the country to take a step back before implementing public transfer payment policy in Malaysia due to their in-depth understanding of public transfer payment policy impact through *Omnia Mobilis* assumption.

Besides that, the study on Econographicology application is limited since it was introduced by Ruiz Estrada (2007) just a decade ago. This research will contribute to the field of Econographicology application since it is a relatively new field of economics. If this research is able to portray the usefulness of Econographicology in public policy modelling, it will increase the visibility of Econographicology in the public policy sphere. Policymakers will be more aware of alternative analytical tools to analyse public policy through application of what Econographicology is offering. Therefore, this research will contribute to the applicability of Econographicology as an analytical tool to investigate public policy from multidimensional perspectives.

Last but not least, this research will expand the scope of policy modelling analysis, where it employs the unorthodox methodology of multi-dimensional graphical modelling. It was reported that for the past 33 years of policy modelling publication at the journal of policy modelling, 99% of the paper published applied traditional 2-Dimensional graphical modelling whereas only 1% applied 3-Dimensional and multi-dimensional graphical modelling (Ruiz Estrada & Yap, 2013). Since this research is analysing public policy using multi-dimensional graphical modelling, it will contribute to enriching policy modelling domain with non-traditional analysis. Therefore, this research will widen the area of policy modelling by capturing the dynamic impacts of a policy that covers both economics and socio-economic aspects.

CHAPTER 2: LITERATURE REVIEW

2.1 Public Economics

Public economics is a study of a government decision in allocating limited resources to achieve economic efficiency and equity in the market (Myles, 1995). It is a branch of economics that focuses on government revenue and expenditure. Public economics has contributed to the utilisation of economic policies to improve the social welfare of a nation such as through public transfer payment. Promoting social welfare is part of the role of the government which ultimately suggests that finding ways to redistribute resources efficiently through social welfare policy is the priority of the government.

According to McConnell et al. (2012), public transfer payment is part of a general subsidy. The study of general subsidy can be massive; hence, this research focuses on one of the types of subsidy given by the government, which is public transfer payment. This research assumes *Zakat* and cash transfer program as the only public transfer payment in Malaysia. However, this research also stipulated a specific assumption on *Zakat* that every *Zakat* expenditure is considered as public transfer payment, although, in modern times, *Zakat* is distributed in monetary and non-monetary form. The premise is made based on the argument of Haron, Hassan, Jasni and Abdul Rahman (2010) that the majority of *Zakat* distribution is in a monetary form. Hence, for simplicity purposes, this research will treat the whole *Zakat* expenditure as public transfer payment in general. An in-depth discussion on *Zakat* will be discussed later in this chapter.

Given that the Malaysian state and the federal government have been utilising public transfer payment as part of its social welfare policy as argued by Saad and Abdullah

(2014), it is a form of Malaysian government expenses which consequently, reaffirms that it is a study of public economics.

In this chapter, a division of six sections will be made, which are public economics in section 2.1 that have been discussed above, theory of public transfer payment in section 2.2, review of empirical findings of public transfer payment in section 2.3, public transfer payment in Malaysia in section 2.4, *Omnia Mobilis* assumption in section 2.5, and Econographicology in section 2.6.

2.2 Theory of Public Transfer Payment

A public transfer payment is a policy that is used by the government as a social welfare tool to redistribute income and is well known within the developing economies (Hyman, 2010; Baird, Ferreira, Özler, & Woolcock, 2013). It is one of the social welfare tools of the government in assisting the poor and needy. Most of the public transfer payments come in monetary form and it is a direct transfer from government revenue to government expenditure under social welfare expenses. According to Hymen (2010), there are various kinds of transfer payments, such as cash transfer, unemployment benefits and social security benefits.

Neo-classical economic approach argued that the implementation of public transfer payment will lead an economic agent to move out from the labor force in the long run (Hyman, 2010). Hyman (2010) argued that both transfer payment in cash or in kind will disincentive any recipients to work. Based on a graphical argument made by Hyman (2010), one can conclude that when a recipient receives transfer payment, that same recipient's budget line will shift upwards. When the budget line shifted due to higher income per day, Hyman (2010) argued that the recipient will increase its leisure hours per

day and reduce their working hours per day. Theoretically, if the transfer payment amount keeps increasing to a certain level, the recipient will maximise its leisure hours per day to 24 hours. This means the same recipient won't participate in the labor force since their working hours have reduced to the minimum of zero hour per day. Therefore, Hyman (2010) convinced that a transfer payment will create disincentive to work among transfer payment recipients and reduce the amount of labor participation in the economy.

2.3 Review of Empirical Findings on Public Transfer Payment

On the contrary with the theory of public transfer payment, a few case studies with empirical findings such as studies made by Soares et al. (2010), Aguero, Carter, and Woolard (2007), and Fernald et al. (2008) have proven directly and indirectly that the neo-classical economic approach on transfer payment as contended in Hyman (2010) to be contradicted with their findings.

The first empirical findings about public transfer payment can be illustrated using Soares et al. (2010) comparative study that focuses on a cash transfer program in Brazil named Bolsa Familia. Through a survey method cited in the paper, Soares et al. (2010) concluded that transfer payment of Bolsa Familia successfully reduced the extreme poverty cases in Brazil without having an unintended effect on the labor force participation in Brazilian economy. Soares et al. (2010) contended that the labor participation of the recipient in Brazil is 2.6% higher than the non-recipient. On top of that, another noteworthy impact of the Bolsa Familia program is the increasing school attendance and decreasing dropout rates in the country. It is an evidence that public transfer payment does not necessarily translate into higher leisure time as suggested in Hyman (2010). However, Soares et al. (2010) found that despite lower dropout rates, children from extreme poverty background tend to be lagging behind in school. It shows

that the cash transfer program is a demand-side intervention and it requires a holistic approach when tackling the issues of poverty.

The second empirical findings of public transfer payment can be found on Aguero et al. (2007) that emphasised on transfer payment in South Africa named Child Support Grant (CSG). CSG is one of many types of public transfer payment where the South African government provides an unconditional cash transfer to extremely poor recipients with the hope to alleviate poverty in the region. Aguero et al. (2007) utilised Econometric approach with Hirano and Imbens estimators and came into conclusion that CSG provides a better nutrition to the recipient's children that lead to better physical and mental development of the child. With that being said, Aguero et al. (2007) contended that it will affect the labour productivity in the long run which indirectly disputed Hyman (2010) theory of public transfer payment.

On the other hand, Fernald et al. (2008) provide a different insight on the empirical findings of public transfer payment because it provides a mechanism to prevent more leisure time to be spent by the recipient as contended in Hyman (2010). Fernald et al. (2008) analysed Mexico's Oportunidades transfer payment program with linear and logistic regression to determine the outcome of public transfer payment on child health, growth, and development. Fernald et al. (2008) argued that transfer payments made in Mexico lead to two possible scenarios; 1. Increase the recipient's purchasing power that leads them to purchase a much healthier food for the family, 2. Increase the probability of the recipient to purchase household equipment that enables a healthier environment within the household. Both of this scenarios does not lead to more leisure time for the recipients because there is a mechanism in-placed to prevent it from happening since Fernald et al. (2008) showed a prime example of conditional cash transfer program where

the government provide the transfer payment with stipulated conditions before the recipient able to receive the cash. This indirectly prevents the recipients from increasing their leisure time then leads to the positive outcome of the public transfer payment as shown in Fernald et al. (2008).

Although the new-classical economic theory of transfer payment is well established with theoretical concepts, this research inclines towards the contradictory evidence of the impact of transfer payments in the economy. Therefore, analysing the impact of public transfer payment policy in Malaysia could contribute to the existing debate and empirical evidence of the impact of transfer payments on the economy as a whole.

2.4 Public Transfer Payment Policy in Malaysia

Malaysian economy has grown tremendously forward compared to its Independence Day in 1957 where a substantial inequality and poverty within the society were prominent with incidence of absolute poverty at 49.3% in 1970 (Rasiah, 2011). Given the huge variation of population demographic in Malaysia, the Malaysian government introduced multiple long-term economic plans since the 1960s to restructure the Malaysian economy in achieving a more equitable and fair distribution of wealth and income within the society. The first long-term economic plan was introduced by the former prime minister, Tun Razak, named Rural Development (1960-1970) plan. The second long-term economic plan is the infamous New Economic Policy (NEP) (1971-1990), aimed to address the racial tension issue that happened in 1969 (Nixon et al., 2017). Post NEP, Malaysian government continued to develop a 10-years economic plan to fit Malaysian economy into the globalisation era and subsequently implemented The National Development Policy (1991-2000), The National Vision Policy (2001-2010) and the New Economic Model (2011-2020) (Nixon et al., 2017).

With the execution of a 20 years long economic plan of NEP since the 1970s, Khalid (2014) contended that the NEP somewhat managed to curb poverty and inequality in some way, but not entirely. It was proven by Khalid (2014) that 20 years of NEP have moved the income distribution from being very inter-ethnically unequal to become skewed towards intra-ethnic inequality, with urban poverty remaining to be a problem. Although the incidence of absolute poverty dropped by 48.7% between 1970 to 2015, Nixon et al. (2017) argued that Malaysia's social protection expenditure is relatively low and there are highly fragmentation of programmes and institutions where social expenditure in Malaysia is offered in multitude of small-scales and for specific-purposes. Nixon et al. (2017) further explained that different ministries in Malaysia will provide different social programmes for different target groups. For instance, any social programme related to disabled people and women, the Ministry of Women, Family and Community Development will be in charge in providing the relevant social programmes whereas if social protection is required for the farmers, it falls on the responsibility of the Ministry of agriculture and the agro-based industry.

Nixon et al. (2017) listed the programmes considered as key pillars amongst the vast range of social support programmes in Malaysia are 1AZAM, eKasih database and BR1M. 1AZAM is a programme introduced by the Malaysian government to support low-income households to generate their own income and reduce their reliability towards the government. Whereas eKasih is a database introduced and coordinated by the Prime Minister Department to enhance and centralise the implementation of multiple social programmes across ministries. Lastly BR1M or Bantuan Rakyat 1 Malaysia was a programme introduced to cushion the high cost of living incurred by low-income households and it is assumed to be the first public transfer payment introduced and implemented nationally in Malaysia.

The public transfer payment policy refers to a payment made by the government in terms of cash or in-kind subsidy to the people in need without expecting a quid pro quo. Public transfer payment can be made through cash transfer from the state to the people, often categorised as non-exhaustive resources since it does not create output directly (McConnell et al., 2012). There are two general types of transfer payment; in-kind and cash.

In-kind transfer payment can be categorised as social security benefits such as food stamps, unemployment compensation and civil service pension (Smeeding, 1977). On the other hand, cash transfer payment is a typical cash transfer from the government to the recipient (Slater & Farrington, 2009).

In Malaysia, both in-kind and cash transfer payment has its own significance contributing to Malaysian economy. Most of the in-kind transfer payment in Malaysia is concentrated in the state level where centralisation is non-existent as not all state governments provide the same in-kind transfer payment. For instance, Selangor Journal (2018) reported that the Selangor state government introduced several schemes to assist the poor households in terms of in-kind transfer payment such as Kasih Ibu Smart Selangor (KISS). KISS is an in-kind transfer payment provided by the state government of Selangor where the government offers a cashless groceries voucher to single mothers to purchase monthly groceries to feed their family. KISS scheme was first introduced in 2017 and the programme was exclusively implemented by the Selangor state government. On top of the non-centralised in-kind transfer payment of social security benefits like KISS, the irregularity of in-kind transfer payments such as unemployment compensation and civil service pension is making it a challenge to objectively quantify and collect data for in-kind transfer payment in Malaysia. The irregularity mentioned includes the low

unemployment rate in Malaysia which holds little unemployment compensation and the varying average duration of a pension being distributed to the pensioners given the fatality rate of pensioners is varying across sample sizes.

Due to the unattainability of data for multitudes of small-scale and specific-purpose social programmes such as 1AZAM, eKasih and KISS, this research will focus more on public transfer payments such as BR1M and *Zakat* where data are publicly available.

Compared to in-kind payment, transfer payment is the most common method being used by both the states and the federal government of Malaysia in standardisation. It was first crystallised in Malaysia as a form of *Zakat* back in the 20th century (Saad & Abdullah, 2014). Although *Zakat* collection is subject to state authority, all 14 states in Malaysia have its own *Zakat* administrators to collect and distribute *Zakat* accordingly since the 1990s (Saad & Abdullah, 2014) whereby in 2012, BR1M was introduced by the federal government as direct cash transfer (Nixon et al., 2017).

Given that cash transfer payment is the most plausible proxy for public transfer payment in Malaysia, this paper will utilise only cash transfer payment when analysing public transfer payment policy in Malaysia. Below discussions will include in-depth deliberations on public transfer payment policy specifically on cash transfer payment in Malaysia such as *Zakat* and cash transfer payment programme.

2.4.1 *Zakat*

Zakat is a vital element in Islam because it is one of the five pillars of Islam and it is obligatory to all Muslim (Sadeq, 2002). Islam without *Zakat* is like a house without pillars and if a home is without its cornerstone, it is bound to collapse. *Zakat* means purification and growth (Qardawi, 2011). Technically, it involves purifying one's soul through the payment of *Zakat* and leading to an increase in material welfare in this world and hereafter (Ahmad, 1989). In principle, *Zakat* is a medium to transfer resources from those who can pay to the needy for their support and uplift (Ahmad, 1989).

Zakat has been used as one of the fiscal policy tools in the early period of Islam (Ahmad, 1989). Historically in the early sixth century, Prophet Muhammad uses a fiscal system that solely based on the holy Quran (Ahmad, 1989) in which it established a society with justice, peace, security and economic well-being. Prophet Muhammad was aiming to achieve social security and having a distributive justice in the economy. During that period, the source of revenue for the state was *Zakat*, Ghanimah (Spoils of War), Jizyah (Tax on non-Muslim live in an Islamic state) and fay' (property obtained without war in face of enemy). Ahmad (1989) further explained that during the early stage of fiscal management in the sixth century, *Zakat* was only levied on traditional items such as gold, silver, merchandise, agricultural produce, livestock and mineral or treasure trove. In the seventh century, the state's revenue has been developed further in order to meet the increase in state's expenditure due to the factor of increase in population and territory by expanding the coverage of *Zakat* items to property that generates income (Ahmad, 1989). Today, various scholars agreed that *Zakat* item coverage can be expanded to any excess wealth as long as the principle of *Zakat* holds (Qardawi, 2011).

The laid out premise entails *Zakat* as a feasible policy that policymakers can utilise in a modern context. First, the supply and demand side of *Zakat* needs to be well defined before policymakers can formulate *Zakat* as a modern fiscal policy tool. The supply side of *Zakat* refers to those who are eligible to pay *Zakat*. Majority of Islamic jurists agreed that any Muslims that possesses an excess of real assets exceeding the Nisab (minimum amount to pay *Zakat*) in one complete lunar year (Hawl) is obliged to pay *Zakat* on the assets(Qardawi, 2011). These *Zakat* payments will be collected by Amil (*Zakat* collector) and redistributed to specified *Zakat* recipients. Reversely, the demand side of *Zakat* is specified to eight recipients called Asnaf.

Historically, *Zakat* money is reserved for a specific eight Asnaf recipients while another source of state revenue will cover other kinds of expenditure. It is divided into eight particular recipients with no inclusion of other categorical definitions to receive *Zakat* money other than the specified one (Qardawi, 2011). The recipients of *Zakat* are divided as the destitute, the poor, the alms collector, people who burdened with debt, the wayfarers, people in bondage or slavery, those who have inclinations towards Islam and those who work towards the path of God (Qardawi, 2011). Taking *Zakat* money from the *Zakat* payer and redistributing it back to the poor and needy forms a mechanism which in complete conditions to fall under classifications of a public transfer payment policy.

Nonetheless, Malaysia state government has been employing *Zakat* as a public policy to help the destitute and the poor for the past 40 years (Saad & Abdullah, 2014). Given the nature of *Zakat* as an economic tool to eradicate poverty (Shirazi & Amin, 2009; Wali, 2013), several studies have already been made to observe the impacts of *Zakat* towards selected macroeconomic variables besides poverty incidence. For example, studies by Suprayitno et al. (2013) and Metwally (1983) showed that *Zakat* distribution has a

positive impact on aggregate consumption whereas Yusoff (2010) argued that *Zakat* expenditure would lead to higher economic growth.

Based on the data published by the state government, *Zakat* distribution in Malaysia increases every year. For example, there is an increase of about 51.15% from RM1.84 million in 2013 to RM2.78 million in 2015. Furthermore, *Zakat* collection and distribution is highly dependend on the state economy and the demographic of Muslim population in each state. According to JAWHAR, a centralised institution that recorded *Zakat* collection and distribution for all 14 states in Malaysia, the highest *Zakat* collection and distribution is at Selangor where in 2016 alone Selangor *Zakat* institution distributed about RM697.49 million. Given that Malaysia population is majority Muslim, *Zakat* institution played an important role in redistributing income through cash transfer in each states for the past 30 years.

From the above discussions, this research intends to argue that *Zakat* is a practical public policy and Malaysia have been using it as an economic tool since the 1970s (Saad & Abdullah, 2014). Therefore, *Zakat* in Malaysia can be categorised as a public transfer payment policy.

2.4.2 Cash Transfer Programs

Besides *Zakat*, cash transfer programs is another form of public transfer payments that the government utilises in assisting the poorer households. There are two types of cash transfer; conditional cash transfer and unconditional cash transfer (Baird et al., 2013). According to Baird et al. (2013), a conditional cash transfer program is where the government will stipulate a condition before enabling the recipients to receive the cash transfer. Meaning when a household receives unconditional cash transfer from the

government, they receive the money without requirements for them to fulfil in order to receive it. For example, a conditional cash transfer for healthcare and education called Familias en Actión (FeA) was introduced by the Columbian government in 2001-2002 (Attanasio, Oppedisano, and Vera-Hernández, 2015). FeA is a conditional cash transfer program where it provides cash transfer in forms of specific health and education activities. On the contrary, an unconditional cash transfer to improve the nutrition of the poor children called Child Support Grant (CSG) was introduced in South Africa around 1998 (Aguero et al., 2007). For the case of CSG, the South African government provided cash to the recipient without any string attached in hope of encouraging the poor households to consume better nutritious food for their children. Therefore, the cash transfer program has a broad application in helping the poor and the destitute similar to *Zakat* and it does not necessarily need to materialise in forms of fiat money.

Besides FeA and CSG, various cash transfer programs were used by several governments, mainly in Latin America. The Mexican government introduced the Oportunidades conditional cash transfer program since 1997 with the aim to boost school enrolments among poor Mexican households (Aguero et al, 2007). Furthermore, the Bolsa Familia program was introduced by the Brazilian government to provide conditional cash transfer through food security and healthcare to the low-income households in Brazil (Soares et al., 2010). Soares et al. (2010) further explained that the Bolsa Familia program also includes unconditional cash transfer, where it provides cash for households that falls under the category of extreme poverty. Therefore, these programs are a form of cash transfer which governments across the developing economies adopted as an economic policy to assist the poor and the destitute in the economy.

Likewise, Malaysian federal government adopted the cash transfer program as economic policy in 2012 to address the issue of the higher cost of living in the country and termed it as BR1M (Kamaruddina, Othman, & Denan, 2013; Nixon et al., 2017). BR1M is an unconditional cash transfer program where the recipients of BR1M have the freedom to spend on any goods and services which they deemed a priority. The significant difference between BR1M and other unconditional cash transfer programs around the world is that the lower-middle-income households are included as recipients whereas Bolsa Familia program in Brazil and CSG program in South Africa are only meant for the poor and impoverished households. Hence, BR1M's coverage is more extensive in comparison to other unconditional cash transfer programs.

It was reported that the total amount allocation of BR1M had increased by 277.78% from the figure when it was first introduced in 2012, going from RM1.8 billion to RM6.8 billion in 2018 (Ministry of Finance Malaysia, 2011; Ministry of Finance Malaysia, 2017). BR1M was set to be distributed to the low-income to lower-middle-income households and as of April 2018, the government have stipulated that only household that earns RM4,000 per month and below and single adults above 21 years old who earn RM2,000 per month and below is eligible to receive BR1M (Ministry of Finance Malaysia, 2017).

With an increase of government spending by more than 200% on cash transfer program over six years, it is surprising that as of today, there is limited research on the impacts of BR1M towards Malaysian economy. To dissect the impact of cash transfer program in Malaysia, this research suggests looking into other studies on the effects of a cash transfer program in another part of the world. For instance, research made by Soares et al. (2010) showed that cash transfer program in Brazil called Bolsa Familia has helped reducing

income inequality, reducing extreme poverty, increasing school attendance and increasing labour force participation in Brazil. Furthermore, a study by Gertler, Martinez, and Rubio-Codina (2012) showed that cash transfer program in Mexico named Oportunidades has alleviated short-term poverty, provided better health and nutrition, caused higher school enrollment for children, and ultimately increased living standards of the poor people in Mexico. Lastly, cash transfer program in South Africa labelled CSG argued that the program succeeded in increasing early childhood nutrition intake which indicated that the health situation for the children in the poor household is improving (Aguero et al., 2007).

2.5 *Omnia Mobilis* Assumption

Above discussions has demonstrated the potential impacts of public transfer payment policy towards economics and socio-economic aspects. However, all literature reviews on *Zakat* and cash transfer program used *Ceteris Paribus* assumption when examining the impacts because it fixes the time on a specific period and examines only some part of the crucial variables by assuming other relevant variables remain constant. This raises a few concerns where a partial analysis may provide a partial picture to the economic problems, neglecting the entire picture of the problems. Therefore, in improving our understanding of partial economic analysis, one needs to understand the *Ceteris Paribus* assumption.

Ceteris Paribus assumption was first introduced by Alfred Marshall in 1890 to analyse complex economic phenomena by parts (Ruiz Estrada et al., 2008). Ruiz Estrada et al. (2008) further explained that economic analysis that utilises *Ceteris Paribus* assumption would allow some of the variables for the study to be considered as unimportant or allow some critical factors in the analysis to be disregarded. Therefore, for the past 128 years,

Ceteris Paribus assumption has dominated economics analysis to improve understanding of complex economic theories because it provides a more straightforward way to model a particular economics problem.

Ruiz Estrada et al. (2008) argued that *Ceteris Paribus* assumption is only applicable in a fixed time frame with selected variables but not dynamic time frame where time is moving continuously, parallelly with the changes of all relevant variables. With regards to analysing the real economic phenomenon happening in the real world, it is crucial to assume that time is dynamic. This "time dynamic" is a framework indicating that time is moving continuously with every relevant variable changing simultaneously. It is the main factor why there is a need to analyse economic phenomena beyond *Ceteris Paribus* assumption in order to improve our understanding of the real impact of a given economics policy. In a "time dynamic" framework, one should be able to examine all the variables that move simultaneously in an analysis the premise that time is also moving dynamically. Hence, economics per se is complicated because of the complexity of the economic agents (Thaler, 2000) yet it should not stop us from examining economics principles using real-world data through "time dynamic" framework.

Ruiz Estrada et al. (2008) believed in acknowledgement of complexity in economic phenomena where numerous variables are moving at the same time in a given "time dynamic" framework which *Ceteris Paribus* is unable to capture. Hence, to complement the notable *Ceteris Paribus* assumption in economic analysis, Ruiz Estrada et al. (2008) suggested examining economics theories using *Omnia Mobilis* assumption. *Omnia Mobilis* assumption is defined as "everything is moving" where it utilises the concept of "time dynamic" when analysing a given economic phenomenon (Ruiz Estrada et al., 2008).

With *Omnia Mobilis* assumption, every economic analysis now is able to scrutinise all relevant variables at the same time, which may improve the understanding of policymakers in tackling the existing economic problems. One of the strengths in the attempt to complement *Ceteris Paribus* assumption with *Omnia Mobilis* assumption is to allow researchers and policymakers not to exclude all relevant variables when analysing any economics issues. Thus, the significant difference between *Ceteris Paribus* assumption and *Omnia Mobilis* assumption is the applicability of *Omnia Mobilis* assumption in explaining the complexity of the real-world economic phenomena extensively with "time dynamic" framework.

With the existence of multi-dimensional graphs submitted by Ruiz Estrada (2007, 2011a) called Econographicology, it is now possible to visualise *Omnia Mobilis* assumption. Econographicology modelling includes the "time dynamic" framework as part of its component when building the multi-dimensional graphs. Thus, Econographicology is the best tool to allow any policymakers and researchers to produce a single graphical form to explain given economic policy with *Omnia Mobilis* assumption.

2.6 Econographicology

Econographicology is the study of the economic graph from new types of figure and Cartesian spaces where it is constructed based on traditional 3-Dimensional space concepts but represents 4-D, 5-D, 8-D, 9-D and Infinity-Dimension (Ruiz Estrada, 2007, 2011a). According to Ruiz Estrada (2007), Econographicology theoretical framework is divided into three major sections, namely analytical graphs, descriptive graphs and simulation graphs. Ruiz Estrada (2007) further explained that analytical charts and illustrative graphs would enable researchers to use real data and experimental data under the micro and macro level of analysis in the short run and long run. The main difference

in descriptive graphs is that it utilises charts and diagrams under experimental data. On the other hand, simulation graphs are divided into two sub-sections; electronics which use software and solutions and prototypes that use different materials. Thus, Econographicology was constructed by forming a graphical method that put emphasis in improving the understanding of economic phenomena.

Ruiz Estrada (2007) mentioned that the purpose of Econographicology which uses multiple-dimension representations is to give more insight to an economist to better understand economic phenomena from the general view. He then argued that Econographicology would be able to provide academics, researchers and policymakers an alternative analytical tool. Besides, Ruiz Estrada (2007) stated that the objectives of Econographicology are to maximise graphical usage that can minimise the process of understanding and analysing economic problems.

2.6.1 Econographicology Tools

In general, Ruiz Estrada (2007, 2011a) differentiated between traditional 2-D and 3-D Cartesian Space with Multi-Dimensional (MD) Cartesian Space, Infinity (ID) Cartesian Space and Multi-Functional (MF) Cartesian Space. These three Cartesian Spaces are a part of Econographicology tools. Table below will summarise the tools based on axis, variables, advantages, weaknesses, and application.

Table 1 Econographicology Tools Differences (Ruiz Estrada, 2007, 2011a)

Type of Dimension	Number of Axis	Variables	Advantages	Disadvantages
Multi-Dimensional (MD) Cartesian Space	5 Axes $([x_1, x_2, x_3, x_4]$,y)	1 dependent variable (y), 4 independent variables (x_1, x_2, x_3, x_4)	1. All 5 Axes have positive and negative values. 2. Consist of two sub-tools: Pyramidal Cartesian Space and Diamond Cartesian Space.	1. Unable to insert more than one dependent variable and 4 independent variables.
Infinity Cartesian Space	n Axes $([x_1,x_2,x_3,\dots,x_{n+1}]$,y)	1 dependent variable (y), n independent variable $(x_1, x_2, x_3, \dots, x_n)$	1. Able to insert an unlimited number of independent variables. 2. The dependent variable (y) can be located in different positions within the Cartesian Space.	1. Unable to insert more than one dependent variable.
Multi-Functional (MF) Cartesian Space	9 Axes R_1= A$_i$ (x_{ij}, y_{000}) & R_2= A$_i$ (x_{ij}, y_{0ij})	5 dependent variables $(y_1, y_2, y_3, y_4, y_5)$, 8 independent variables $(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8)$	1. Cartesian Space can be divided into ratios that are mutually exclusive. 2. Extendable to inter-linkage coordinate space that have n number of dependent variables, independent variables, and ratios.	1. Unable to insert more than 5 dependent variables and 8 independent variables without the extension model.

2.6.1.1 Multi-Dimensional (MD) Cartesian Space

MD Cartesian space consists of five Axes with one dependent variable and four independent variables. The dependent variable "y" will be at the centre of the graph and surrounded by all four independent variables "x" (Ruiz Estrada, 2007). Ruiz Estrada (2007) expanded Multi-Dimensional Cartesian Space into two types of shape - Pyramidal Cartesian Space and Diamond Cartesian Space.

According to Ruiz Estrada (2007), Pyramid Cartesian Space consists of five axes which denotes four independent variables and one dependent variable. Each variable has its own axes and the axes for the dependent variable is placed at the center of the graph to act as a convergence point for all independent variables. Assuming every variable would have a positive value at a certain point, it will form a shape of a pyramid when every point at the axes is connected. Thus, Pyramid Cartesian Space allows any change in all or some independent variables; there will be a direct effect on the dependent variable.

Conversely, Diamond Cartesian Space design is based on 3-Dimensional Cartesian Space, which covers two levels of analysis (Ruiz Estrada, 2007). The first level of analysis represents five axes covering four independent variables and one dependent variable for each axes. Whereas for the second level of analysis, it shares the same four axes of independent variables from the first level of analysis but an extension of the fifth axes as the new dependent variable. With some similarity with Pyramid Cartesian Space, the axes for the dependent variable from the first and the second level of analysis is positioned at the center of the graph to act as a convergence point for the same independent variables. Ruiz Estrada (2007) emphasised that the dependent variable in the first and the second level of analysis should be mutually exclusive with each other, although they share the

same straight line. Hence, if both levels of analysis are joined, it will take the shape of a diamond and allow researchers to analyse two different scenarios of the dependent variable that share the same set of independent variables in one Cartesian Space at the same time.

2.6.1.2 Infinity (ID) Cartesian Space

According to Ruiz Estrada (2007), Infinity Cartesian Space can contain an infinite number of axes with an endless number of independent variables but only one dependent variable. Although it is only one dependent variable, the dependent variable "y" can have positive and negative values. Besides, the dependent variable is allowed to be located in different positions within the circle parametric of the infinity Cartesian Space, whereas the independent variables "x" joins together to form the circle parametric. Therefore, the final graph will become a cylinder shape with different levels of dimension, which allows researchers to investigate specific economic problems across time and space.

2.6.1.3 Multi-Functional (MF) Cartesian Space

MF Cartesian Space contains nine axes with five dependent variables and eight independent variables (Ruiz Estrada, 2007). MF Cartesian Space formed two ratios of analysis that are mutually exclusive. Each ratio has four spaces (or quadrant), where each Ratio contains four independent variables respectively (Ruiz Estrada, 2007, 2011a). With two sets of ratios, Ruiz Estrada (2007) explained that it would allow researchers to include eight independent variables and five dependent variables in the same Cartesian Space.

Furthermore, Ruiz Estrada (2011a) suggested that MF Cartesian Space can be expanded to contain an infinite number of axes with an endless amount of dependent and independent variables called as the Inter-Linkage Coordinate Space. Inter-Linkage Coordinate Space is a derivation from MF Cartesian Space. According to Ruiz Estrada (2011a), Inter-Linkage Coordinate Space is formed by an infinite number of horizontal axes or general axes (A_0, A_1, …, A_n…) that will be represented by a period. Each general axes will have an infinite amount of windows refraction (W_0, W_1, …, W_n…) that will contain an infinite amount of sub-x and sub-y axis that will be represented by independent and dependent variables. Each windows refraction then will be combined under the same general axes with the application of the inter-linkage connectivity of windows refraction.

Ruiz Estrada (2011a) contended that Inter-Linkage Coordinate Space would be able to insert a large number of different functions and variables in different windows refraction simultaneously. With this functionality, Inter-Linkage Coordinate Space can be applied to include all relevant and critical variables when analysing any economic problems simultaneously without assuming any significant variable remains constant which is more realistic when compared with the real world. Further elaboration of MF Cartesian Space and Inter-Linkage Coordinate Space will be discussed more in-depth in the following chapter under research design.

2.6.2 Econographicology Empirical Review

The empirical review of Econographicology will be discussed based on the three major tools of Econographicology. The first tool, Multi-Dimensional (MD) Cartesian Space was utilised as a part of the tool in Ruiz Estrada and Yap (2006) study where the research showed the impact of trade liberalisation on income growth in selected countries. Ruiz Estrada and Yap (2006) evaluated the trade liberalisation based on three different

approaches mainly on political economy, economic theory, and trade policy. Through these approaches, Ruiz Estrada and Yap (2006) explored the MD Cartesian Space as an element when computing the Openness Growth Monitoring (OGM) Model to analyse the impact of trade liberalisation on income growth. Ruiz Estrada and Yap (2006) constructed the Diamond Cartesian Space to illustrate the degrees of openness by production sectors such as the agriculture sector, industrial sector, energy sector, and service sector. Through the constructed Diamond Cartesian Space of trade openness, it provides the element for the OGM Model to be computed based on the current landscape of global development of trade liberalisation. Through analysing 38 countries from 1995-2001, Ruiz Estrada and Yap (2006) concluded that trade liberalisation did not generate income growth in the developing countries.

The second tool, Infinity Cartesian Space was applied in Ruiz Estrada et al. (2008) to describe the law of demand and supply beyond *Ceteris Paribus* assumption. The core idea was to replace the conventional 2-Dimensional demand and supply lines into a multi-dimensional graphical representation. Ruiz Estrada et al. (2008) aimed to analyse the movement of price as the dependent variable against a set of independent variables that affect the price level in the market. By converting the unit of measurement for all variables into growth rate, Ruiz Estrada et al. (2008) managed to plot the quantity demanded and quantity supplied in the same cartesian space. Ruiz Estrada et al. (2008) concluded in their study that quantity demanded and quantity supplied will always be in disequilibrium state due to the asymmetric information in the market that continuously changes over time.

The last tool, Multi-Functional (MF) Cartesian Space was applied in Ruiz Estrada (2014) to analyse the impact of the United States (US) economy on the global economy.

Since the study includes 5 major economic regions in the world such as Japan, China, ASEAN, Latin America, and European Union as the dependent variable, the study then extends the MF Cartesian Space into Inter-Linkage Coordinate Space to include 6 dependent variables (US, Japan, China, ASEAN, Latin America, and European Union). Ruiz Estrada (2014) inserted 6 independent variables which are Gross Domestic Product (GDP) of the regions, Export level, Foreign Direct Investment (FDI), stock market, unemployment rate, and poverty rate. With 30 different windows refraction within the Cartesian Space, Ruiz Estrada (2014) concluded that the US economy has a directly proportional relationship with the global economy where any changes in the US economy, all 5 regions' economy will be affected.

CHAPTER 3: METHODOLOGY

This research will mainly be using quantitative analysis through Econographicology introduced by Ruiz Estrada (2007). Besides, this research's examinations will put emphasis on evaluation and analysis of public transfer payment policy through multidimensional perspectives. As discussed above, the usage of *Ceteris Paribus* assumption in previous literature has constrained us in the analysis of public transfer payment policy from multi-dimensional lenses. Complimenting *Ceteris Paribus* assumption with *Omnia Mobilis* assumption will provide this research a new perspective of examining public transfer payment policy. As of today, there are no tools in existence have been developed to make an analysis using *Omnia Mobilis* assumption except Econographicology as contended by Ruiz Estrada et al. (2008). Therefore, utilisation of Econographicology tools such as Inter-Linkage Coordinate Space as introduced by Ruiz Estrada (2011a) is needed.

Inter-Linkage Coordinate Space will provide a different perspective of analysing public transfer payment policy since it will reflect all affected variables simultaneously in a single graphical form. Hence, it will give the overall picture to researchers and policymakers regarding the impact of public transfer payment policy in each period range of time that will affect the decision making in implementing the policy in the future. Hence, this research will analyse public transfer payment policy in non-traditional ways and look at it with *Omnia Mobilis* assumption from multi-dimensional perspectives through Econographicology. This chapter will be divided into three sections, which are a theoretical framework in section 3.1, research design in section 3.2 and data collection in section 3.3.

3.1 Theoretical Framework

Public economics has laid down the basic principle of subsidy and public transfer payment. These are parts of government expenditures which will have its unintended effect on the overall economy (Myles, 1995). Previous literature reviews have discussed extensively on the impact of public transfer payment to certain variables using *Ceteris Paribus* assumption. Therefore, this section will elaborate on those existing evidence of the effects of public transfer payment to the overall economy.

To examine the implication of public transfer payment policy with *Omnia Mobilis* assumption from multi-dimensional perspectives, the theoretical framework will play a role to establish the relationship between public transfer payment and selected macroeconomic variables based on previous literature and how it formed the domino-effect within implementation of public transfer payment policy.

The foundation of understanding the macroeconomic implications of public transfer payment policy is to assume the marginal propensity to consume for the recipient is relatively high compared to the non-recipient (Metwally, 1983). The chances for the poor and needy to use the transferred money to consume essential goods and services is high because of the higher marginal propensity to consume. When transfer payment is distributed to the poor, the disposable income of the recipients is expected to increase and therefore increases its consumption pattern.

According to a study by Suprayitno et al. (2013) and Rawlings and Rubio (2005), public transfer payment policy has a positive impact on aggregate consumption through the increase of its disposable income. With higher income, the recipients would consume more and contribute to the rise of the aggregate consumption in the long run.

Given that previous studies strongly suggested that public transfer payment will affect the income of the poor positively and ultimately positively affect the aggregate consumption of the economy, it is justifiable to include the income level of the Bottom 40% (B40) of the household as well as the amount of aggregate consumption in the economy as the variables in this study.

Besides, the concept of the multiplier effect is essential to explain the consequence of transfer payment in macroeconomics level (Abu Bakar & Abdul Rahman, 2007). With higher aggregate consumption and higher multiplier effect, it will lead to higher growth in the economy (Yusoff, 2010, 2011). Hence, it is admissible to include Gross Domestic Product (GDP) level as a proxy to economic growth as one of the variables affected positively by the increase of public transfer payment.

When the income of the B40 households increases due to public transfer payment, B40 households will have a better opportunity to have access into education (Rawlings and Rubio, 2005; Soares et al., 2010; Yusoff, 2011). Higher disposable income for the B40 households will provide a sense of financial security for the parents to send their kids to school and ultimately may increase the level of education of the B40 communities. When the children of the poor have access to primary and secondary education, it is expected that their level of education will be increased in the long run and benefits them positively.

Another example can be drawn for transfer payment that may affect positively to the level of education of the poor is through scholarship (Srinovita, Udiutomo, & Haryadi, 2016). Srinovita et al. (2016) reasoned that giving education to the recipient via scholarship can be useful in reducing poverty incidence and increase economic empowerment of the poor in the long term. Public transfer payment policy will not only increase their education level but also increase the income level of the poor in the long

run as a consequence of long run effect. However, given our definition of public transfer payment is in terms of cash transfer and not in-kind transfer like scholarship, this paper will not include the amount of the scholarship distributed every year by the government for consistency.

Since previous works of literature pointed out that public transfer payment will affect the education of the recipients through higher school enrollment (Rawlings and Rubio, 2005; Soares et al., 2010; Yusoff, 2011), inclusion of school enrollment rate is essential for this research. Given the absence of microdata on the school enrollment rate of the poor households, this research assumes the enrollment rate of secondary school as the proxy for the overall school enrollment by the B40 recipient. This assumption is based on reasonings provided by Rawling and Rubio (2005) and Srinovita et al. (2016) that public transfer payment will motivate the recipients to send their children to a higher level of education and they will prompt to continue sending their children to secondary school level and higher given the resulting stable financial security. Since the data on primary school enrollment in Malaysia has little to no variation relatively compared to the secondary school enrollment due to the existing Malaysian law obliging parents to send their kids to primary schools (Education Act, 1996), this research decided to use secondary school enrollment rate as the variable representing the level of education of the B40 households. Hence, the expected relationship between public transfer payment and secondary school enrollment is positively correlated.

Furthermore, public transfer payment policy has a positive impact on labor participation, which in turn contributes to lower unemployment rate in the category of low-income earners (Soares et al., 2010). Soares et al. (2010) explained that upon receiving transferred payment, recipients would be able to provide better nutrition for

themselves which therefore increases their probability of working in the labor force. Once the recipients have the ability to work because of transferred payment, it is an indirect effect of public transfer payment policy towards the economy. Given the data on the unemployment rate in Malaysia has little to no variation, this study decides to use the absolute number of the unemployed person in Malaysia as the proxy for the unemployment rate. Hence, the correlation between public transfer payment and the number of unemployed people will be negative.

With a solid foundation on this theoretical framework, it is not possible to change the order of variables when performing an analysis using Econographicology. It is to ensure the domino effect is fully backed by the literature and changing the order of variables would not allow this research to utilise Inter-Linkage Coordinate Space as a tool for analysis.

3.2 Research Design

To investigate the impacts of public transfer payment policy with *Omnia Mobilis* assumption through Multi-Dimensional graphs, this research will be designed to undertake exploratory study through secondary analysis. It will utilise the vast availability of literature review on *Zakat* and cash transfer program. At the same time, this research will be using secondary data that is available from multiple sources. Besides that, this research will fit in Econographicology as the analytical tools because it allows researchers to utilise the Multi-Dimensional graphs to explain economics problems with *Omnia Mobilis* assumption.

However, there are limitations to some of the Multi-Dimensional graphs that was introduced by Ruiz Estrada (2007). The weakness is where the charts are only able to

include a limited number of variables whereby to evaluate public transfer payment policy; this research requires multiple variables to be involved in a single graphical form. For instance, the Multi-Dimensional Cartesian Space only able to accommodate four independent variables and Infinity Cartesian Space only allow one dependent variable. Since MF Cartesian Space can be extended to Inter-Linkage Coordinate Space that can put up multiple axes and variables, it will be the most suitable analytical tool to investigate public transfer payment policy.

According to Ruiz Estrada (2007), MF Cartesian Space contains at least nine general axes which are $[(X_{1\text{-}j}, X_{2\text{-}j}, X_{3\text{-}j}, X_{4\text{-}j}), (Y_{i\text{-}0}, Y_{1\text{-}j}, Y_{2\text{-}j}, Y_{3\text{-}j}, Y_{4\text{-}j})]$ where "j" has a value of 0 to ∞. On the same Cartesian plane, it will be divided into two ratios of analysis, which are Ratio 1 (R_1) and Ratio 2 (R_2). R_1 function equal to $(X_{i\text{-}0}, Y_{i\text{-}0})$ whereas R_2 function equal to $(X_{i\text{-}j}, Y_{i\text{-}j})$ where "i" has a value of 1 to 4. Each ratio has four quadrants that will be denoted as "S", and it has its functions which are as follows:

Table 2 Function for each quadrant in Multi-Functional Cartesian Space

Ratio 1	**Ratio 2**
$S1 = (X_{1\text{-}0}, Y_{i\text{-}0})$	$S5 = (X_{1\text{-}1}, Y_{1\text{-}1})$
$S2 = (X_{2\text{-}0}, Y_{i\text{-}0})$	$S6 = (X_{2\text{-}1}, Y_{2\text{-}1})$
$S3 = (X_{3\text{-}0}, Y_{i\text{-}0})$	$S7 = (X_{3\text{-}1}, Y_{3\text{-}1})$
$S4 = (X_{4\text{-}0}, Y_{i\text{-}0})$	$S8 = (X_{4\text{-}1}, Y_{4\text{-}1})$

This model has been illustrated by the original author as follows:

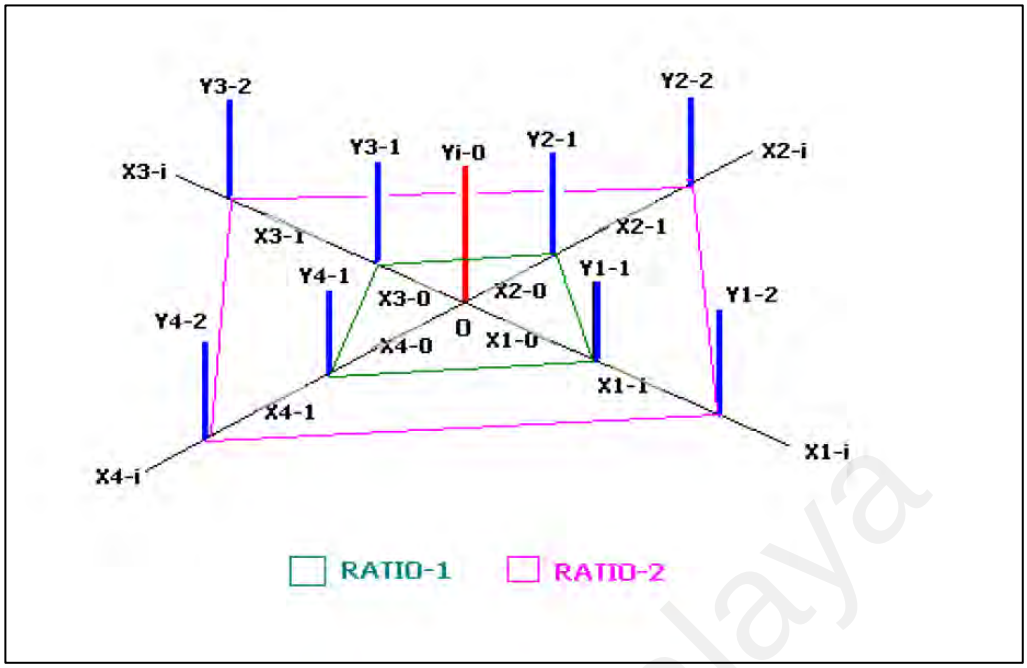

Figure 1 MF Cartesian Space (Ruiz Estrada, 2007, 2011a)

Based on figure 1, there is one dependent variable and four independent variables in Ratio 1, whereas, in Ratio 2, there are four dependent variables and four independent variables. In general, there are five general functions in both ratios. For Ratio 1, the general function is $Y_{1\text{-}0} = f(X_{1\text{-}0}, X_{2\text{-}0}, X_{3\text{-}0}, X_{4\text{-}0})$. While for Ratio 2, the general functions are $Y_{1\text{-}1} = f(X_{1\text{-}1})$, $Y_{2\text{-}1} = f(X_{2\text{-}1})$, $Y_{3\text{-}1} = f(X_{3\text{-}1})$, and $Y_{4\text{-}1} = f(X_{4\text{-}1})$.

Figure 1 above is a simplified version of MF Cartesian Space. Ruiz Estrada (2011a) suggested that MF Cartesian space can contain an infinite number of axes with an infinite number of dependent and independent variables which will expand to become Inter-Linkage Coordinate Space. Thus, figure 1 can be developed graphically to become as follows:

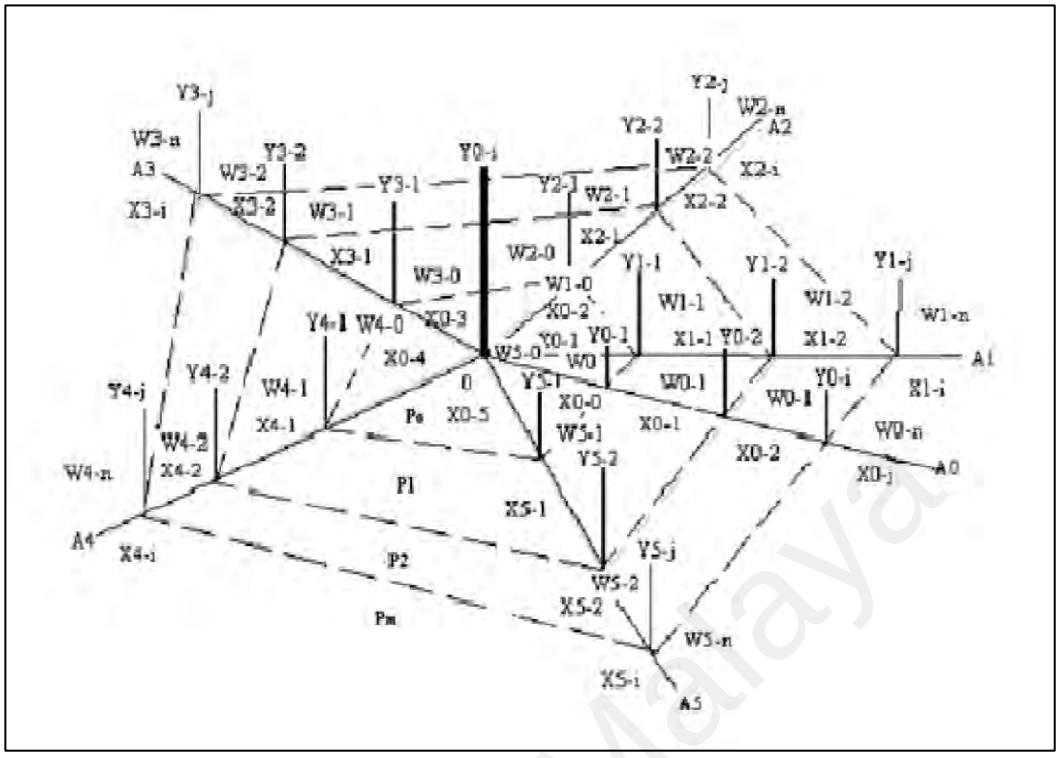

Figure 2 Inter-Linkage Coordinate Space (Ruiz Estrada, 2011a)

For Inter-Linkage Coordinate Space, the general axes can be expanded from *[($X_{1\text{-}j}$, $X_{2\text{-}j}$, $X_{3\text{-}j}$, $X_{4\text{-}j}$), ($Y_{i\text{-}0}$, $Y_{1\text{-}j}$, $Y_{2\text{-}j}$, $Y_{3\text{-}j}$, $Y_{4\text{-}j}$)]* to *[($A_{0\text{-}j}$, $A_{1\text{-}j}$, $A_{2\text{-}j}$, $A_{3\text{-}j}$, $A_{4\text{-}j}$, $A_{5\text{-}j}$, …, $A_{n\text{-}j}$), ($Y_{i\text{-}0}$, $Y_{0\text{-}j}$, $Y_{1\text{-}j}$, $Y_{2\text{-}j}$, $Y_{3\text{-}j}$, $Y_{5\text{-}j}$, …, $Y_{n\text{-}j}$)]* where "n" has a value from 0 to ∞ as well. It also can expand its ratios of analysis from two ratios to an infinite number of ratios.

This research is utilising Inter-Linkage Coordinate Space as the tool to analyse public transfer payment with *Omnia Mobilis* assumption. Inter-Linkage Coordinate Space will provide a better insight compared to MF Cartesian Space because this research required ten general axes to represent period and six variables in a single axes. Given the limitations of MF Cartesian Space only allow four general axes, Inter-Linkage Coordinate Space is the most suitable tool to be used for this research.

For this study, general axes of $(A_{0-j}, A_{1-j}, A_{2-j}, A_{3-j}, A_{4-j}, A_{5-j}, \ldots, A_{n-j})$ in the Inter-Linkage Coordinate Space will be represented as periods. Since this research has a sample size of ten periods, the general axes then can be expressed as $(A_{1-j}, A_{2-j}, A_{3-j}, A_{4-j}, A_{5-j}, A_{6-j}, A_{7-j}, A_{8-j}, A_{9-j}, A_{10-j})$.

Each general axes of $(A_{1-j}, A_{2-j}, A_{3-j}, A_{4-j}, A_{5-j}, A_{6-j}, A_{7-j}, A_{8-j}, A_{9-j}, A_{10-j})$ will have its multiple windows refraction of $(W_{i-0}, W_{0-j}, W_{1-j}, W_{2-j}, W_{3-j}, W_{5-j}, \ldots, W_{n-j})$ that have function of a variable against one period of time. This research contain six variables which are percentage change of public transfer payment distributed (PTP), percentage change of income of the B40 household (Yp), percentage change of aggregate consumption (AgC), percentage change of gross domestic product (Y), percentage change of secondary school enrollment (Edu), and percentage change of unemployed person (U). Hence, there are six different windows in each axis that can be expressed as $(W_{1-j}, W_{2-j}, W_{3-j}, W_{4-j}, W_{5-j}, W_{6-j})$.

Each window refraction then is based on a combination of the sub-x axis (X_{i-j}) with its sub-y axis (Y_{i-j}), respectively. Each window refraction $(W_{1-j}, W_{2-j}, W_{3-j}, W_{4-j}, W_{5-j}, W_{6-j})$ will be followed by the coordinate Space of (X_{i-j}, Y_{i-j}). The sub-x axis is represented by a period, and we can express it as (P_{i-j}) whereas the sub-y axis represented by each variable mentioned above that can be expressed as $(PTP_{i-j}; Yp_{i-j}; AgC_{i-j}; Y_{i-j}; Edu_{i-j}; U_{i-j})$. Note that the term "i" represents the position of general axes, whereas the term "j" represents the position of the window refraction.

Once every windows refraction and general axes have been established, every windows refraction can be connected under the inter-linkage connectivity of windows refraction that has the same general axes which can be represented as ® as suggested by Ruiz Estrada (2011a). In short, a single general axes with six window refractions can be drawn individually from two-dimensional perspectives with an expression of $W_{n-1} = (P_{n-1}, PTP_{n-1})$ ® $W_{n-2} = (P_{n-2}, Yp_{n-2})$ ® $W_{n-3} = (P_{n-3}, AgC_{n-3})$ ® $W_{n-4} = (P_{n-4}, Y_{n-4})$ ® $W_{n-5} = (P_{n-5}, Edu_{n-5})$ ® $W_{n-6} = (P_{n-6}, U_{n-6})$ where "n" is the number of period in each general axes.

Since there are ten periods and six window refractions, the overall expression can be written and summarised in the table below:

Table 3 Overall expression of Inter-Linkage Coordinate Space for PTP

General Axis	Function
General Axis 1 (A_1 = Period 1)	$W_{1-1} = (P_{1-1}, PTP_{1-1})$ ® $W_{1-2} = (P_{1-2}, Yp_{1-2})$ ® $W_{1-3} = (P_{1-3}, AgC_{1-3})$ ® $W_{1-4} = (P_{1-4}, Y_{1-4})$ ® $W_{1-5} = (P_{1-5}, Edu_{1-5})$ ® $W_{1-6} = (P_{1-6}, U_{1-6})$
General Axis 2 (A_2 = Period 2)	$W_{2-1} = (P_{2-1}, PTP_{2-1})$ ® $W_{2-2} = (P_{2-2}, Yp_{2-2})$ ® $W_{2-3} = (P_{2-3}, AgC_{2-3})$ ® $W_{2-4} = (P_{2-4}, Y_{2-4})$ ® $W_{2-5} = (P_{2-5}, Edu_{2-5})$ ® $W_{2-6} = (P_{2-6}, U_{2-6})$
General Axis 3 (A_3 = Period 3)	$W_{3-1} = (P_{3-1}, PTP_{3-1})$ ® $W_{3-2} = (P_{3-2}, Yp_{3-2})$ ® $W_{3-3} = (P_{3-3}, AgC_{3-3})$ ® $W_{3-4} = (P_{3-4}, Y_{3-4})$ ® $W_{3-5} = (P_{3-5}, Edu_{3-5})$ ® $W_{3-6} = (P_{3-6}, U_{3-6})$

Table 3 Continued

General Axis	Function
General Axis 4 (A_4 = Period 4)	$W_{4-1} = (P_{4-1}, PTP_{4-1}) \circledR W_{4-2} = (P_{4-2}, Yp_{4-2}) \circledR W_{4-3} = (P_{4-3}, AgC_{4-3}) \circledR W_{4-4} = (P_{4-4}, Y_{4-4}) \circledR W_{4-5} = (P_{4-5}, Edu_{4-5}) \circledR W_{4-6} = (P_{4-6}, U_{4-6})$
General Axis 5 (A_5 = Period 5)	$W_{5-1} = (P_{5-1}, PTP_{5-1}) \circledR W_{5-2} = (P_{5-2}, Yp_{5-2}) \circledR W_{5-3} = (P_{5-3}, AgC_{5-3}) \circledR W_{5-4} = (P_{5-4}, Y_{5-4}) \circledR W_{5-5} = (P_{5-5}, Edu_{5-5}) \circledR W_{5-6} = (P_{5-6}, U_{5-6})$
General Axis 6 (A_6 = Period 6)	$W_{6-1} = (P_{6-1}, PTP_{6-1}) \circledR W_{6-2} = (P_{6-2}, Yp_{6-2}) \circledR W_{6-3} = (P_{6-3}, AgC_{6-3}) \circledR W_{6-4} = (P_{6-4}, Y_{6-4}) \circledR W_{6-5} = (P_{6-5}, Edu_{6-5}) \circledR W_{6-6} = (P_{6-6}, U_{6-6})$
General Axis 7 (A_7 = Period 7)	$W_{7-1} = (P_{7-1}, PTP_{7-1}) \circledR W_{7-2} = (P_{7-2}, Yp_{7-2}) \circledR W_{7-3} = (P_{7-3}, AgC_{7-3}) \circledR W_{7-4} = (P_{7-4}, Y_{7-4}) \circledR W_{7-5} = (P_{7-5}, Edu_{7-5}) \circledR W_{7-6} = (P_{7-6}, U_{7-6})$
General Axis 8 (A_8 = Period 8)	$W_{8-1} = (P_{8-1}, PTP_{8-1}) \circledR W_{8-2} = (P_{8-2}, Yp_{8-2}) \circledR W_{8-3} = (P_{8-3}, AgC_{8-3}) \circledR W_{8-4} = (P_{8-4}, Y_{8-4}) \circledR W_{8-5} = (P_{8-5}, Edu_{8-5}) \circledR W_{8-6} = (P_{8-6}, U_{8-6})$
General Axis 9 (A_9 = Period 9)	$W_{9-1} = (P_{9-1}, PTP_{9-1}) \circledR W_{9-2} = (P_{9-2}, Yp_{9-2}) \circledR W_{9-3} = (P_{9-3}, AgC_{9-3}) \circledR W_{9-4} = (P_{9-4}, Y_{9-4}) \circledR W_{9-5} = (P_{9-5}, Edu_{9-5}) \circledR W_{9-6} = (P_{9-6}, U_{9-6})$
General Axis 10 (A_{10} = Period 10)	$W_{10-1} = (P_{10-1}, PTP_{10-1}) \circledR W_{10-2} = (P_{10-2}, Yp_{10-2}) \circledR W_{10-3} = (P_{10-3}, AgC_{10-3}) \circledR W_{10-4} = (P_{10-4}, Y_{10-4}) \circledR W_{10-5} = (P_{10-5}, Edu_{10-5}) \circledR W_{10-6} = (P_{10-6}, U_{10-6})$

Once an overall expression has been derived, we then continue to construct the initial state of Inter-Linkage Coordinate Space before any data being plotted. It can be summarised in figure 3 below:

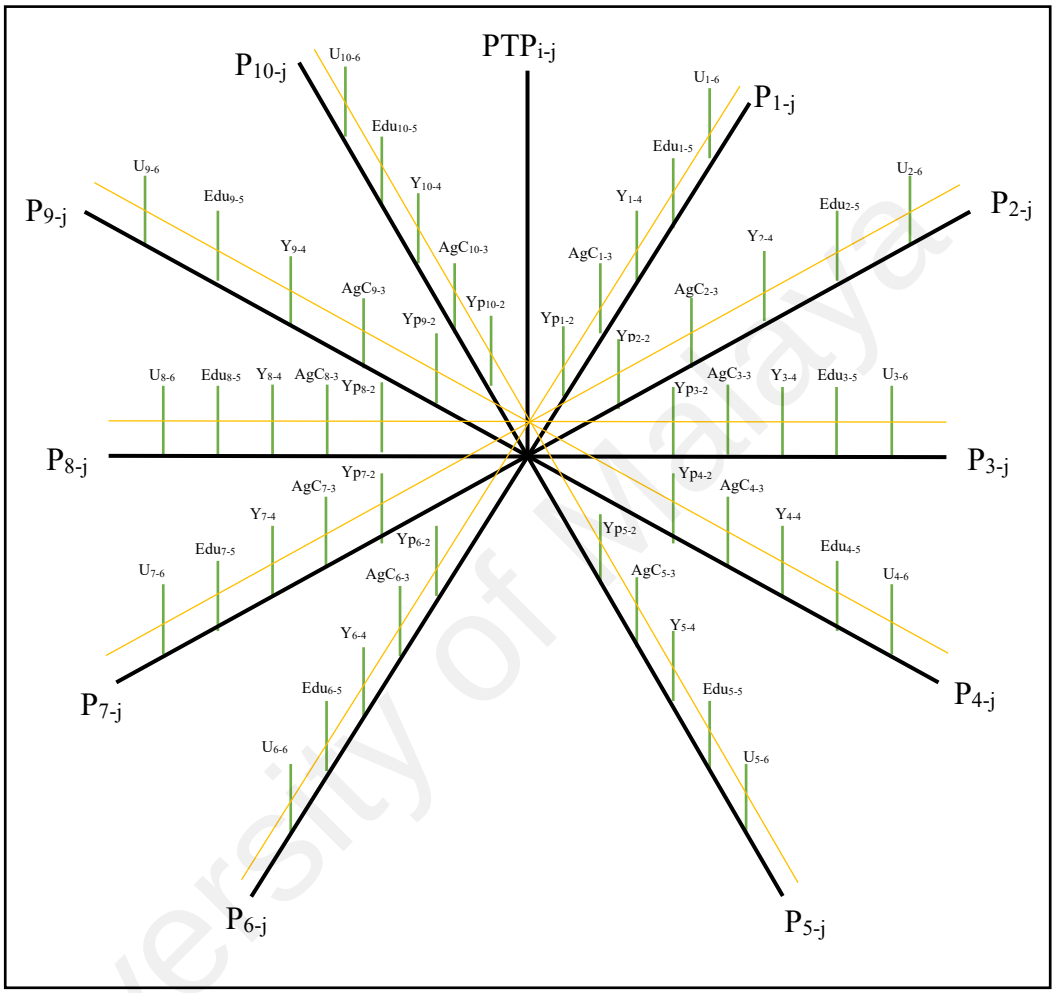

Figure 3 Inter-Linkage Coordinate Space Frame

Based on figure 3 above, there are ten general axes which represent ten different periods. Each general axis is colored black line for easy visualisation and each sub-y axis is colored as a green line. Since there are six windows with six different variables involved, there are a total of fifty sub-y axis lines or five sub-y axis lines in each general axis.

3.3 Data Collection

There are a total of six variables involved in this research. These variables were chosen based on the solid theoretical background, as discussed in chapter 2. The source of the data is from the Department of Statistics Malaysia, Ministry of Finance Malaysia, and JAWHAR. This research consists of ten periods from 2008 to 2018, given the limited data for the previous periods. There are ten periods with six variables in each period, with a total of seventy numbers of samples.

The first variable is the total amount of public transfer payment distributed which consist of the summation of the total amount of *Zakat* distributed and the total amount of BR1M distributed. The raw data was collected in the unit measurement of Ringgit Malaysia (RM) million and has a mean of RM 4,795.3803 million and a median of RM4,340.7597 million. Below are the line graphs based on the original data.

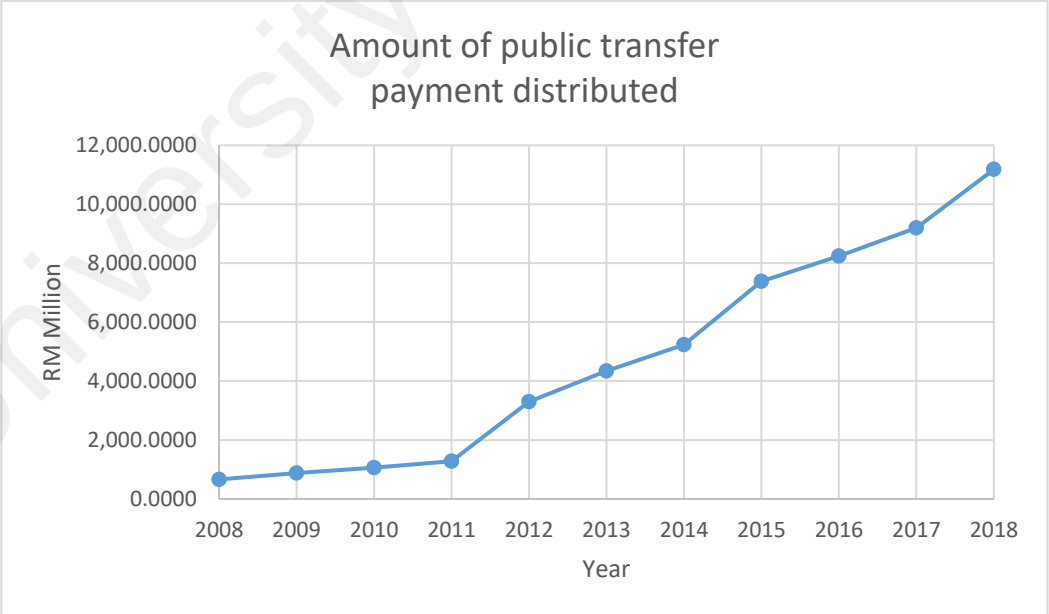

Figure 4 Total amount of Public Transfer Payment distributed in RM Million

The second variable is the total income of Bottom-40 (B40) household. The raw data was collected in the unit measurement of RM per month and has a mean of RM2,173.09 per month and a median of RM1,885.79 per month. Below is the line graph based on the original data.

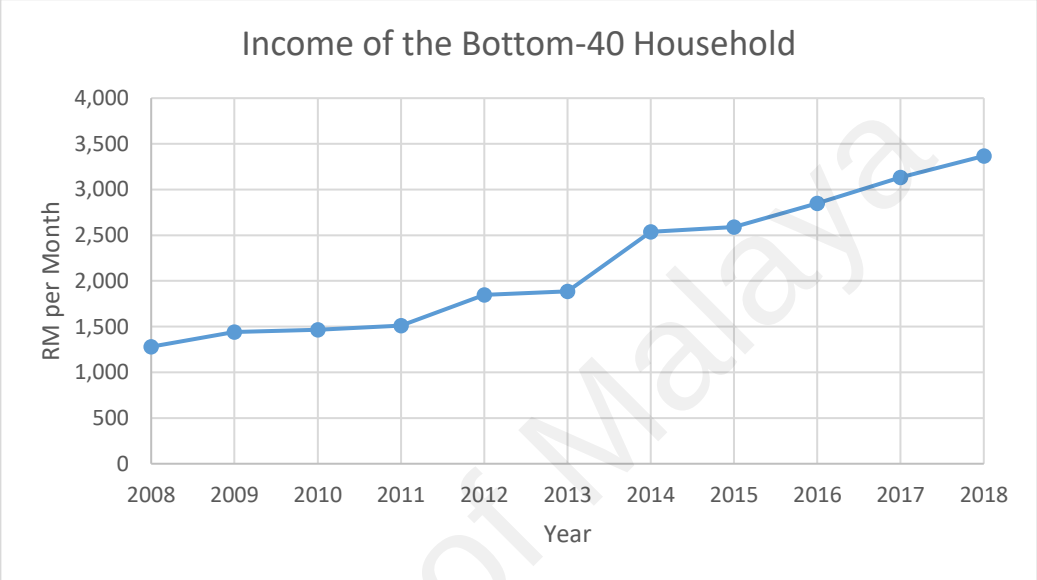

Figure 5 Income level of the Bottom-40 Household in RM per month

The third variable is the total amount of aggregate consumption in Malaysia. The raw data was collected in the unit measurement of RM billion and has a mean of RM539.3378 billion and a median of RM527.7490 billion. Below is the line graph based on the original data.

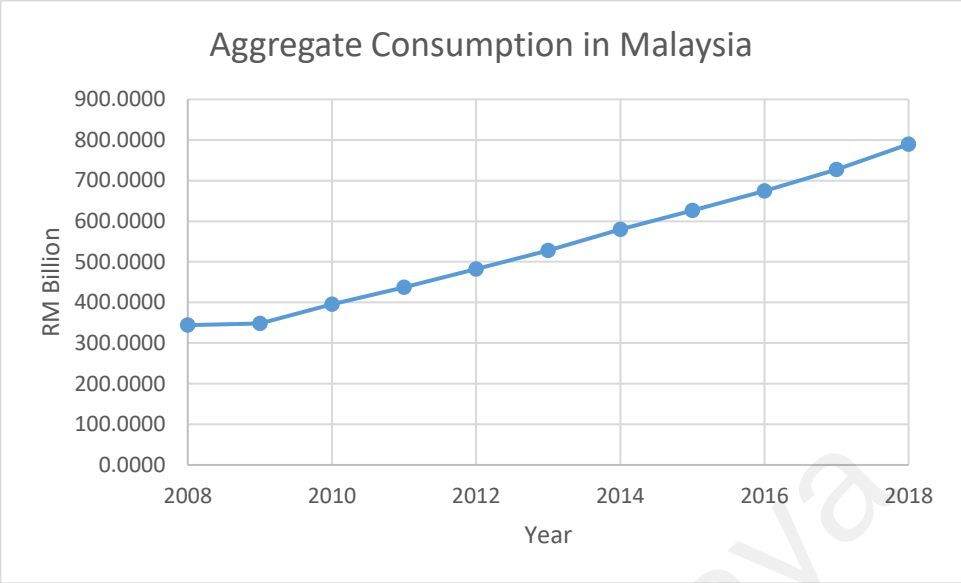

Figure 6 Aggregate Consumption in Malaysia in RM Billion

The fourth variable is the amount of Malaysia Gross Domestic Product (GDP) at the current price. The raw data was collected in the unit measurement of RM billion and has a mean of RM1,035.3021 billion and a median of RM1,018.6140 billion. Below is the line graph based on the original data.

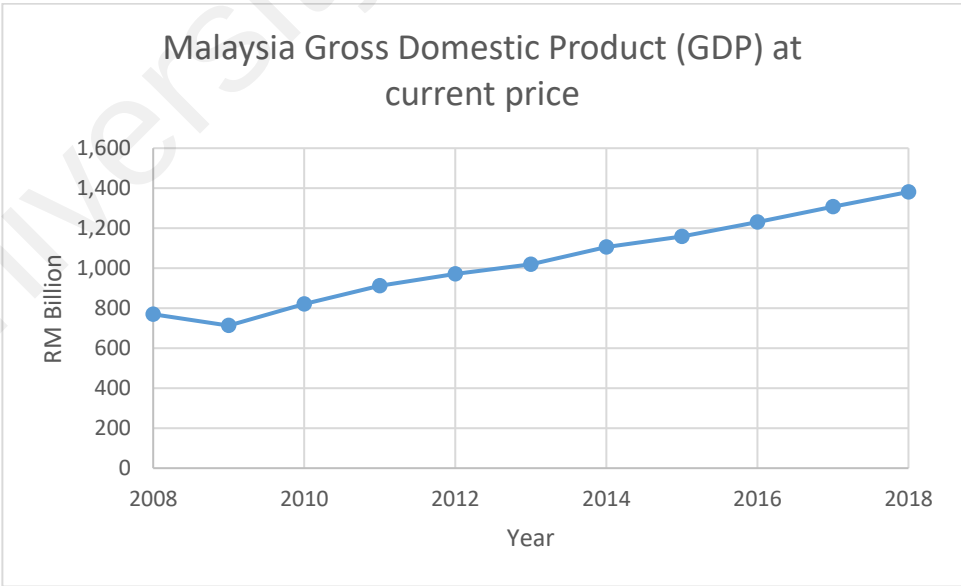

Figure 7 Malaysia GDP at current price in RM Billion

The fifth variable is the enrollment rate in secondary school. The raw data was collected in the unit measurement of percentage and has a mean of 89.92% and a median of 90%. Below is the line graph based on the original data.

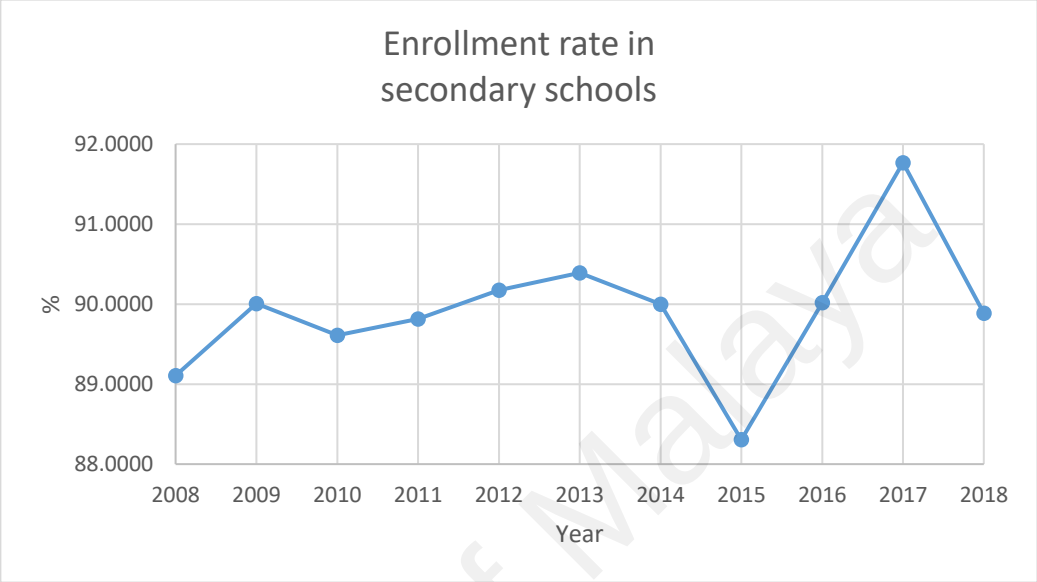

Figure 8 Enrollment rate in a secondary school in %

The last variable is the number of an unemployed person. The raw data was collected in the unit measurement of a number of people and has a mean of 435 thousand people and a median of 418 thousand people. Below is the line graph based on the original data.

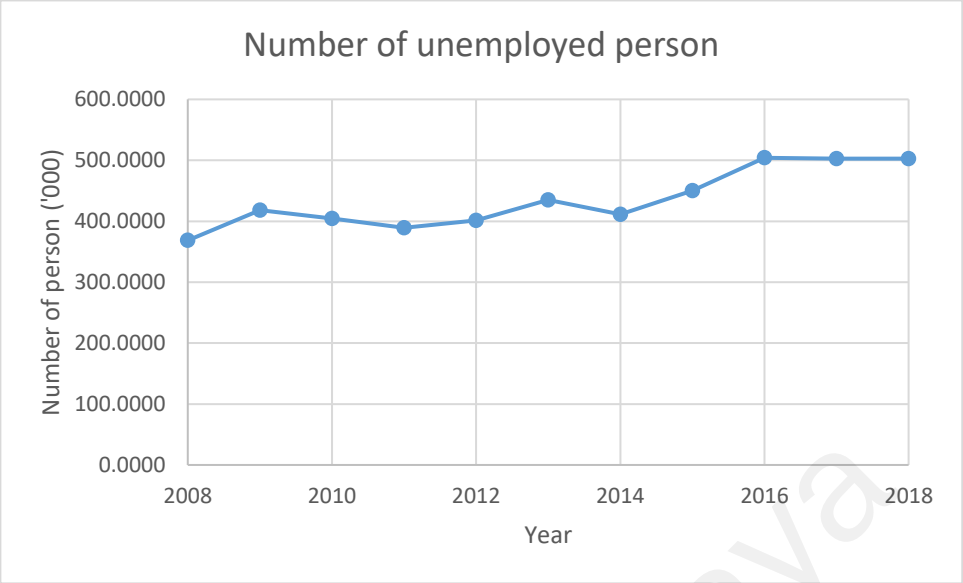

Figure 9 Number of unemployed persons in thousands

To construct Inter-Linkage Coordinate Space, one needs to convert the data into the percentage change compared with the previous year. Hence, the selected variables will be converted into percentage changes from one period to another which can be listed as follows; (1) Percentage change of the amount of public transfer payments distributed in Malaysia (PTP), (2) Percentage change of the level of B40 household income in Malaysia (Yp), (3) Percentage change of the aggregate consumption in Malaysia (AgC), (4) Percentage change of Malaysia Gross Domestic Product (GDP) at the current price (Y), (5) Percentage change of enrollment rate in a secondary school in Malaysia (Edu), (6) Percentage change of unemployed person in Malaysia (U).

Once all the data have been collected and converted, the data then needs to be standardised with the overall mean to get a more accurate representation of the result when plotting it into the Inter-Linkage Coordinate Space.

Broadly, there are four general types of data standardisation. According to Hatcher (2013), the first type of data standardisation technique is the 0-1 scaling. 0-1 scaling will

allow every variable to be calculated based on its maximum and minimum value and allows variables to bear different mean and standard deviation within the same range of data set. The second type of data standardisation technique is dividing each value by the range. This technique will convert the data set to be in a similar range but still hold different mean and variance. The third type of data standardisation technique is dividing each value by the standard deviation. Hatcher (2013) explained that this technique will convert all the variables to have a variance of 1 but still hold different mean. The fourth and final type of data standardisation technique is the z-score scaling. z-score scaling will transform all of the variables to have equal means and standard deviation of zero and one respectively. Hence, given that to construct Inter-Linkage Coordinate space requires an equal mean, the z-score scaling is the most suitable data standardisation technique that can be applied in this research.

As suggested by Hatcher (2013) and Jajuga and Walesiak (2000), data standardisation will provide a fair comparison between all variables in a single analysis. Since the base of our analysis is not based on the variability of the data instead of on the position of coordinate space in each window refraction, having an equal means is important. Therefore, applying the standardisation of z-score with the overall mean is the most suitable approach. As suggested by Hatcher (2013) and Jajuga and Walesiak (2000), the formula suggested to perform z-score scaling is as follow:

$$Z = \frac{x - \mu}{\sigma}$$

Where z is the standardised score, x is the initial value of data given, μ is the overall mean of all data sets, and σ is the overall standard deviation of all data sets.

With classical standardisation of z-score, the standardised data then is expected to have a mean of zero and a standard deviation of one. With a mean of zero, the data then can be plotted into Inter-Linkage Coordinate Space uniformly. For instance, for any standardised data that have a value of less than zero, it can be plotted into the coordinate space below the average line that has a yellow colour-coding that can be reflected in figure 3. Whereas if the standardised data have a value of more than zero, it can be plotted into the coordinate space above the average line. Since all the sub-x axis within general axes is representing a period, hence the location of exact coordinate space should be on the center of sub-x axis for each window refraction to improve the scaling of the result. On top of that, the position of the coordinate space in each window refraction can be sorted according to the standardised value given it is within the same general axes.

CHAPTER 4: RESULTS AND DISCUSSIONS

In any economic policy implementation, there is a domino-effect where consequences to the general economy do matter. Ruiz Estrada (2014) termed this as "economic wave". It means that when there are changes in a single variable, there will be the implication to one or more variables backed by literature review consequently. Using Econographicology as a tool to measure the impact of a given variable, Ruiz Estrada (2014) managed to visualise the economic wave using a multi-dimensional space diagram and proved it with real data that the economic wave does exist.

Inspired by the idea of the economic wave, the domino-effect or the economic wave of the public transfer payment policy in Malaysia can be examined with Inter-Linkage Coordinate Space. To comprehend the economic wave of public transfer payment policy, one needs to understand the chain-effect that has a sound literature review on the given policy. Given the *Omnia Mobilis* assumption, when the government implements public transfer payment policy, the government will distribute the cash transfer to all recipients which majority constituted of the B40 households. A direct increase in the income of the B40 households is expected. As argued by Metwally (1983) that a more impoverished household generally has a higher marginal propensity to consume, it is expected that the recipient of the cash transfer will increase its consumption pattern due to the increase of their income. As "time dynamic" is taken into account, the aggregate consumption of the economy is expected to increase due to the multiplier effect (Suprayitno et al., 2013; Rawlings and Rubio, 2005). An increase in aggregate consumption through public transfer payment can intensify the economic growth of the nation, as Yusoff (2011) study suggested. When the income of the recipient and the economy is growing, the recipient

of cash transfer has a higher tendency to provide better education to their offspring which in turn can improve their level of education through higher participation in the early stages of education (Srinovita et al., 2016). Likewise, public transfer payment will affect labor's participation rate in the workforce through higher productivity that in turns will reduce the number of unemployed people (Soares et al., 2010).

This chapter will be divided into four sections. The first section will discuss the comparison between *Zakat* and BR1M, then the following three sections will discuss the impact of public transfer payment using 2-Dimensional graph and Inter-Linkage Coordinate Space.

4.1 Public Transfer Payment: *Zakat* vs BR1M

This study primarily analysed the amount of public transfer payment distributed between 2008 to 2018. The amount of public transfer payment is based on the summation of *Zakat* distribution and BR1M distribution. Since BR1M is a relatively new policy tool that was introduced by the Malaysian government in 2012-2013, the data of BR1M is unavailable before the introduction of the policy. In contrast, *Zakat* has been used as a policy tool by the Malaysian state government since the 1970s (Saad & Abdullah, 2014) and this research is only able to retract the data as far back as 2008. Due to the non-centralised *Zakat* institution, *Zakat* data is not available prior to 2008 for all 14 states in Malaysia. Given this limitation, the comparison of *Zakat* and BR1M can only be made fairly starting from period 7 (2014-2015) to period 10 (2017-2018).

This comparison will utilise the same research design of Inter-Linkage Coordinate Space but with a little adjustment of having four general axes for four periods instead of ten general axes for ten periods.

4.1.1 *Zakat*

Zakat data is available from 2008 to 2018. However, for comparison purposes with BR1M, this research decided to only take from 2014-2018 which consist of four periods. The original data were converted into percentage change and standardised using z-score scaling. To construct *Zakat* (Z_{i-j}) Inter-Linkage Coordinate Space, we then need to derive the general equation.

Table 4 Overall expression of Inter-Linkage Coordinate Space for *Zakat*

General Axis	Function
General Axis 7 (A_7 = Period 7)	$W_{7-1} = (P_{7-1}, Z_{7-1}) \circledR W_{7-2} = (P_{7-2}, Yp_{7-2}) \circledR W_{7-3} = (P_{7-3}, AgC_{7-3}) \circledR W_{7-4} = (P_{7-4}, Y_{7-4}) \circledR W_{7-5} = (P_{7-5}, Edu_{7-5}) \circledR W_{7-6} = (P_{7-6}, U_{7-6})$
General Axis 8 (A_8 = Period 8)	$W_{8-1} = (P_{8-1}, Z_{8-1}) \circledR W_{8-2} = (P_{8-2}, Yp_{8-2}) \circledR W_{8-3} = (P_{8-3}, AgC_{8-3}) \circledR W_{8-4} = (P_{8-4}, Y_{8-4}) \circledR W_{8-5} = (P_{8-5}, Edu_{8-5}) \circledR W_{8-6} = (P_{8-6}, U_{8-6})$
General Axis 9 (A_9 = Period 9)	$W_{9-1} = (P_{9-1}, Z_{9-1}) \circledR W_{9-2} = (P_{9-2}, Yp_{9-2}) \circledR W_{9-3} = (P_{9-3}, AgC_{9-3}) \circledR W_{9-4} = (P_{9-4}, Y_{9-4}) \circledR W_{9-5} = (P_{9-5}, Edu_{9-5}) \circledR W_{9-6} = (P_{9-6}, U_{9-6})$
General Axis 10 (A_{10} = Period 10)	$W_{10-1} = (P_{10-1}, Z_{10-1}) \circledR W_{10-2} = (P_{10-2}, Yp_{10-2}) \circledR W_{10-3} = (P_{10-3}, AgC_{10-3}) \circledR W_{10-4} = (P_{10-4}, Y_{10-4}) \circledR W_{10-5} = (P_{10-5}, Edu_{10-5}) \circledR W_{10-6} = (P_{10-6}, U_{10-6})$

4.1.1.1 *Zakat* Individual General Axes

Before constructing the whole Inter-Linkage Coordinate Space, one needs to draw each general axis separately. Since this comparison of *Zakat* consists of four periods, there will be four different general axes drawn against five sub-y axis variables. Each data plotted has gone through the standardised process and each coordinate space is located according to its relative value in comparison with its overall mean which is zero and represented by the yellow line. Thus, below are the figures of all individual general axes with its respective function for *Zakat* (Z_{i-j}):

(a) Zakat Period 7 (2014-2015)

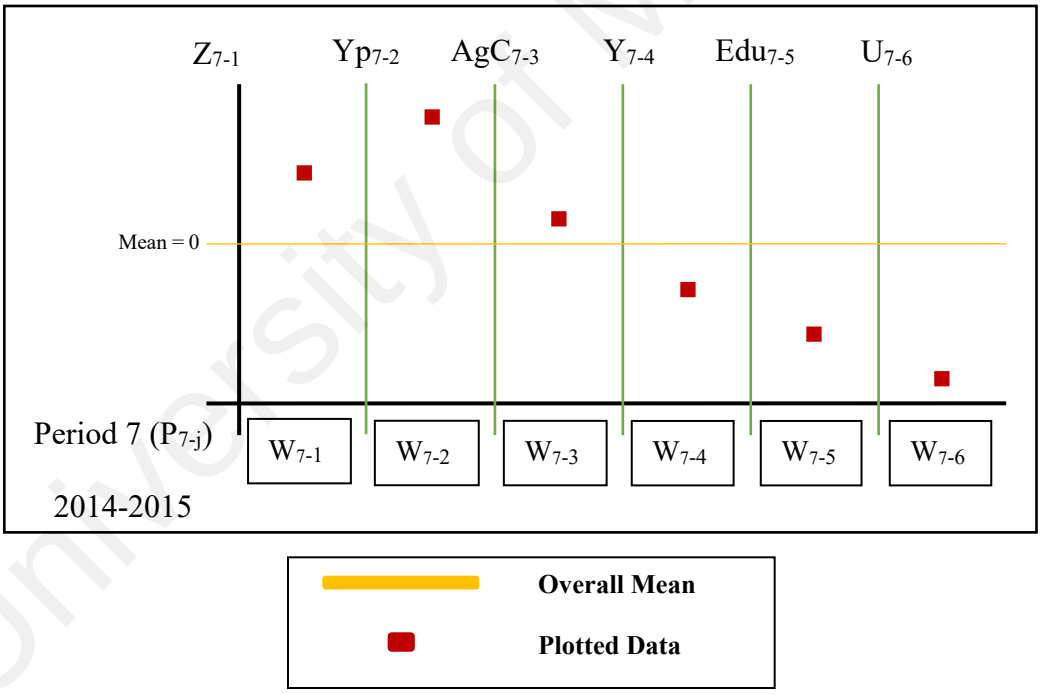

Figure 10 *Zakat* Individual General Axes for Period 7

General Axis 7 (A_7 = Period 7): $W_{7-1} = (P_{7-1}, Z_{7-1})$ ® $W_{7-2} = (P_{7-2}, Yp_{7-2})$ ® $W_{7-3} = (P_{7-3}, AgC_{7-3})$ ® $W_{7-4} = (P_{7-4}, Y_{7-4})$ ® $W_{7-5} = (P_{7-5}, Edu_{7-5})$ ® $W_{7-6} = (P_{7-6}, U_{7-6})$;

(b) Zakat Period 8 (2015-2016)

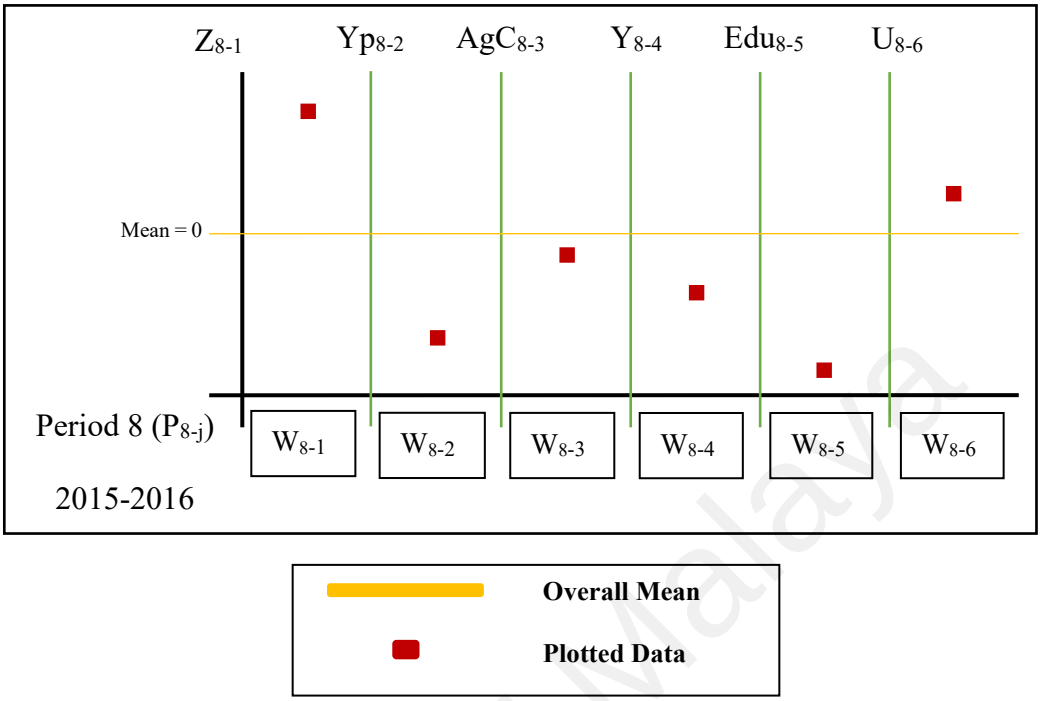

Figure 11 *Zakat* Individual General Axes for Period 8

General Axis 8 (A_8 = Period 8): W_{8-1} = (P_{8-1}, Z_{8-1}) ® W_{8-2} = (P_{8-2}, Yp_{8-2}) ® W_{8-3} = (P_{8-3}, AgC_{8-3}) ® W_{8-4} = (P_{8-4}, Y_{8-4}) ® W_{8-5} = (P_{8-5}, Edu_{8-5}) ® W_{8-6} = (P_{8-6}, U_{8-6});

(c) Zakat Period 9 (2016-2017)

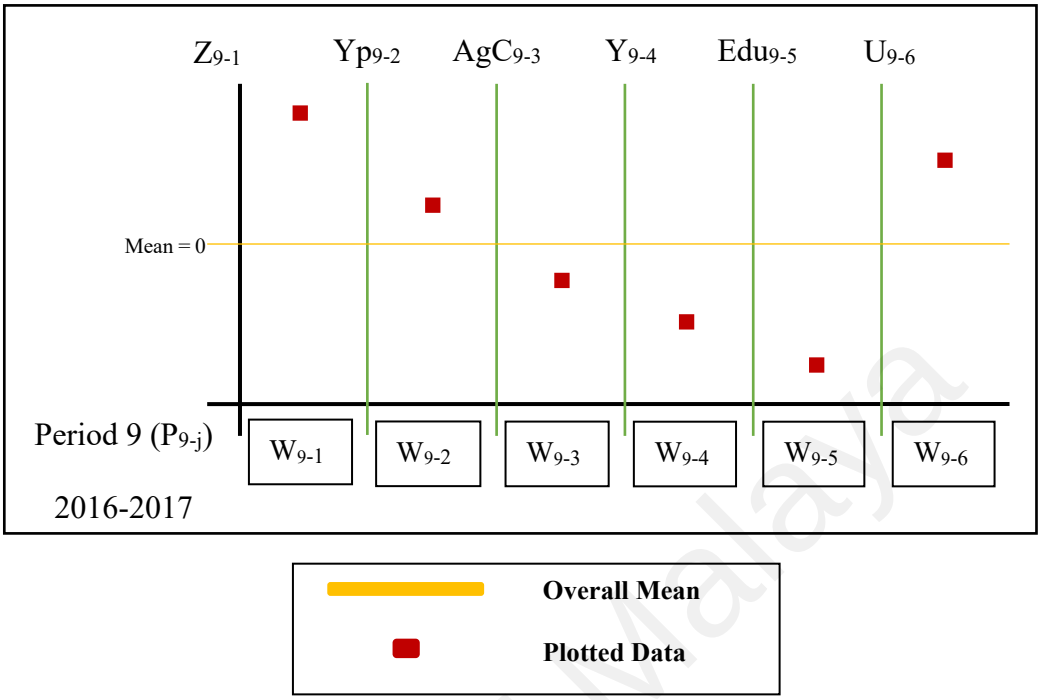

Figure 12 *Zakat* Individual General Axes for Period 9

General Axis 9 (A_9 = Period 9): W_{9-1} = (P_{9-1}, Z_{9-1}) ® W_{9-2} = (P_{9-2}, Yp_{9-2}) ® W_{9-3} = (P_{9-3}, AgC_{9-3}) ® W_{9-4} = (P_{9-4}, Y_{9-4}) ® W_{9-5} = (P_{9-5}, Edu_{9-5}) ® W_{9-6} = (P_{9-6}, U_{9-6});

(d) Zakat Period 10 (2017-2018)

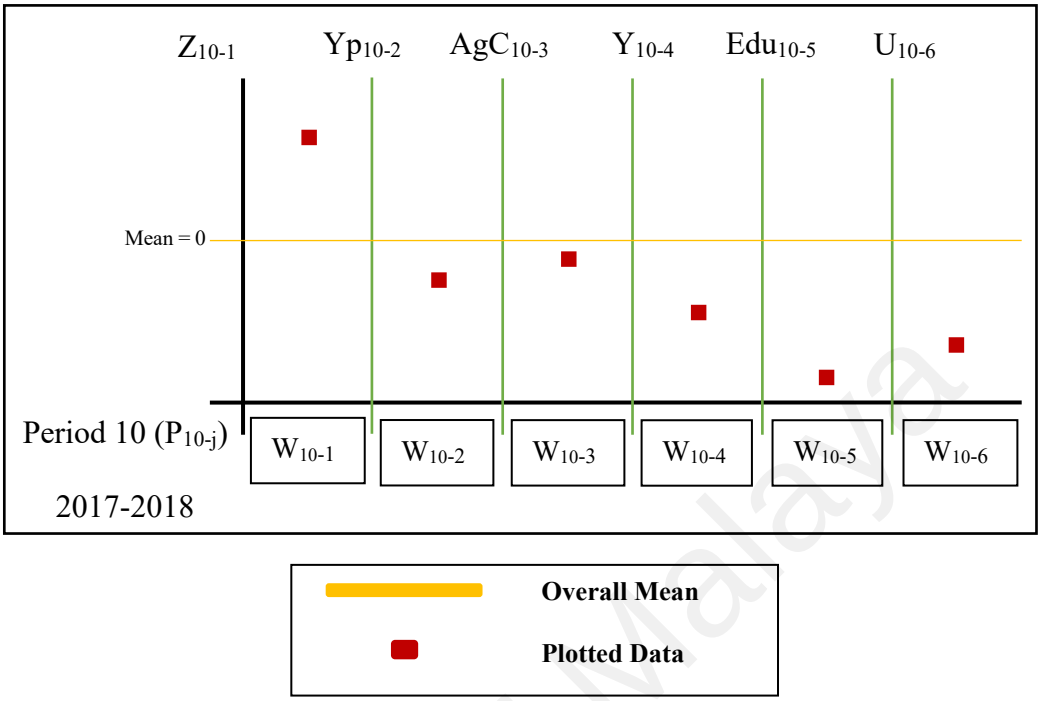

Figure 13 *Zakat* Individual General Axes for Period 10

General Axis 10 (A_{10} = Period 10): $W_{10\text{-}1}$ = ($P_{10\text{-}1}$, $Z_{10\text{-}1}$) ® $W_{10\text{-}2}$ = ($P_{10\text{-}2}$, $Yp_{10\text{-}2}$) ® $W_{10\text{-}3}$ = ($P_{10\text{-}3}$, $AgC_{10\text{-}3}$) ® $W_{10\text{-}4}$ = ($P_{10\text{-}4}$, $Y_{10\text{-}4}$) ® $W_{10\text{-}5}$ = ($P_{10\text{-}5}$, $Edu_{10\text{-}5}$) ® $W_{10\text{-}6}$ = ($P_{10\text{-}6}$, $U_{10\text{-}6}$).

4.1.1.2 Complete Inter-Linkage Coordinate Space for *Zakat*

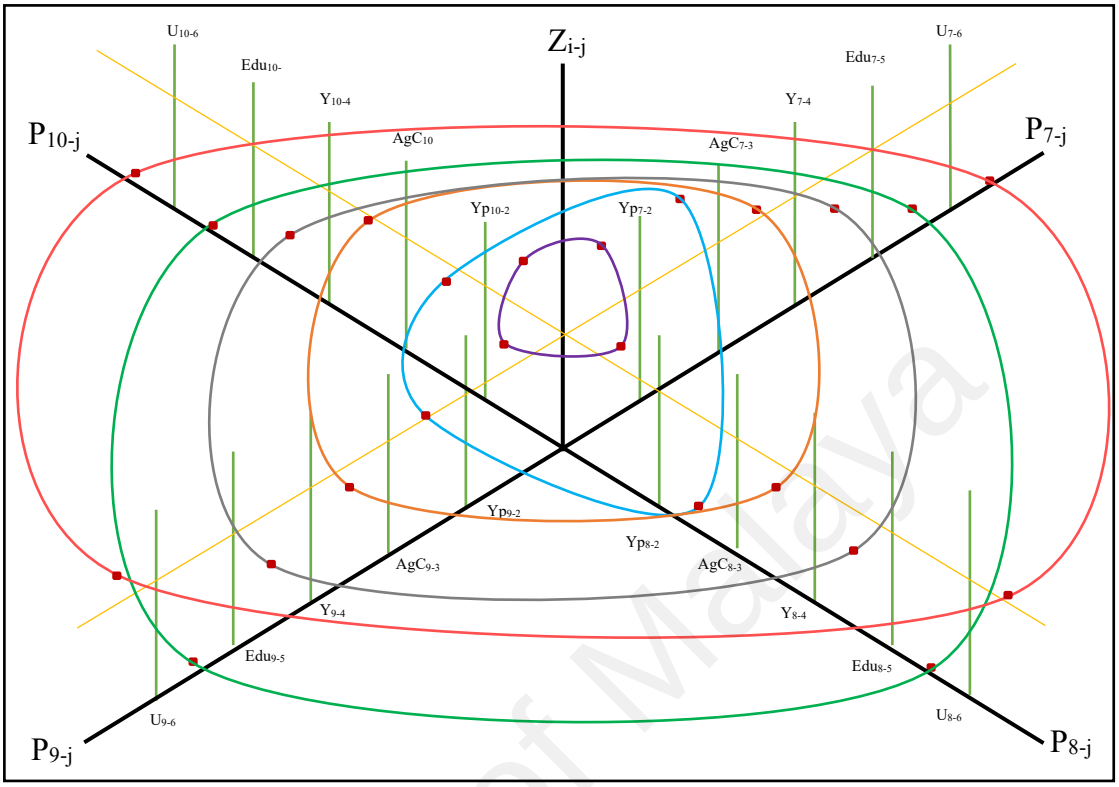

Figure 14 Complete Inter-Linkage Coordinate Space for *Zakat*

With constructed individual general axes for *Zakat*, we then combine each individual axis in a single cartesian space to form the Inter-Linkage Coordinate Space for *Zakat*. Connecting the plotted data within the sub-y axis between one period to another, the concept of *Omnia Mobilis* now can be applied. In a dynamic time frame where every variable is moving simultaneously, the connected Inter-Linkage Coordinate Space diagram will enable us as researchers to have a better understanding of the impact of *Zakat* towards Malaysian economy specifically through income of the B40 household,

aggregate consumption, GDP, education level, and unemployment. Diagram above is the complete Inter-Linkage Coordinate Space of *Zakat* on Malaysian economy.

Based on the diagram of Inter-Linkage Coordinate Space for *Zakat*, the connected line within the sub-y axis that forms a unique shape is an indicator of domino-effect when *Zakat* was implemented. This concept is termed as "Ripple-Effect". Given the limited number of samples when separating the public transfer payment into *Zakat* and BR1M, it is not possible to portray "Ripple-Effect" in a comprehensive way. Hence, further discussion of "Ripple-Effect" will be discussed in the upcoming sections.

4.1.2 BR1M

Because the availability of BR1M data is from 2013 onwards, this comparison will only consist of four periods as discussed before. The original data were converted into percentage change and standardised using z-score scaling. To construct BR1M (B_{i-j}) Inter-Linkage Coordinate Space, we then need to derive the general equation.

Table 5 Overall expression of Inter-Linkage Coordinate Space for BR1M

General Axis	Function
General Axis 7 (A_7 = Period 7)	$W_{7-1} = (P_{7-1}, B_{7-1}) \circledR W_{7-2} = (P_{7-2}, Yp_{7-2}) \circledR W_{7-3} = (P_{7-3}, AgC_{7-3}) \circledR W_{7-4} = (P_{7-4}, Y_{7-4}) \circledR W_{7-5} = (P_{7-5}, Edu_{7-5}) \circledR W_{7-6} = (P_{7-6}, U_{7-6})$
General Axis 8 (A_8 = Period 8)	$W_{8-1} = (P_{8-1}, B_{8-1}) \circledR W_{8-2} = (P_{8-2}, Yp_{8-2}) \circledR W_{8-3} = (P_{8-3}, AgC_{8-3}) \circledR W_{8-4} = (P_{8-4}, Y_{8-4}) \circledR W_{8-5} = (P_{8-5}, Edu_{8-5}) \circledR W_{8-6} = (P_{8-6}, U_{8-6})$
General Axis 9 (A_9 = Period 9)	$W_{9-1} = (P_{9-1}, B_{9-1}) \circledR W_{9-2} = (P_{9-2}, Yp_{9-2}) \circledR W_{9-3} = (P_{9-3}, AgC_{9-3}) \circledR W_{9-4} = (P_{9-4}, Y_{9-4}) \circledR W_{9-5} = (P_{9-5}, Edu_{9-5}) \circledR W_{9-6} = (P_{9-6}, U_{9-6})$
General Axis 10 (A_{10} = Period 10)	$W_{10-1} = (P_{10-1}, B_{10-1}) \circledR W_{10-2} = (P_{10-2}, Yp_{10-2}) \circledR W_{10-3} = (P_{10-3}, AgC_{10-3}) \circledR W_{10-4} = (P_{10-4}, Y_{10-4}) \circledR W_{10-5} = (P_{10-5}, Edu_{10-5}) \circledR W_{10-6} = (P_{10-6}, U_{10-6})$

4.1.2.1 BR1M Individual General Axes

Before constructing the whole Inter-Linkage Coordinate Space, as mentioned before, individual general axes need to be drawn separately. There will be four different general axes because of four periods and it will be drawn against five sub-y axis variables. Each data plotted has gone through the standardised process and each coordinate space is located according to its relative value in comparison with its overall mean which is zero

and represented by the yellow line. Thus, below are the figures of all individual general axes with its respective function for BR1M (B_{i-j}):

(a) BR1M Period 7 (2014-2015)

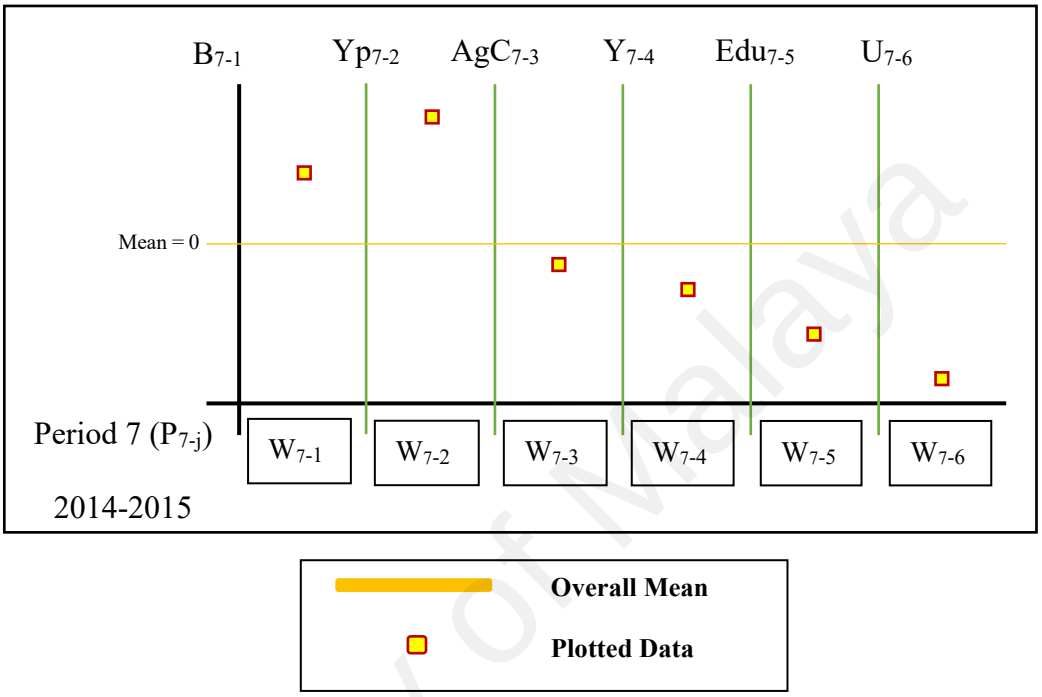

Figure 15 BR1M Individual General Axes for Period 7

General Axis 7 (A_7 = Period 7): $W_{7-1} = (P_{7-1}, B_{7-1})$ ® $W_{7-2} = (P_{7-2}, Yp_{7-2})$ ® $W_{7-3} = (P_{7-3}, AgC_{7-3})$ ® $W_{7-4} = (P_{7-4}, Y_{7-4})$ ® $W_{7-5} = (P_{7-5}, Edu_{7-5})$ ® $W_{7-6} = (P_{7-6}, U_{7-6})$;

(b) BR1M Period 8 (2015-2016)

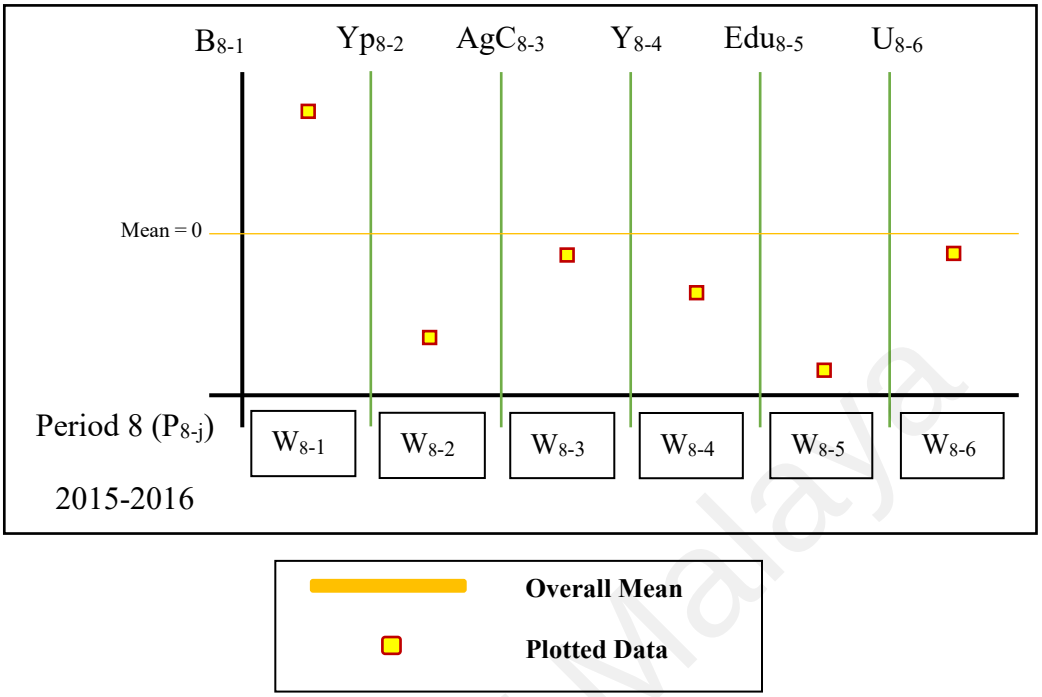

Figure 16 BR1M Individual General Axes for Period 8

General Axis 8 (A_8 = Period 8): W_{8-1} = (P_{8-1}, B_{8-1}) ® W_{8-2} = (P_{8-2}, Yp_{8-2}) ® W_{8-3} = (P_{8-3}, AgC_{8-3}) ® W_{8-4} = (P_{8-4}, Y_{8-4}) ® W_{8-5} = (P_{8-5}, Edu_{8-5}) ® W_{8-6} = (P_{8-6}, U_{8-6});

(c) BR1M Period 9 (2016-2017)

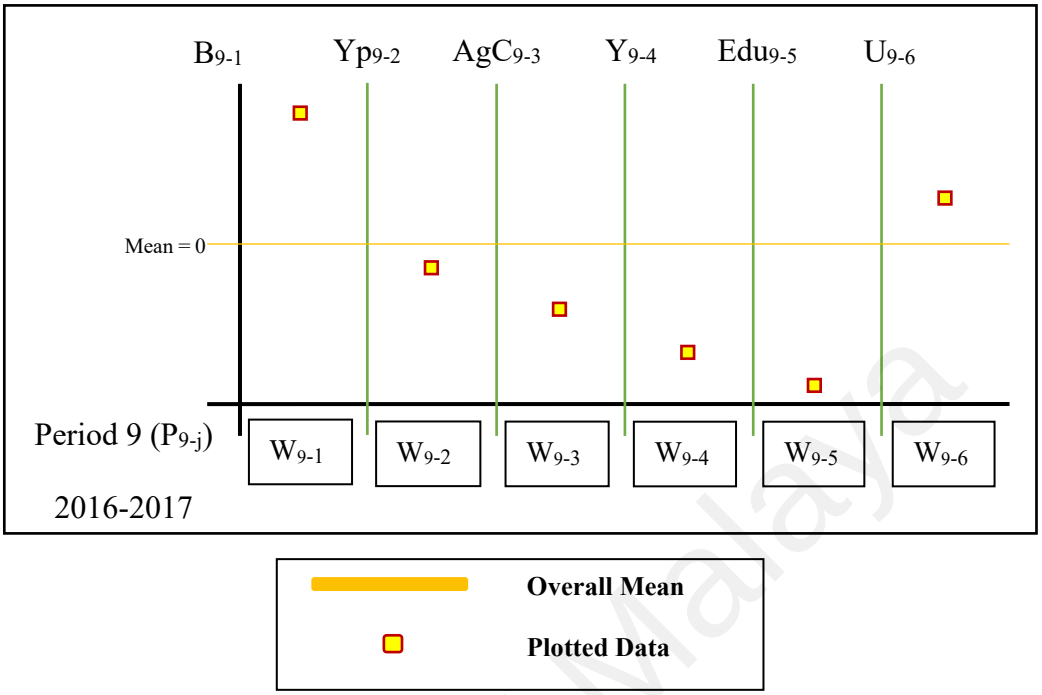

Figure 17 BR1M Individual General Axes for Period 9

General Axis 9 (A_9 = Period 9): W_{9-1} = (P_{9-1}, B_{9-1}) ® W_{9-2} = (P_{9-2}, Yp_{9-2}) ® W_{9-3} = (P_{9-3}, AgC_{9-3}) ® W_{9-4} = (P_{9-4}, Y_{9-4}) ® W_{9-5} = (P_{9-5}, Edu_{9-5}) ® W_{9-6} = (P_{9-6}, U_{9-6});

(d) BR1M Period 10 (2017-2018)

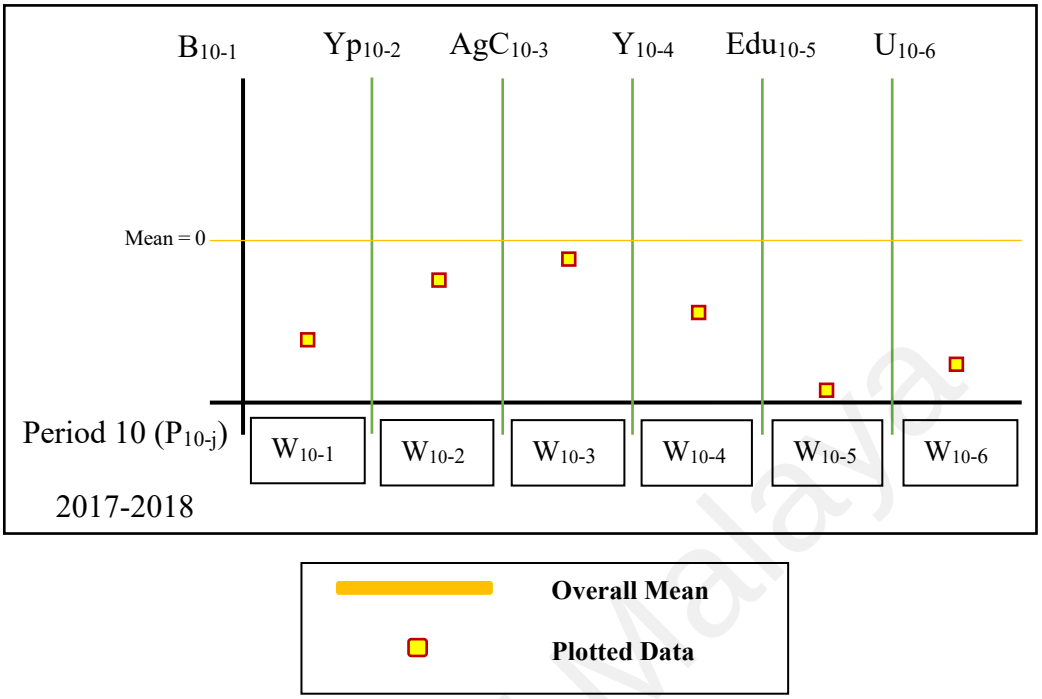

Figure 18 BR1M Individual General Axes for Period 10

General Axis 10 (A_{10} = Period 10): $W_{10\text{-}1} = (P_{10\text{-}1}, B_{10\text{-}1})$ ® $W_{10\text{-}2} = (P_{10\text{-}2}, Yp_{10\text{-}2})$ ® $W_{10\text{-}3} = (P_{10\text{-}3}, AgC_{10\text{-}3})$ ® $W_{10\text{-}4} = (P_{10\text{-}4}, Y_{10\text{-}4})$ ® $W_{10\text{-}5} = (P_{10\text{-}5}, Edu_{10\text{-}5})$ ® $W_{10\text{-}6} = (P_{10\text{-}6}, U_{10\text{-}6})$.

4.1.2.2 Complete Inter-Linkage Coordinate Space for BR1M

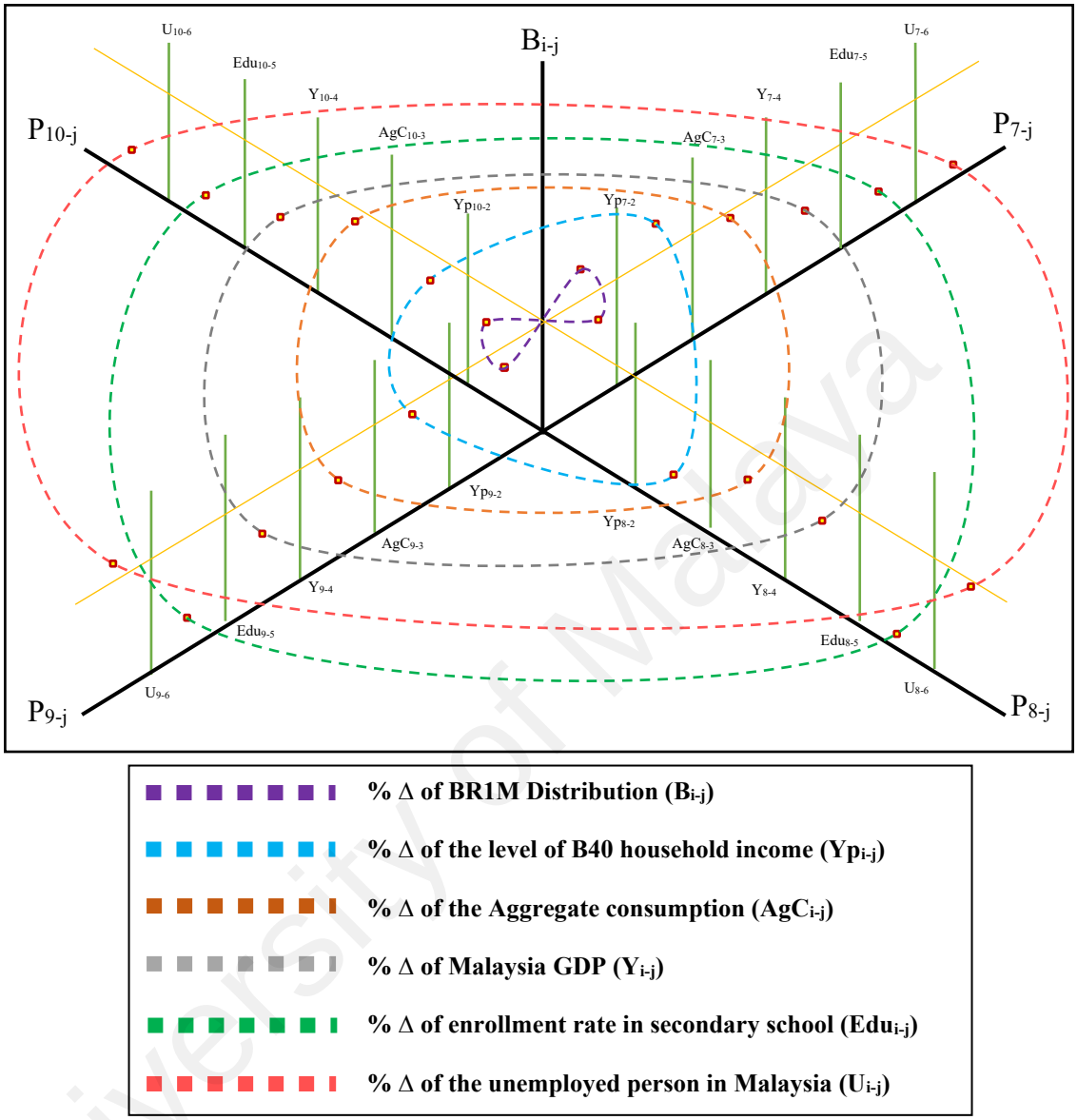

Figure 19 Complete Inter-Linkage Coordinate Space for BR1M

With constructed individual general axes for BR1M, we then combine each individual axis in a single cartesian space to form the Inter-Linkage Coordinate Space for BR1M. *Omnia Mobilis* assumption now can be applied once we connect the plotted data within the sub-y axis from one period to another. In a dynamic time frame where every variable is moving instantaneously, the connected Inter-Linkage Coordinate Space diagram will enable us as a researcher to have a better grasp of the impact of BR1M towards Malaysian economy specifically through the income of the B40 household, aggregate consumption,

GDP, education level, and unemployment. The diagram above is the complete Inter-Linkage Coordinate Space of BR1M on the Malaysian economy.

Note that the uncommon shape of BR1M distribution (purple color-code line) is due to the drawing angle. It just that the BR1M distribution line's drawing angle made it look like a rubber knot. Imagine if we untie the knot, the shape will be back to normal like other variables where it has an oval-kind of shape.

Using the same concept as mentioned before, based on the diagram of Inter-Linkage Coordinate Space for BR1M, the connected line within the sub-y axis that forms a unique shape is an indicator of domino-effect when BR1M was implemented. This concept is termed as "Ripple-Effect" and will be discussed in the upcoming sections.

4.1.3 Overall Comparison

In order to compare the impact of *Zakat* and BR1M to the Malaysian economy through selected variables, this research suggests combining the two Inter-Linkage Coordinate Space of *Zakat* and BR1M. Since both measurements share similar raw data on all of the sub-y axis except for *Zakat* and BR1M, it is possible to plot all the data relatively using the standardised data set. Note that both *Zakat* and BR1M still do not share the same mean and standard deviation prior to the standardisation process. Hence, the shape for similar variables for both *Zakat* and BR1M will have micro differences. Below figure is the overall comparison of Inter-Linkage Coordinate Space between *Zakat* and BR1M.

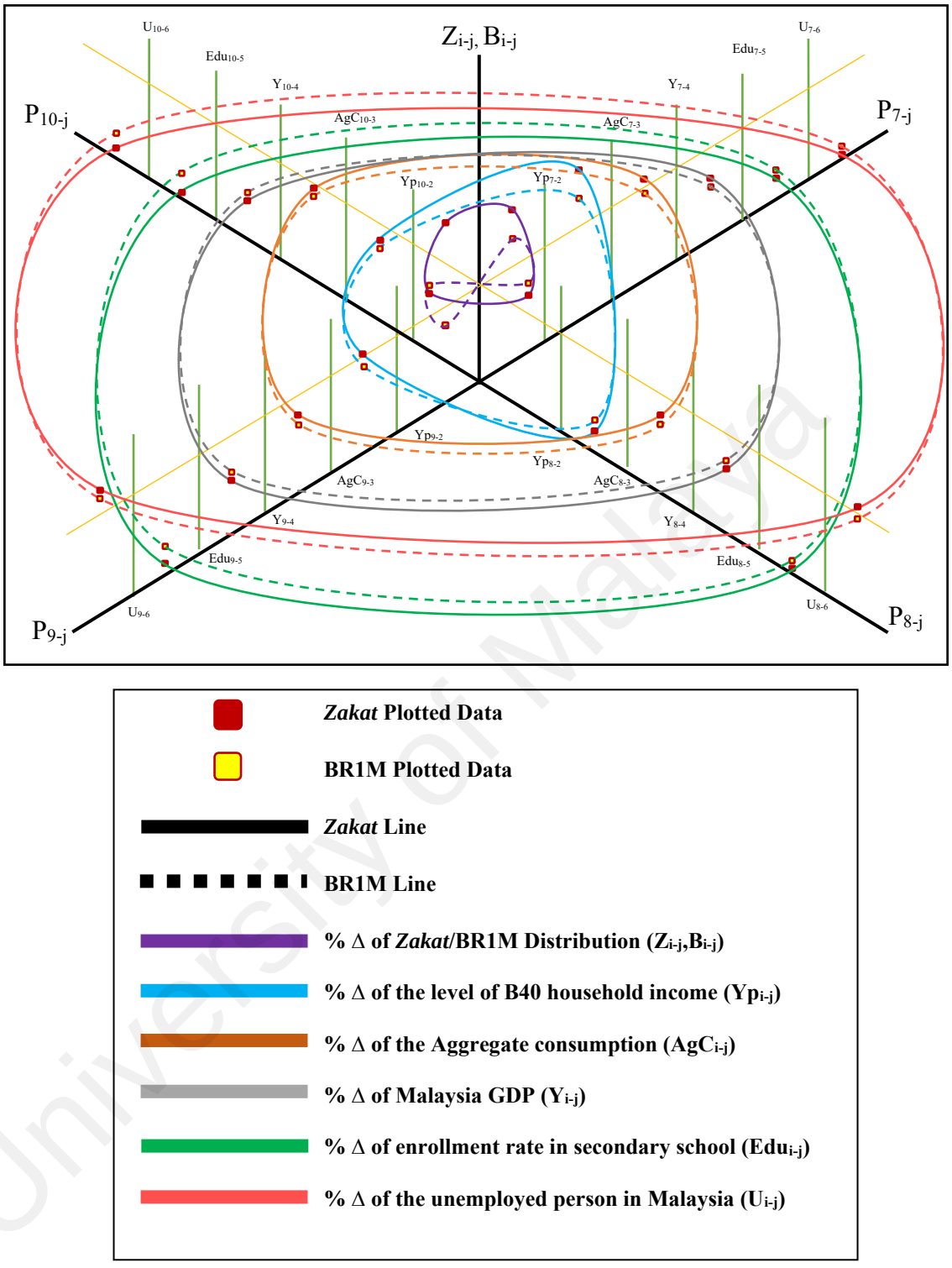

Figure 20 Comparison between *Zakat* and BR1M using Inter-Linkage Coordinate Space

Based on the overall comparison of Inter-Linkage Coordinate Space between *Zakat* and BR1M as illustrated in the figure above, all sub-y axis except *Zakat* and BR1M line have similar patterns despite small differences. The small differences in those areas are

due to the differences in the mean and standard deviation of the data set before the standardisation process took place.

To interpret the result, the impact of *Zakat* on the level of B40 household income is much more significant compared to BR1M because the plotted data of *Zakat* is above BR1M in period 1, period 3, and period 4. On the other hand, the impact of *Zakat* is incredibly significant on the aggregate consumption to compare with BR1M since the plotted data for all four periods is above BR1M. Meanwhile, the impact of BR1M on Malaysia GDP is higher than *Zakat* given that the plotted data for BR1M is higher in period 2, period 3, and period 4. Moreover, the impact of BR1M is much more significant on the enrollment rate in secondary school compared to *Zakat* since all plotted data of BR1M is higher than *Zakat* in all four periods. Lastly, the impact of *Zakat* and BR1M is balanced on the unemployment since the plotted data of *Zakat* is higher in period 2 and period 3 whereas the plotted data of BR1M is higher in period 1 and period 4.

This shows that *Zakat* and BR1M produce almost similar impact towards the Malaysian economy through selected variables and both of these tools can be considered as public transfer payment policy in Malaysia.

4.2 Public Transfer Payment Individual General Axes

Previous section has discussed the construction of Inter-Linkage Coordinate Space for *Zakat* and BR1M separately. Now to analyse the impact of public transfer payment as a whole, one needs to build Inter-Linkage Coordinate Space for it.

Given the explanation on the economic wave of public transfer payment policy in beginning of chapter 4, this section will provide a detailed two-dimensional graphical form of individual general axes with real data for all ten periods on public transfer

payment policy. Note that the small square shape in maroon color-coded is representing the specific coordinate space for each window refraction whereas the economic wave can be represented by the curve in each individual general axis that has blue color-coded.

As mentioned before, the first move before constructing the whole Inter-Linkage Coordinate Space is to draw each general axis separately. Since the study consists of ten periods, there will be ten different general axes drawn against five sub-y axis variables. Each data plotted has gone through the standardised process and each coordinate space is located according to its respective value in comparison with its overall mean. Thus, below are the figures of all individual general axes with its respective function for public transfer payment policy:

4.2.1 PTP Period 1 (2008-2009)

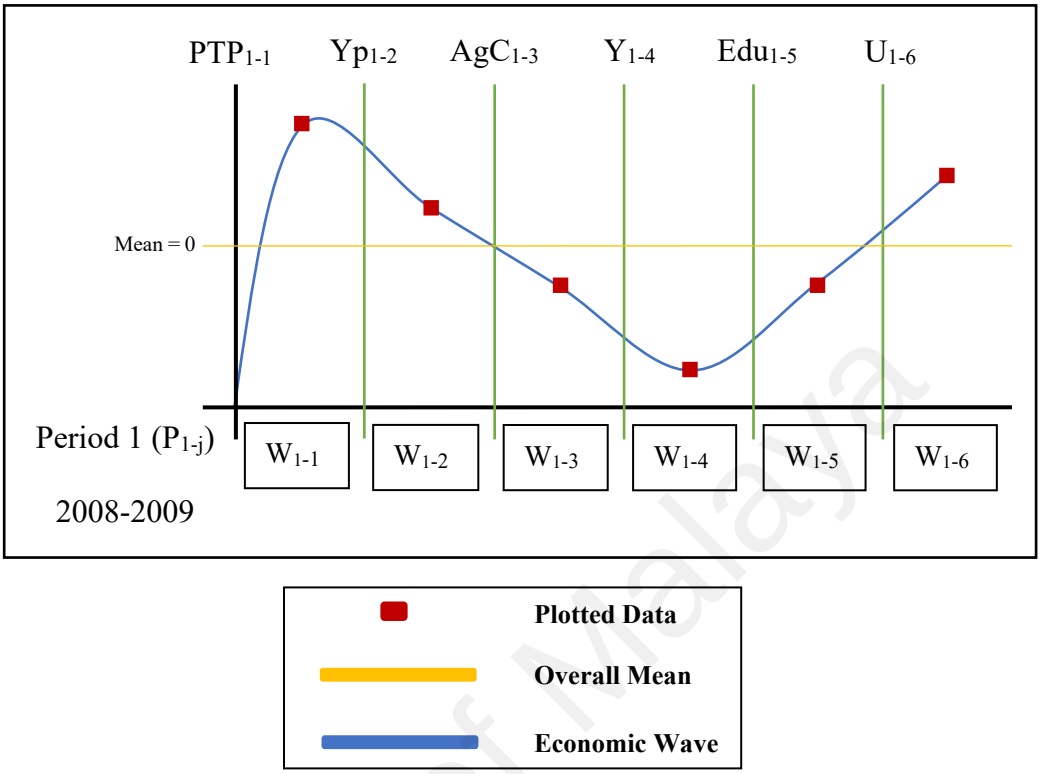

Figure 21 PTP Individual General Axes for Period 1

General Axis 1 (A_1 = Period 1): $W_{1-1} = (P_{1-1}, PTP_{1-1})$ ® $W_{1-2} = (P_{1-2}, Yp_{1-2})$ ® $W_{1-3} = (P_{1-3}, AgC_{1-3})$ ® $W_{1-4} = (P_{1-4}, Y_{1-4})$ ® $W_{1-5} = (P_{1-5}, Edu_{1-5})$ ® $W_{1-6} = (P_{1-6}, U_{1-6})$;

4.2.2 PTP Period 2 (2009-2010)

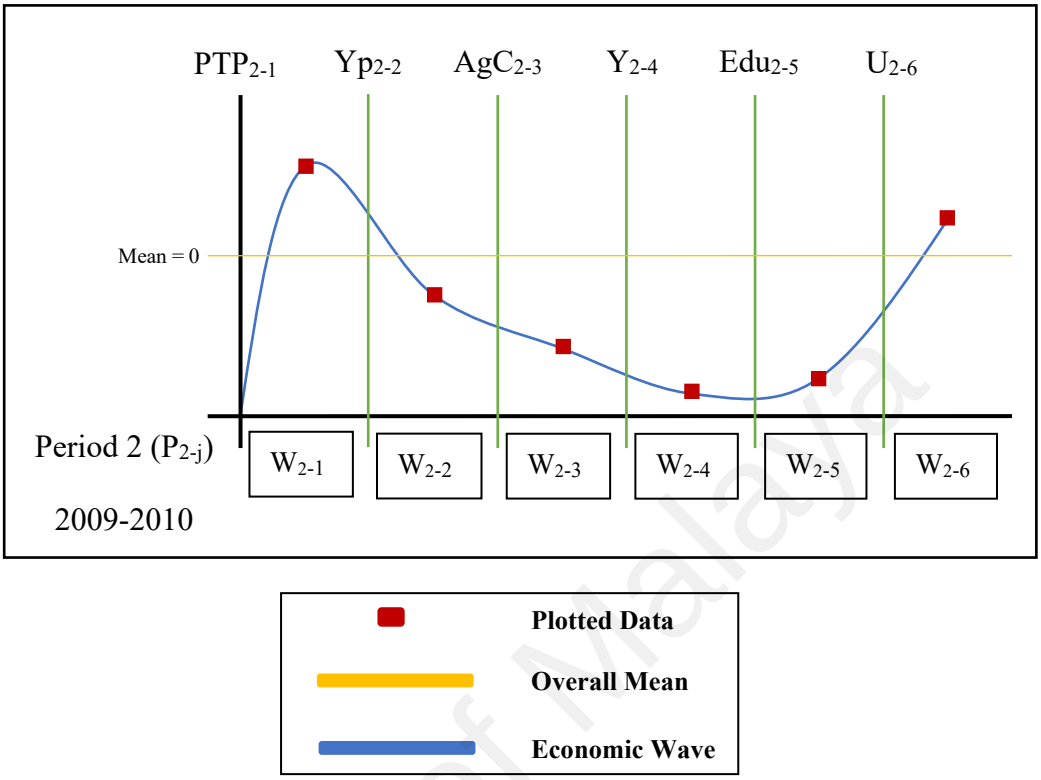

Figure 22 PTP Individual General Axes for Period 2

General Axis 2 (A_2 = Period 2): $W_{2\text{-}1}$ = ($P_{2\text{-}1}$, $PTP_{2\text{-}1}$) ® $W_{2\text{-}2}$ = ($P_{2\text{-}2}$, $Yp_{2\text{-}2}$) ® $W_{2\text{-}3}$ = ($P_{2\text{-}3}$, $AgC_{2\text{-}3}$) ® $W_{2\text{-}4}$ = ($P_{2\text{-}4}$, $Y_{2\text{-}4}$) ® $W_{2\text{-}5}$ = ($P_{2\text{-}5}$, $Edu_{2\text{-}5}$) ® $W_{2\text{-}6}$ = ($P_{2\text{-}6}$, $U_{2\text{-}6}$);

4.2.3 PTP Period 3 (2010-2011)

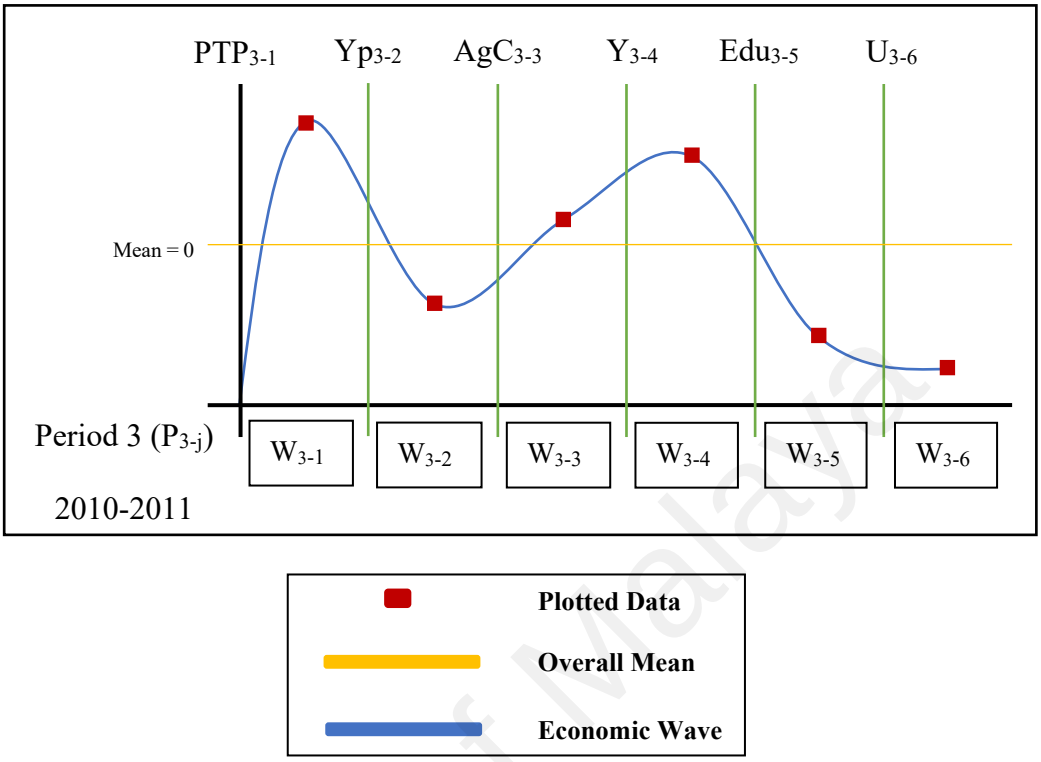

Figure 23 PTP Individual General Axis for Period 3

General Axis 3 (A_3 = Period 3): $W_{3-1} = (P_{3-1}, PTP_{3-1})$ ® $W_{3-2} = (P_{3-2}, Yp_{3-2})$ ® $W_{3-3} = (P_{3-3}, AgC_{3-3})$ ® $W_{3-4} = (P_{3-4}, Y_{3-4})$ ® $W_{3-5} = (P_{3-5}, Edu_{3-5})$ ® $W_{3-6} = (P_{3-6}, U_{3-6})$;

4.2.4 PTP Period 4 (2011-2012)

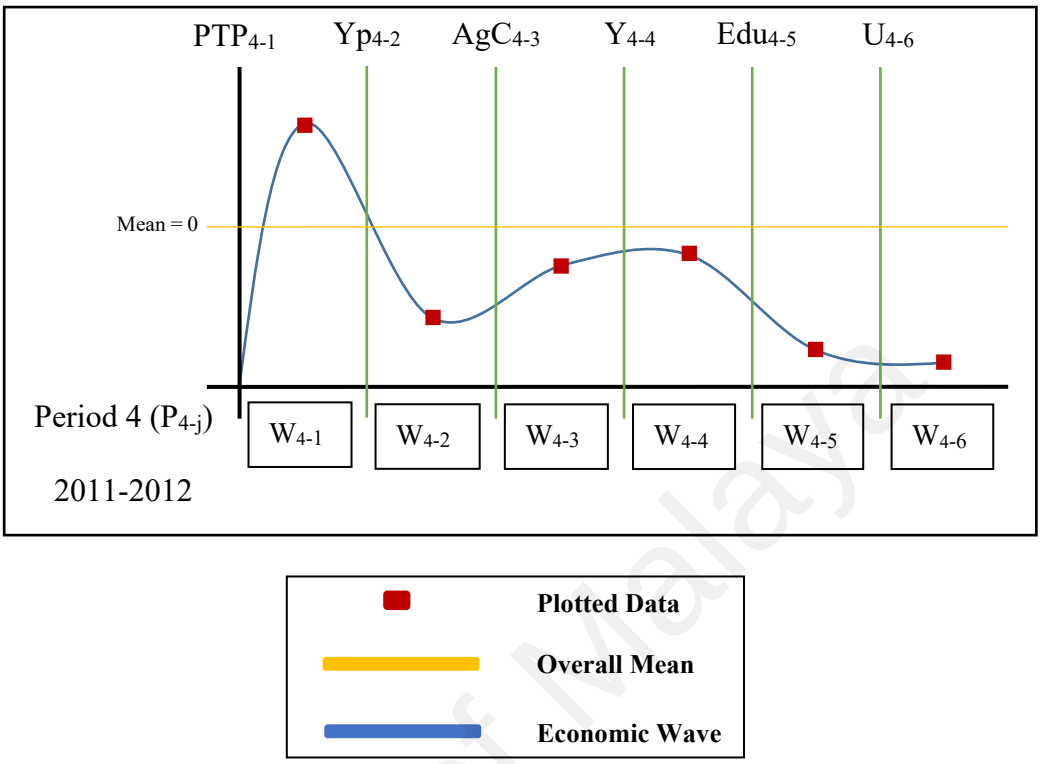

Figure 24 PTP Individual General Axes for Period 4

General Axis 4 (A_4 = Period 4): $W_{4-1} = (P_{4-1}, PTP_{4-1})$ ® $W_{4-2} = (P_{4-2}, Yp_{4-2})$ ® $W_{4-3} = (P_{4-3}, AgC_{4-3})$ ® $W_{4-4} = (P_{4-4}, Y_{4-4})$ ® $W_{4-5} = (P_{4-5}, Edu_{4-5})$ ® $W_{4-6} = (P_{4-6}, U_{4-6})$;

4.2.5 PTP Period 5 (2012-2013)

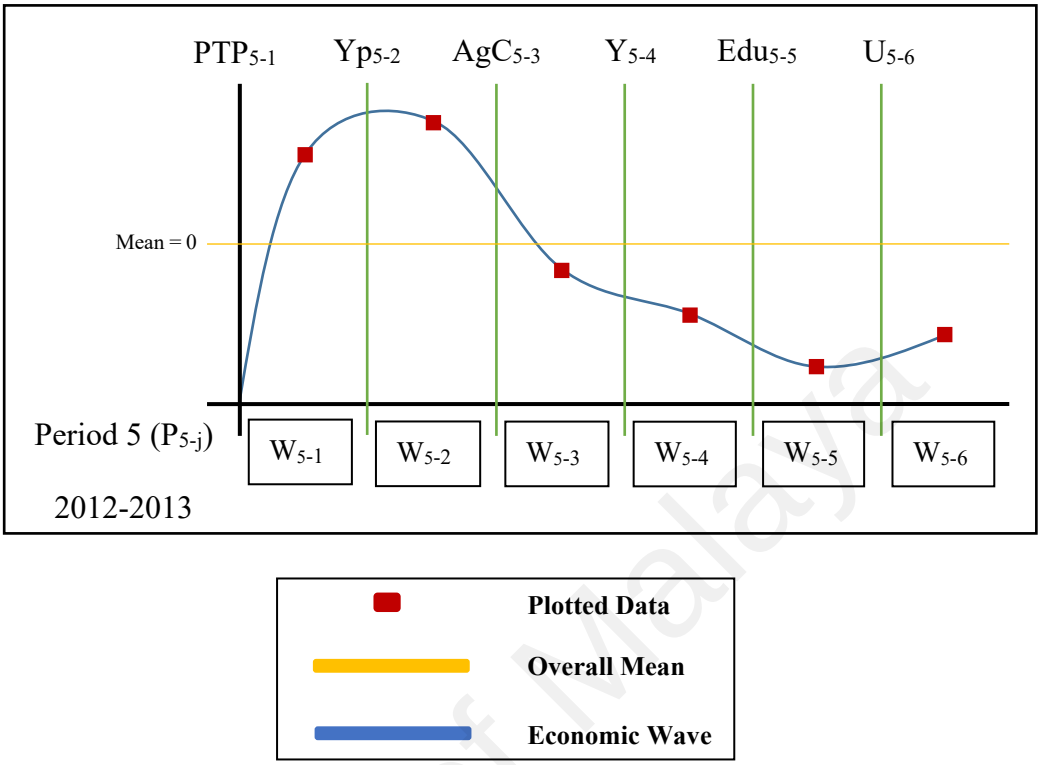

Figure 25 PTP Individual General Axes for Period 5

General Axis 5 (A_5 = Period 5): $W_{5-1} = (P_{5-1}, PTP_{5-1})$ ® $W_{5-2} = (P_{5-2}, Yp_{5-2})$ ® $W_{5-3} = (P_{5-3}, AgC_{5-3})$ ® $W_{5-4} = (P_{5-4}, Y_{5-4})$ ® $W_{5-5} = (P_{5-5}, Edu_{5-5})$ ® $W_{5-6} = (P_{5-6}, U_{5-6})$;

4.2.6 PTP Period 6 (2013-2014)

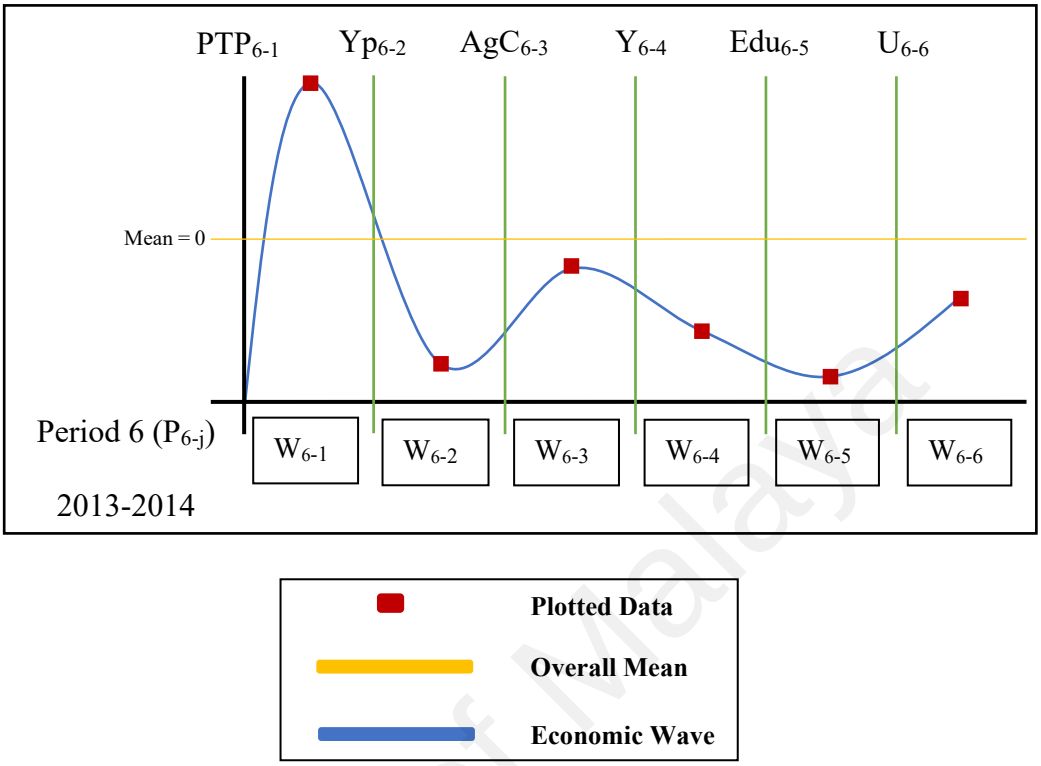

Figure 26 PTP Individual General Axes for Period 6

General Axis 6 (A_6 = Period 6): $W_{6-1} = (P_{6-1}, PTP_{6-1})$ ® $W_{6-2} = (P_{6-2}, Yp_{6-2})$ ® $W_{6-3} = (P_{6-3}, AgC_{6-3})$ ® $W_{6-4} = (P_{6-4}, Y_{6-4})$ ® $W_{6-5} = (P_{6-5}, Edu_{6-5})$ ® $W_{6-6} = (P_{6-6}, U_{6-6})$;

4.2.7 PTP Period 7 (2014-2015)

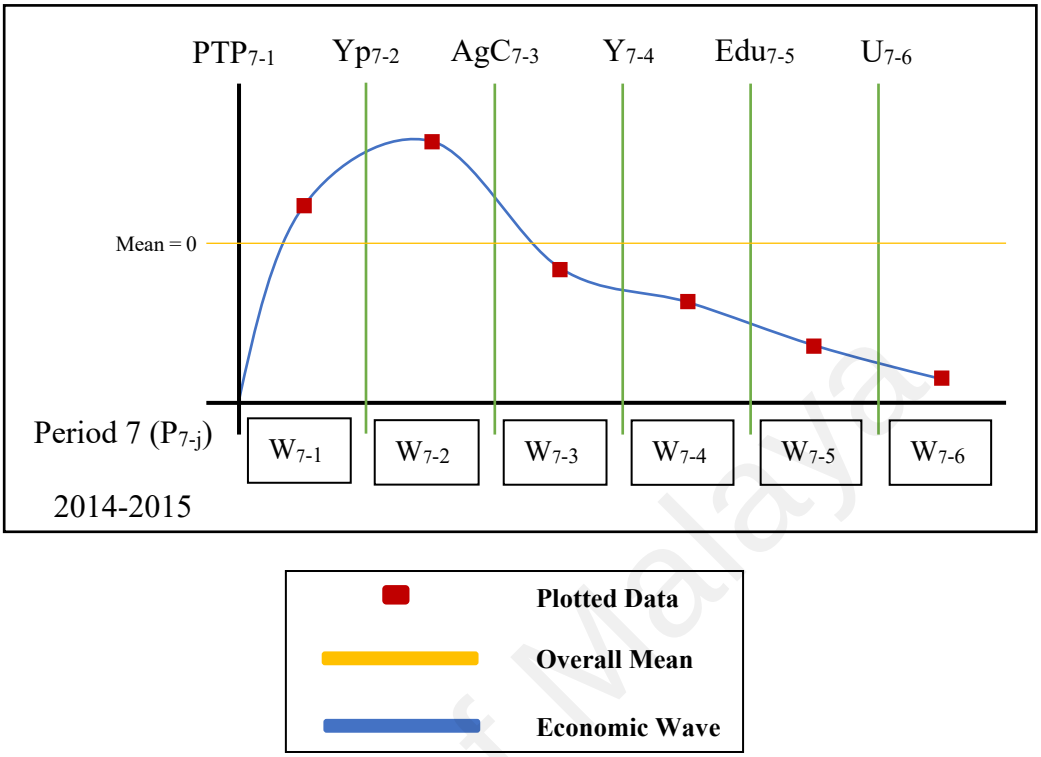

Figure 27 PTP Individual General Axes for Period 7

General Axis 7 (A_7 = Period 7): $W_{7-1} = (P_{7-1}, PTP_{7-1})$ ® $W_{7-2} = (P_{7-2}, Yp_{7-2})$ ® $W_{7-3} = (P_{7-3}, AgC_{7-3})$ ® $W_{7-4} = (P_{7-4}, Y_{7-4})$ ® $W_{7-5} = (P_{7-5}, Edu_{7-5})$ ® $W_{7-6} = (P_{7-6}, U_{7-6})$;

4.2.8 PTP Period 8 (2015-2016)

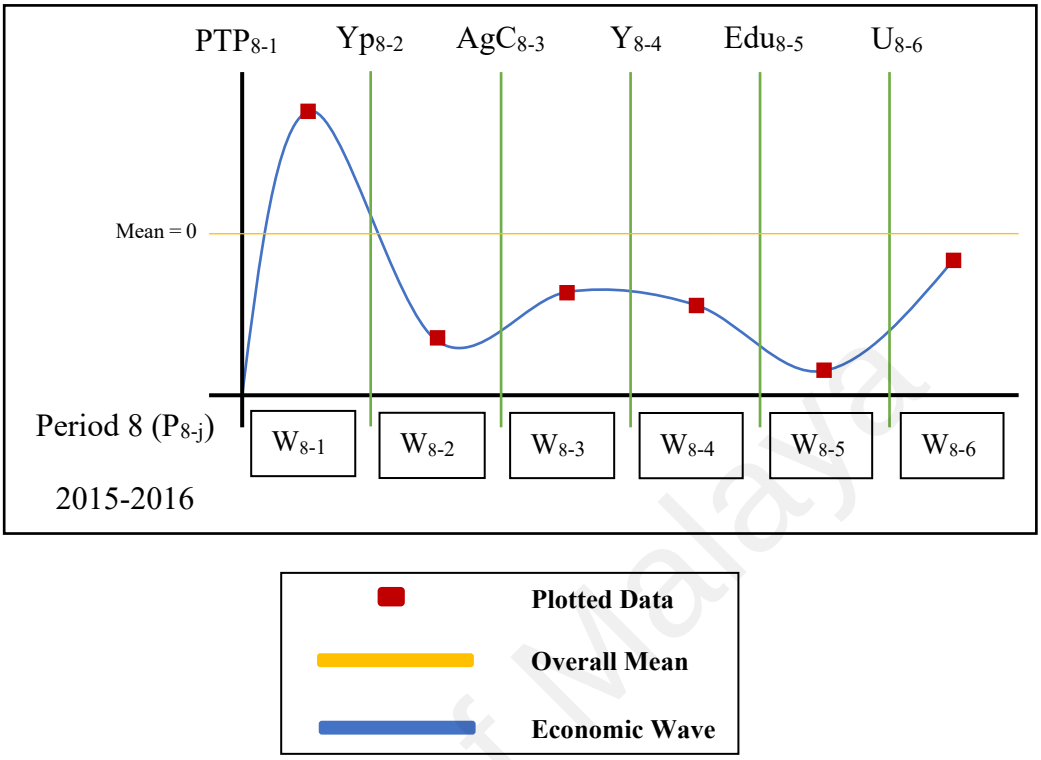

Figure 28 PTP Individual General Axes for Period 8

General Axis 8 (A_8 = Period 8): $W_{8-1} = (P_{8-1}, PTP_{8-1})$ ® $W_{8-2} = (P_{8-2}, Yp_{8-2})$ ® $W_{8-3} = (P_{8-3}, AgC_{8-3})$ ® $W_{8-4} = (P_{8-4}, Y_{8-4})$ ® $W_{8-5} = (P_{8-5}, Edu_{8-5})$ ® $W_{8-6} = (P_{8-6}, U_{8-6})$;

4.2.9 PTP Period 9 (2016-2017)

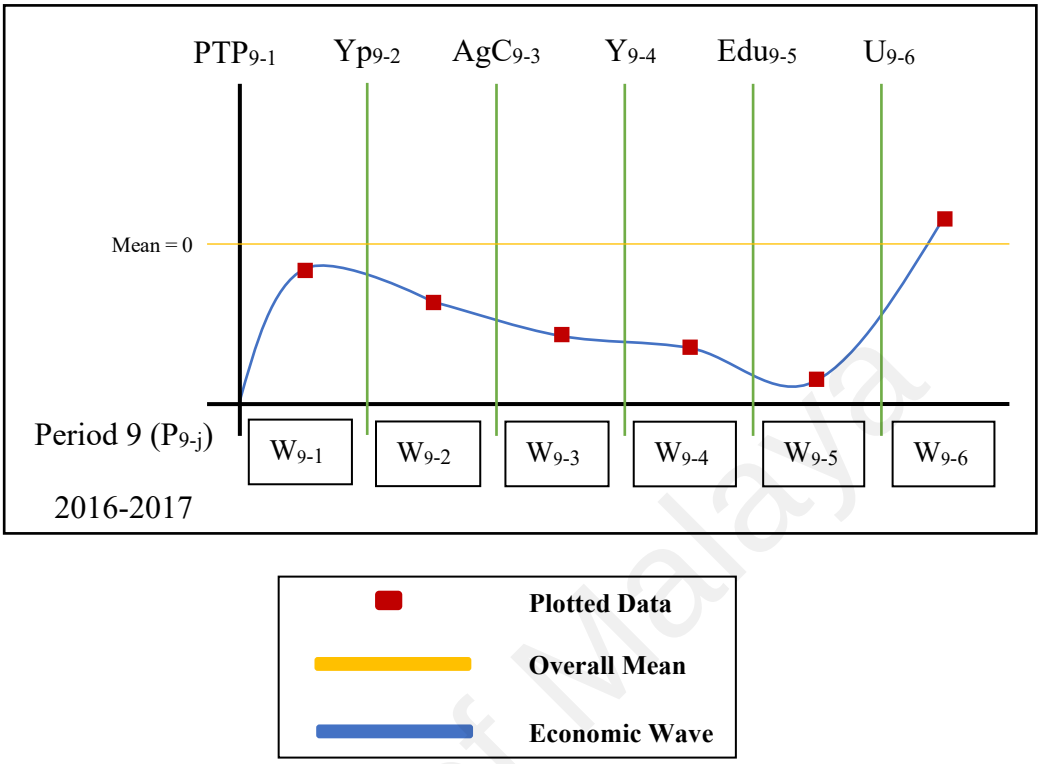

Figure 29 PTP Individual General Axes for Period 9

General Axis 9 (A_9 = Period 9): $W_{9-1} = (P_{9-1}, PTP_{9-1})$ ® $W_{9-2} = (P_{9-2}, Yp_{9-2})$ ® $W_{9-3} = (P_{9-3}, AgC_{9-3})$ ® $W_{9-4} = (P_{9-4}, Y_{9-4})$ ® $W_{9-5} = (P_{9-5}, Edu_{9-5})$ ® $W_{9-6} = (P_{9-6}, U_{9-6})$;

4.2.10 PTP Period 10 (2017-2018)

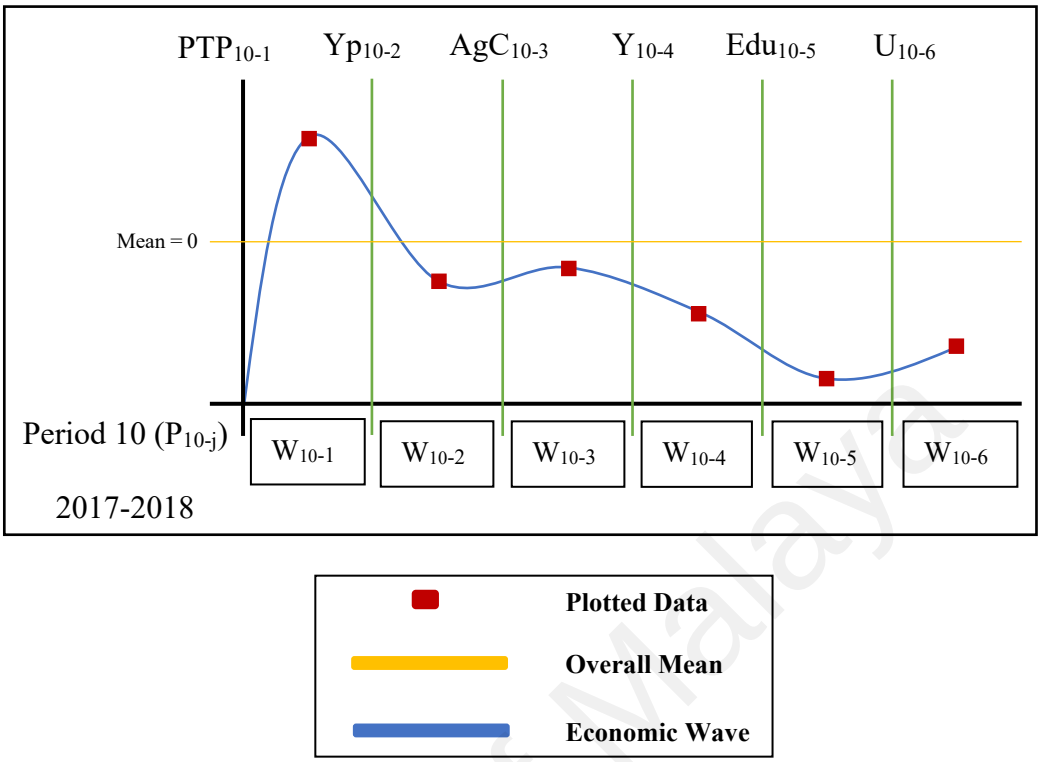

Figure 30 PTP Individual General Axes for Period 10

General Axis 10 (A_{10} = Period 10): $W_{10\text{-}1} = (P_{10\text{-}1}, PTP_{10\text{-}1})$ ® $W_{10\text{-}2} = (P_{10\text{-}2}, Yp_{10\text{-}2})$ ® $W_{10\text{-}3} = (P_{10\text{-}3}, AgC_{10\text{-}3})$ ® $W_{10\text{-}4} = (P_{10\text{-}4}, Y_{10\text{-}4})$ ® $W_{10\text{-}5} = (P_{10\text{-}5}, Edu_{10\text{-}5})$ ® $W_{10\text{-}6} = (P_{10\text{-}6}, U_{10\text{-}6})$.

4.3 Partial Inter-Linkage Coordinate Space for Public Transfer Payment

Based on figure 3, Inter-Linkage Coordinate Space in this study consists of ten general axes that represent the number of periods labelled "P_{i-j}", and it increases in the clockwise direction. Between these ten general axes, there is one central pillar that represents the percentage change of public transfer payment distributed in Malaysia labelled "PTP_{i-j}". In each general axis, there are six different windows labelled "W_{i-j}" and five different sub-y axis labelled "Yp_{i-j}", "AgC_{i-j}", "Y_{i-j}", "Edu_{i-j}", and "U_{i-j}" subsequently. Within each general axis, there is a middle line representing the average amount for all axes. Given the frame in figure 3, all the standardised data then can be plotted into the frame. The updated frame would be as follows:

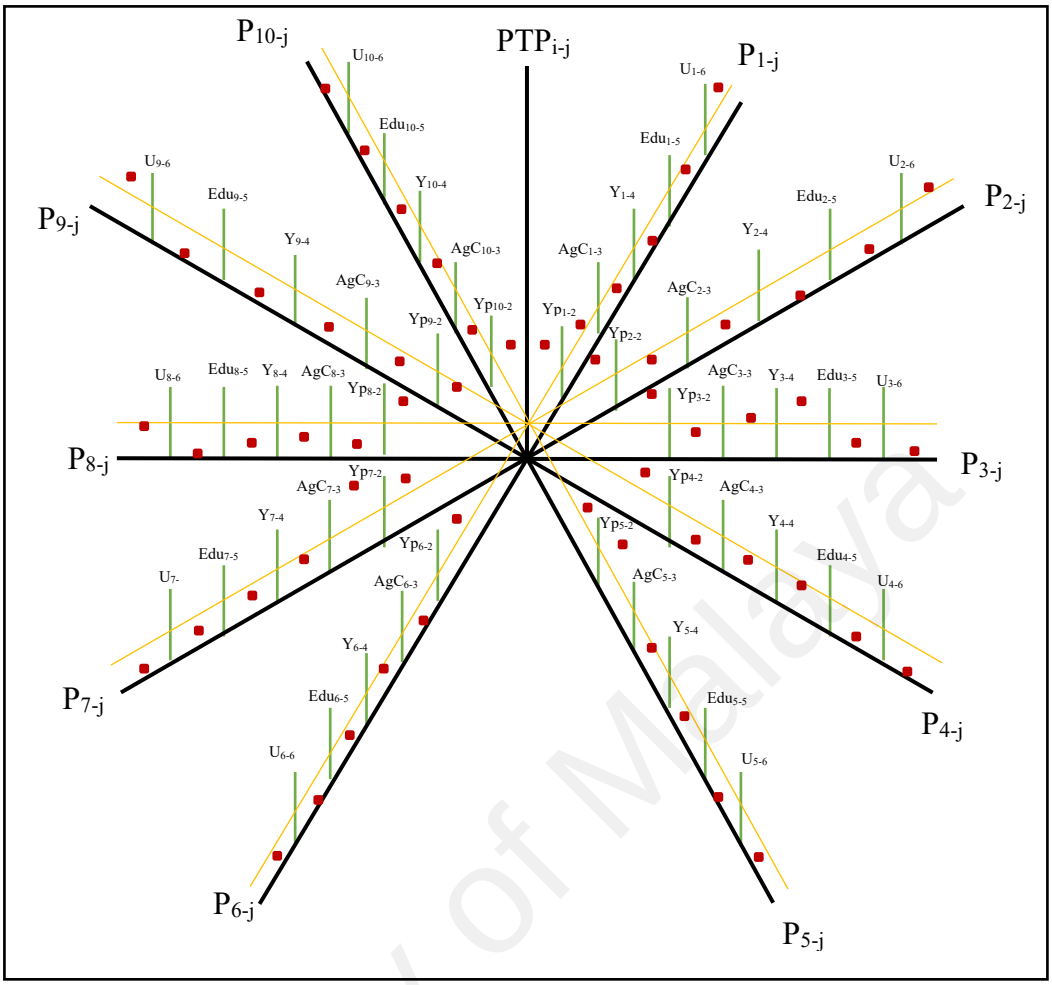

Figure 31 Plotted Inter-Linkage Coordinate Space Frame

Inter-Linkage Coordinate Space allows the researcher to examine a given variable for all ten periods. For instance, the graphical form within the Inter-Linkage Coordinate Space for all sub-y axis can be drawn individually as follows:

4.3.1 Public Transfer Payment, PTP_{i-j}

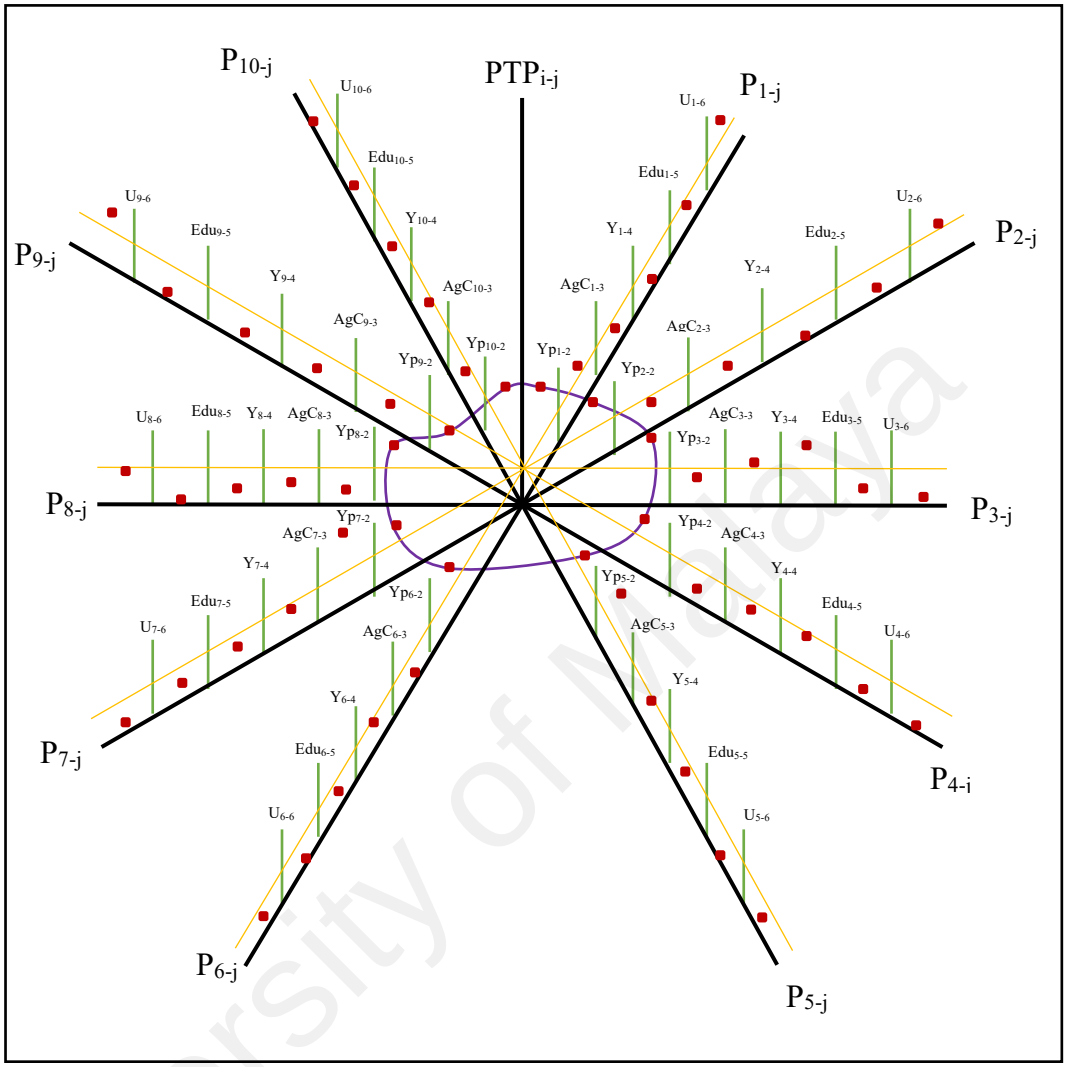

Figure 32 Partial Inter-Linkage Coordinate Space for Sub-y Axis (PTP_{i-j})

Based on figure 32, the purple line represents the percentage change of public transfer payment distributed for all ten periods. Through this Inter-Linkage Coordinate Space partial diagram, it can be interpreted that there is an uncommon behavior between period eight to period ten where the amount changes decreased from period eight to period nine and increased back up from period nine to period ten. Given that the general election in Malaysia occurs in 2018 (Nambiar, 2016), it may be one of the reasons why the amount of public transfer payment distributed increases from period nine to period ten that leads

to an uncommon shape of the curve in figure 32. This explanation can be backed by public-choice theory, where the government of the day is expected to increase its expenditure before an election takes place (Myles, 1995). On the contrary, given the small scaling in figure 32, it is difficult to pinpoint a spike in public transfer payment because of the introduction of BR1M in period 5.

On the other hand, to measure the effectiveness of PTP across all ten periods, we can refer to figure 32 plotted data. All periods have plotted data that is above the overall mean except period 9. Hence, this is an indication that PTP is effective in period 1, period 2, period 3, period 4, period 5, period 6, period 7, period 8, and period 10, but not really effective in period 9.

4.3.2 B40 Household Income, Yp_{i-j}

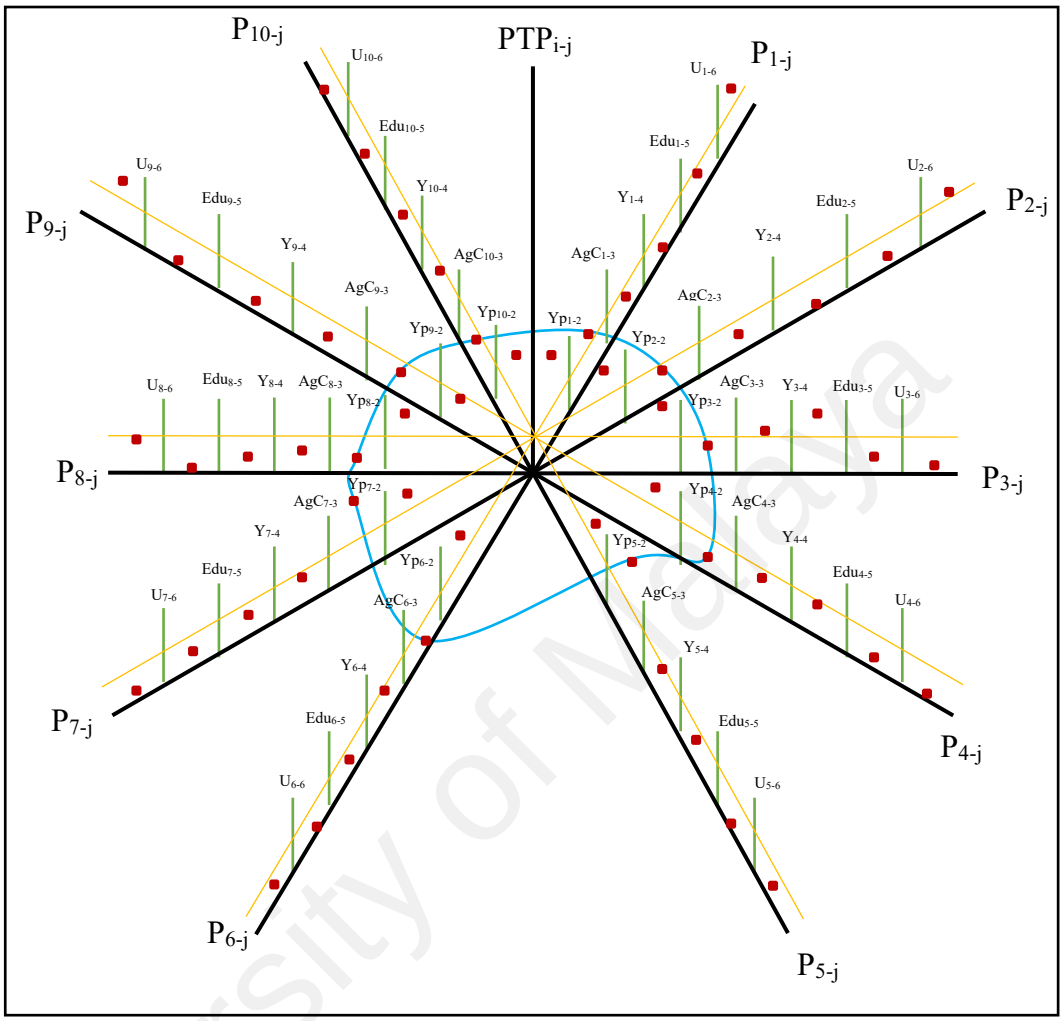

Figure 33 Partial Inter-Linkage Coordinate Space for Sub-y Axis (Yp_{i-j})

Based on figure 33, the blue line represents the percentage change of B40 household income level for all ten periods. With this partial Inter-Linkage Coordinate Space, we can observe that there is a sharp increase from period four to period five and a sharp decline from period five to period six. Specifically, in period five, it is where the Malaysian government implemented public transfer payment policy, which is the unconditional cash transfer program named BR1M. BR1M distribution managed to cause the percentage change of B40 household income level to be above the overall mean during the period five.

4.3.3 Aggregate Consumption, AgC_{i-j}

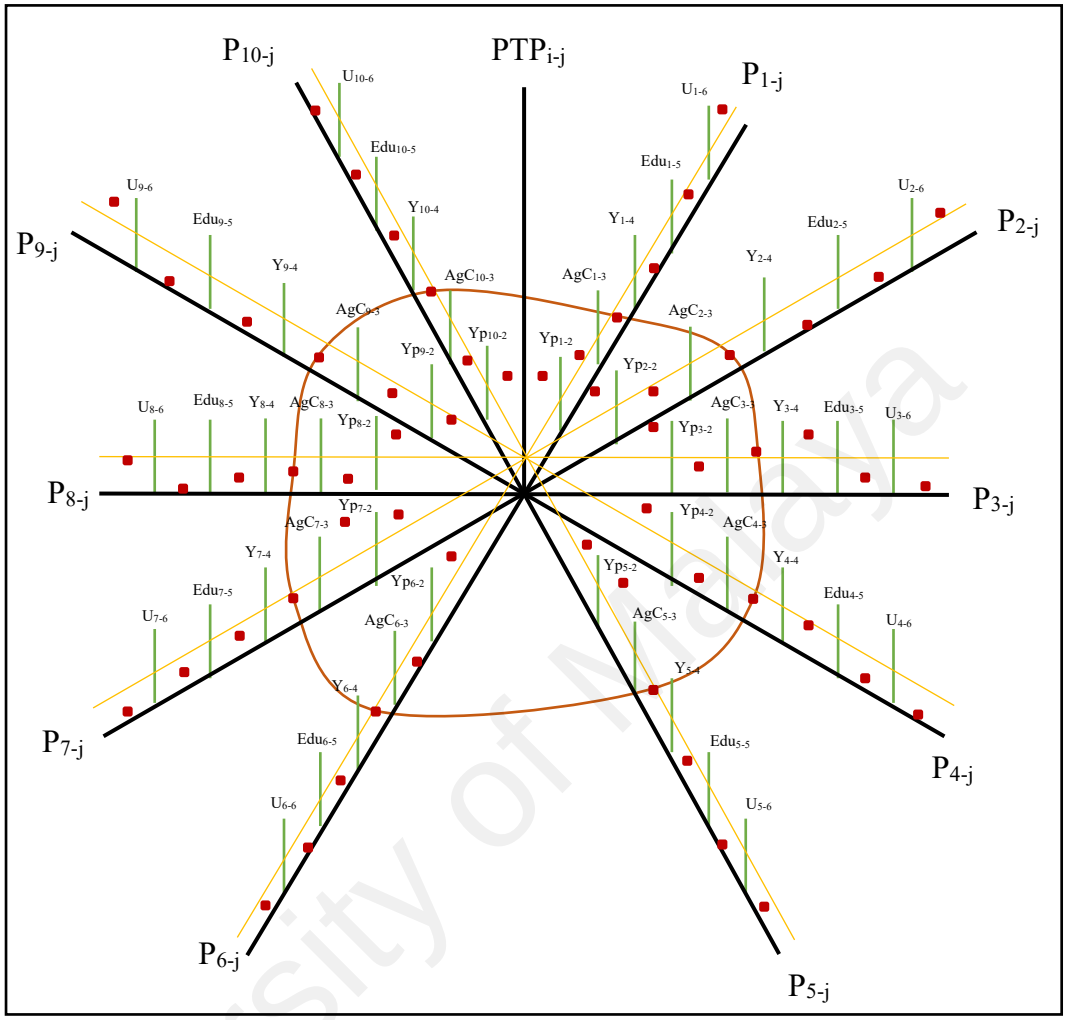

Figure 34 Partial Inter-Linkage Coordinate Space for Sub-y Axis (AgC_{i-j})

Based on figure 34, the brown line represents the percentage change of aggregate consumption in all ten periods. According to figure 34, all nine periods except period three, aggregate consumption have a lower percentage change than the overall mean. Period three has the highest percentage change of aggregate consumption, and according to Nambiar (2016), it is the period where the Malaysian economy is recovering from the 2008 global financial crisis.

4.3.4 Economic Growth, Y_{i-j}

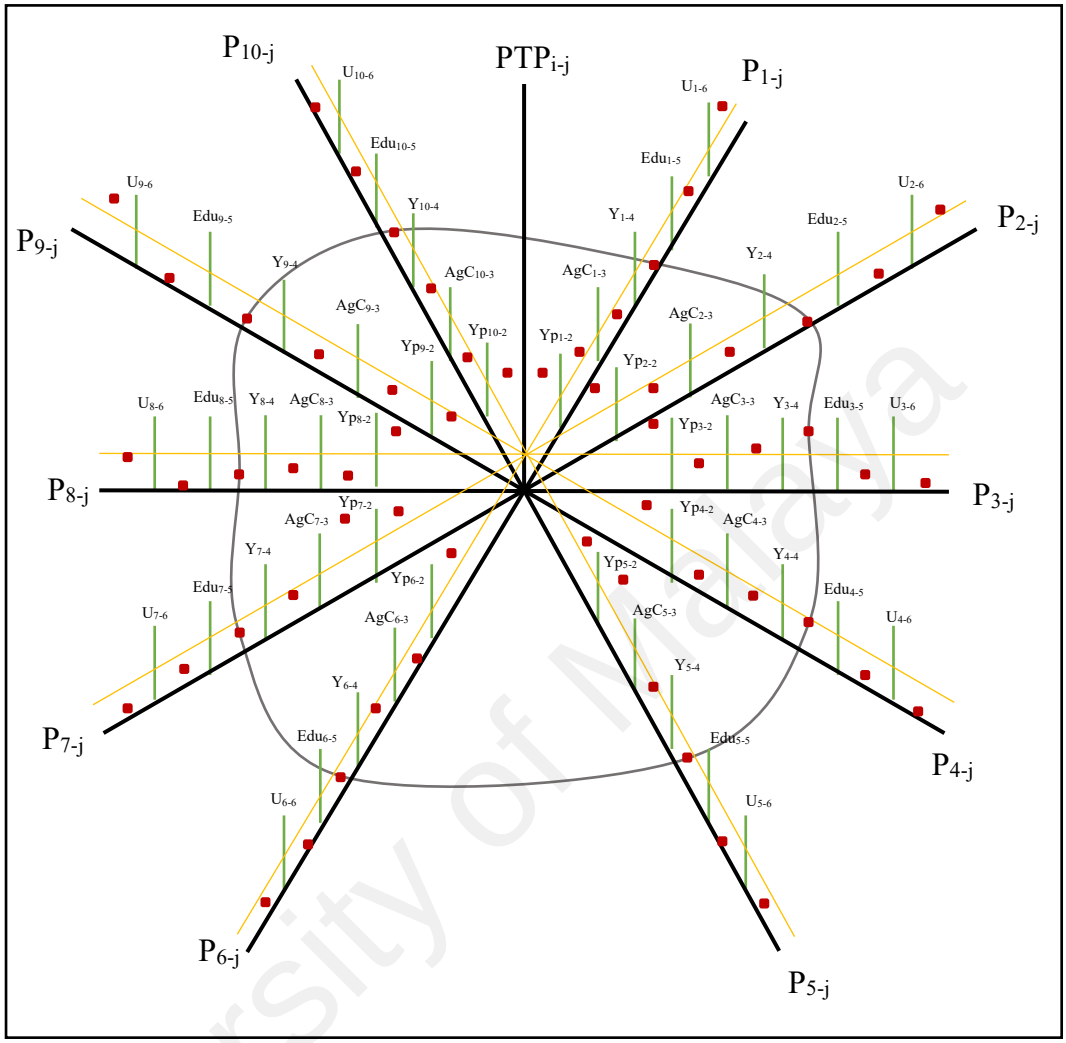

Figure 35 Partial Inter-Linkage Coordinate Space for Sub-y Axis (Y_{i-j})

Based on figure 35, the grey line represents the percentage change of economic growth in all ten periods. Similar behavior with the aggregate consumption, all nine periods in Inter-Linkage Coordinate Space are growing at lower than average rate except in period three. Since it is well established that aggregate consumption and economic growth have a positive correlation (Froyen, 2013), having an almost similar graphical form in the Inter-Linkage Coordinate Space is highly anticipated. Hence, as argued by Nambiar (2016), in period three, it is where the Malaysian economy is in the recovery process.

4.3.5 Education Level, Edu_{i-j}

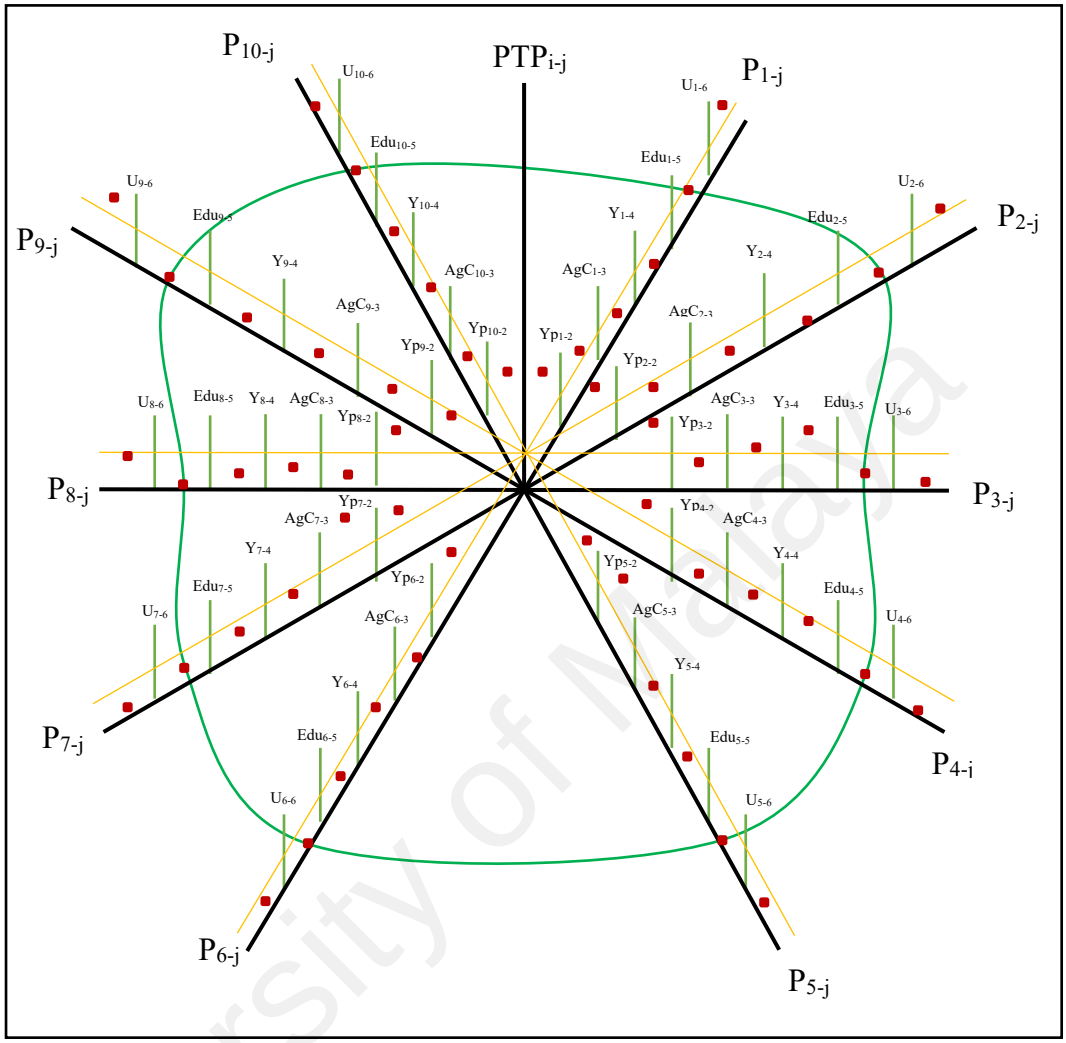

Figure 36 Partial Inter-Linkage Coordinate Space for Sub-y Axis (Edu_{i-j})

Based on figure 36, the green line represents the percentage change of secondary school enrolment for all ten periods. Interestingly all ten periods for the growth rate of secondary school enrolment rate remains lower than the overall mean. This is because the variation of secondary school enrolment rate in Malaysia is not as high as the other variables. Thus, the percentage change of secondary school enrolment rate in Malaysia remains stable throughout all ten periods.

4.3.6 Unemployment, U_{i-j}

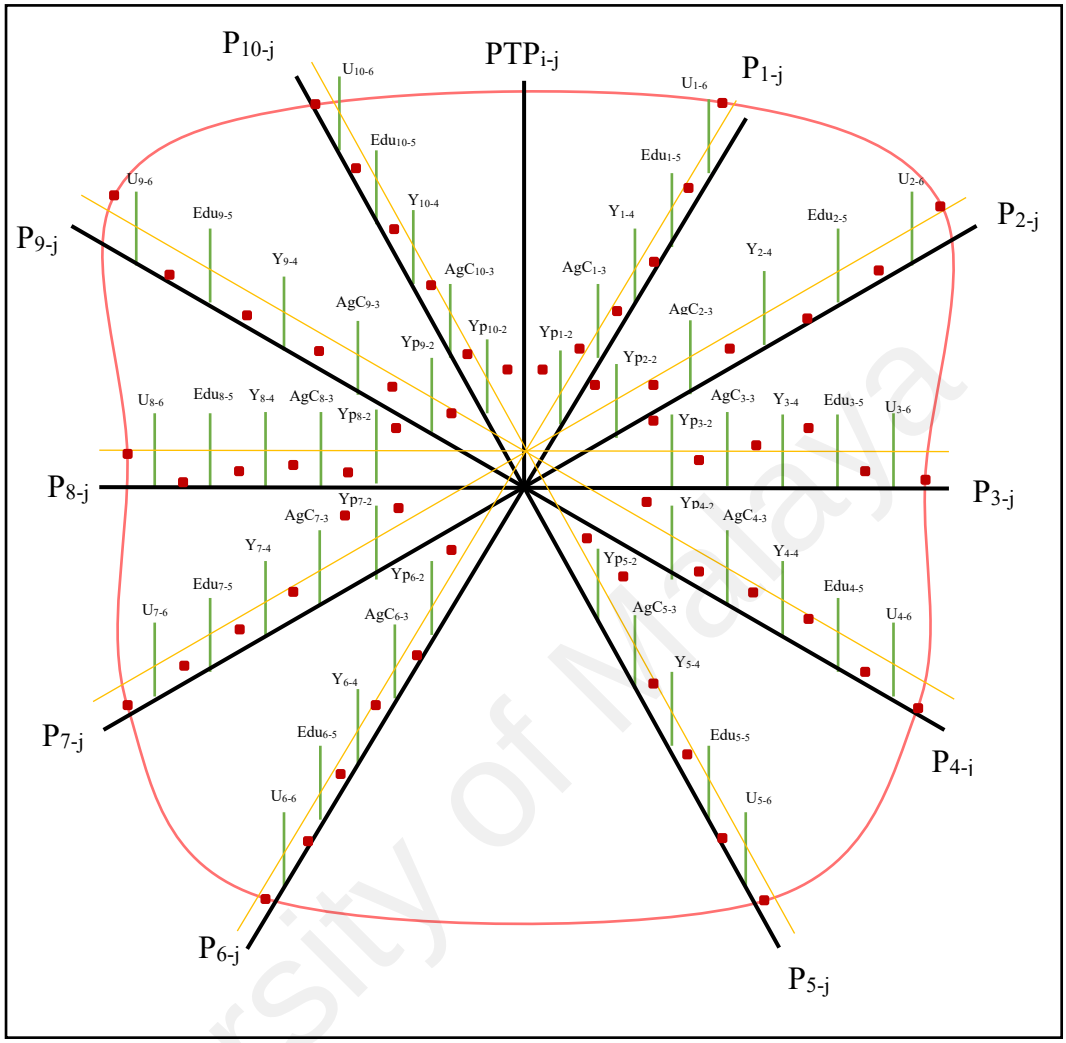

Figure 37 Partial Inter-Linkage Coordinate Space for Sub-y Axis (U_{i-j})

Based on figure 37, the pink line represents the percentage change in the number of unemployed persons for all ten periods. The percentage change in the number of unemployed persons is bigger than the overall mean during period one, period two, and period nine. The rest of the periods have a lower percentage change than the overall mean. As the Malaysian economy is experiencing the 2008 global financial crisis (Nambiar, 2016), it is anticipated that the number of unemployed persons is relatively higher than the average. Hence, the percentage change of unemployed persons is bigger than the

overall mean in period one and period two before it recovers from the global crisis starting period three.

4.4 Complete Inter-Linkage Coordinate Space for Public Transfer Payment

Domino-effect is an economic cycle that happens when one economic variable is affecting other economic variables and that variable will affect another variable consequently (McConnell et al., 2012). Previous studies have proved that public transfer payment does imply a domino effect to B40 household income level (Suprayitno et al., 2013), aggregate consumption (Rawlings & Rubio, 2005), overall economic growth (Yusoff, 2010), education level of the poor (Srinovita et al., 2016), and unemployment rate (Soares et al., 2010). Given the literature review, the complete Inter-Linkage Coordinate Space allows us to examine the domino-effect in one graphical form. By connecting the dots for all ten periods with its respective coordinate space in the sub-y axis, it will form a ripple-like motion on the complete Inter-Linkage Coordinate Space. Imagine throwing a rock in a pond filled with water; when the rock touches the surface of the water; it will create a ripple-like motion. This “Ripple-Effect " can be used as an analogy where the implementation of public transfer payment policy is like the rock and because of it, it creates a domino-effect that can be represented by its ripple-motion on the surface of the water.

4.4.1 "Ripple-Effect"

"Ripple-Effect" is a phenomenon that happens in the complete Inter-Linkage Coordinate Space of public transfer payment policy that indicates a domino-effect of the economic policy. It can be portrayed as follows:

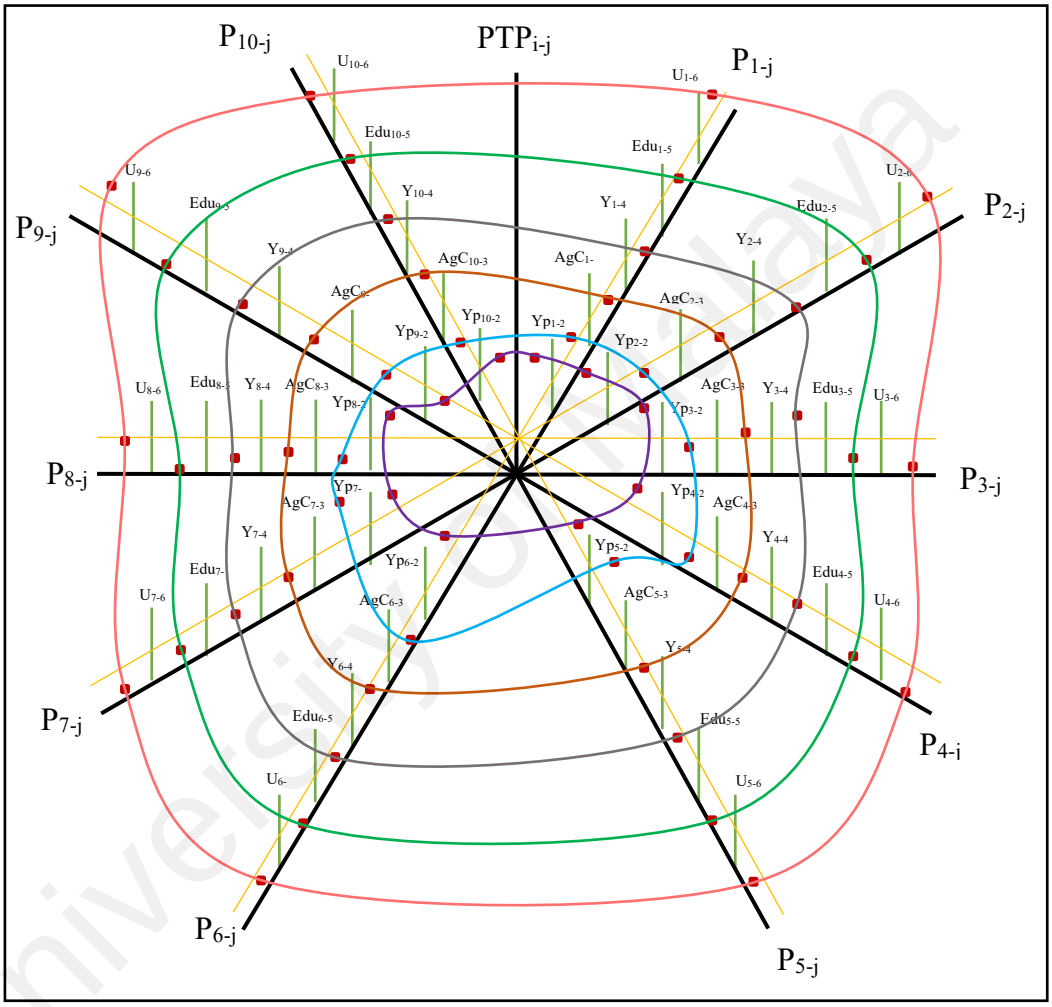

Figure 38 Complete Inter-Linkage Coordinate Space for Public Transfer Payment with "Ripple-Effect"

Based on figure 38, the “Ripple-Effect” can be observed where a ripple-like motion is moving outside from the center and forming a circle around it. Note that the middle of the Inter-Linkage Coordinate Space is the distribution of public transfer payment policy. The “Ripple-Effect” is where it starts with the purple curve and ripple down to the blue curve, to brown curve, to grey curve, to green curve, and finally to the pink curve. The “Ripple-Effect” is a graphical proof with real-time data in Econographicology to portray the domino-effect in the economy through economic policy.

4.4.2 3-Dimensional Surface Graphical Perspectives

To further strengthen our result on the complete Inter-Linkage Coordinate Space, 3-Dimensional surface graphical perspective is required to provide more evidence that real data back the complete Inter-Linkage Coordinate Space.

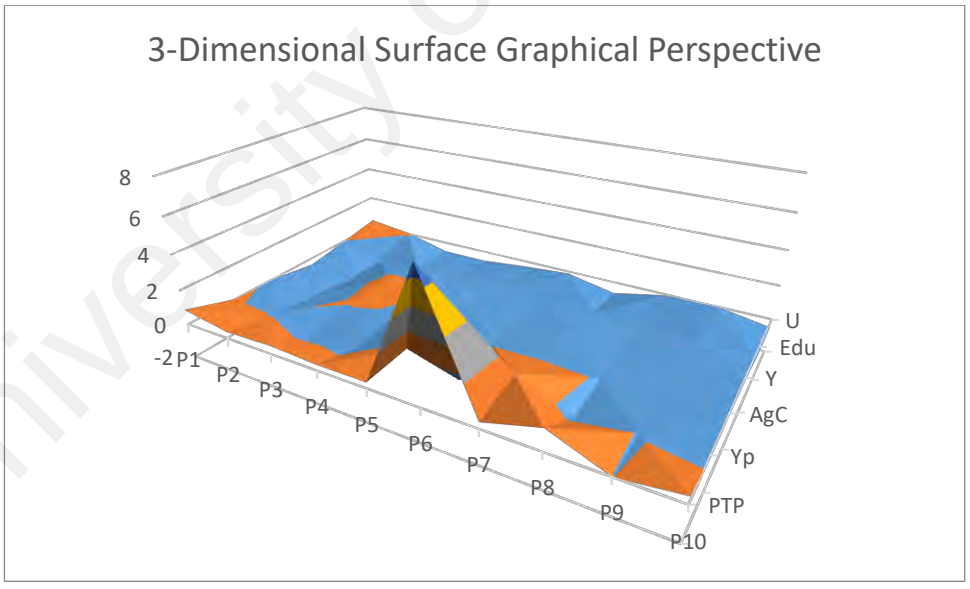

Figure 39 3-Dimensional Surface Graphical Perspective

Based on figure 39, with standardised data to construct a 3-Dimensional graphical perspective, it can be observed that similar uncommon behavior occurs around period five to period seven especially for public transfer payment policy distribution as well as the B40 household income level. Based on figure 39, it is visible to analyse that there is a sharp change for B40 household income between period five to period seven.

4.4.3 "Ripple-Effect" and "Dynamic Economic Wave"

To examine Inter-Linkage Coordinate Space at its full potential, it can integrate with the idea of the economic wave into the same graphical form. With Inter-Linkage Coordinate Space, all the economic waves can be drawn consequently that can be known as "Dynamic Economic Wave" since the assumption of "time dynamic" is still hold where time is moving and every variable is also moving simultaneously. Hence, a final state of Inter-Linkage Coordinate Space can be derived as follows:

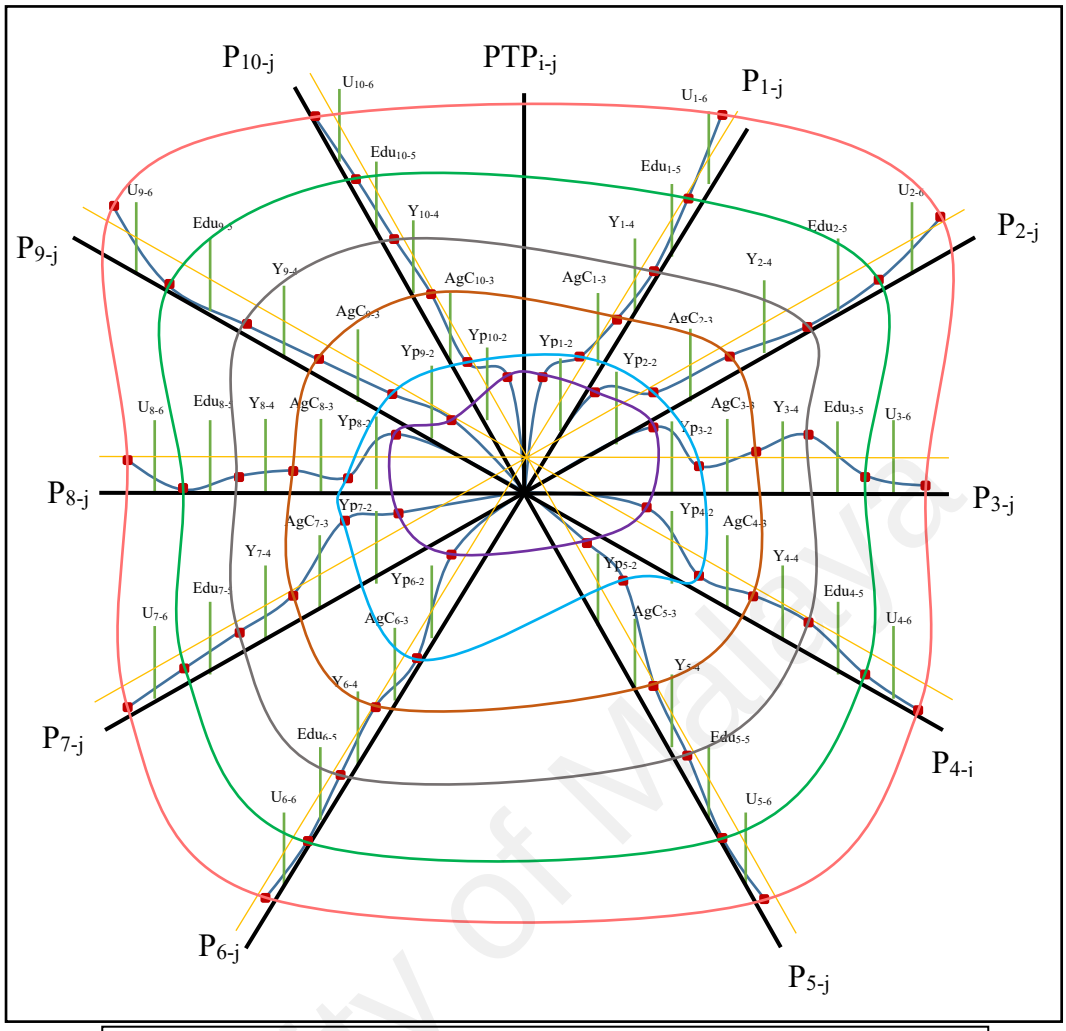

Figure 40 "Ripple-Effect" and "Dynamic Economic Wave" of Inter-Linkage Coordinate Space

Figure 40 above is the final graphical form of Inter-Linkage Coordinate Space that showcases the "Ripple-Effect" and "Dynamic Economic Wave" at the same time. To simplify figure 40, we then can remove the Inter-Linkage Coordinate Space Frame to observe a much clearer shape of Inter-Linkage Coordinate Space.

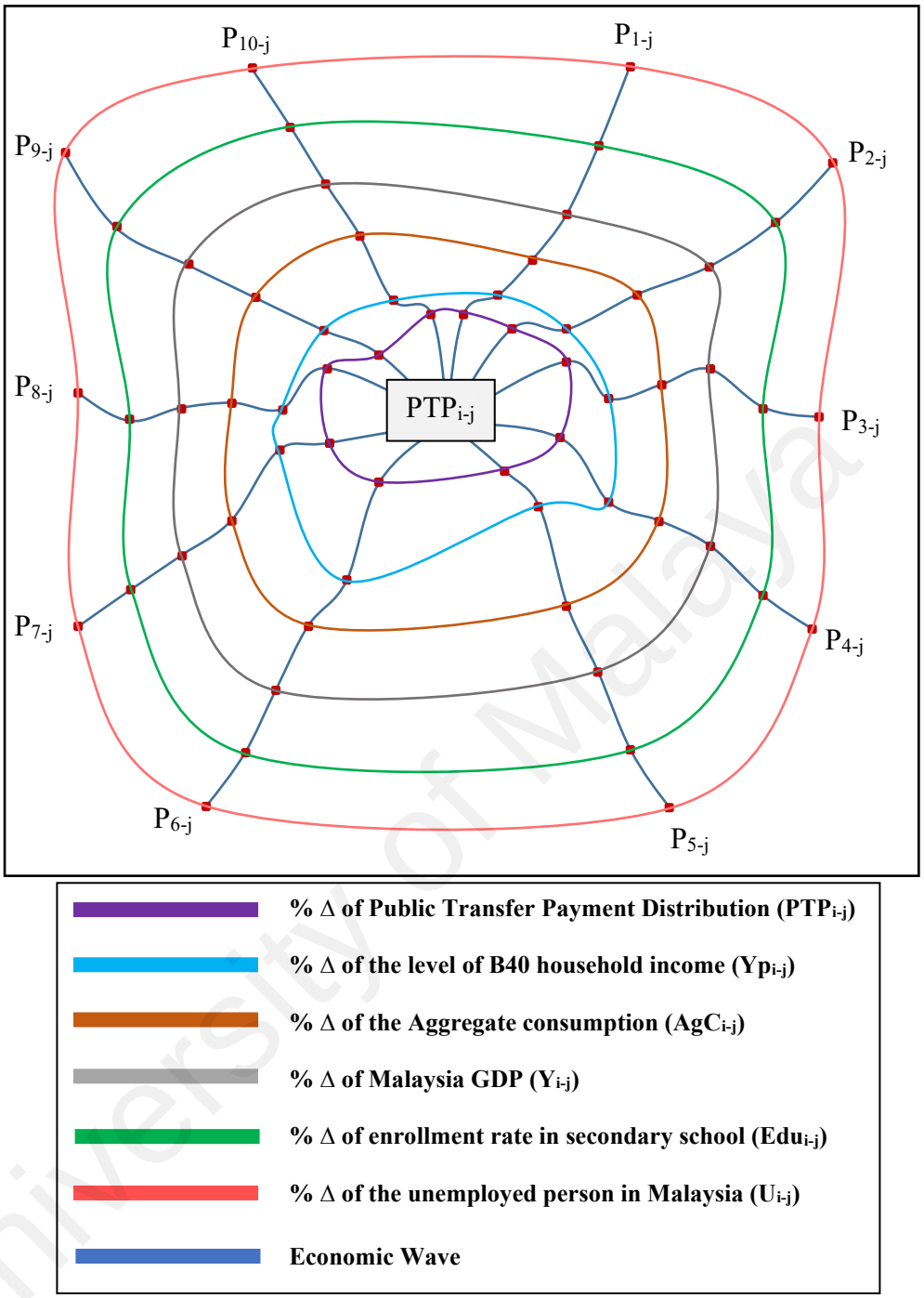

Figure 41 Simplified "Ripple-Effect" and "Dynamic Economic Wave" of Inter-Linkage Coordinate Space

Figure 41 is the simplified version of the Inter-Linkage Coordinate Space without its frame. The purpose of figure 41 is to allow researchers and policymakers to observe the overall impact of a given economic policy and for this case, public transfer payment policy. Figure 41 manages to showcase a much clearer picture of the "Ripple-Effect" as well as the "Dynamic Economic Wave".

Based on figure 41, the most apparent uncommon shape within the Inter-Linkage Coordinate Space is on the purple curve between period eight to period ten and on the blue curve between period four to period six. As examined in section 4.3, the deflected curvature for the purple curve is due to the public-choice theory, where the government will increase its current expenditure prior to the general election. In this case, it is due to a higher percentage change of public transfer payment distributed before the 2018 general election.

On the other hand, the deflected curvature on the blue curve between period four to six shown in figure 41 is due to the introduction of BR1M by Malaysian federal government as a new form of cash transfer that leads to the higher percentage change of B40 household income level.

The rest of the curvature in the Inter-Linkage Coordinate Space in figure 41 has somewhat a symmetrical shape that does not indicate an uncommon economic phenomenon. Inter-Linkage Coordinate Space able to show what happened when public transfer payment policy was implemented towards the overall economy in one graphical form with *Omnia Mobilis* assumption taken into account. This tool managed to improve our understanding of the public transfer payment policy and allow us as researchers to observe and analyse all variables simultaneously affected by public transfer payment per se. Therefore, Inter-Linkage Coordinate Space is the most suitable tool for multi-dimensional analysis to assist researchers and policymakers in examining a given economic policy with *Omnia Mobilis* assumption.

CHAPTER 5: CONCLUSION AND POLICY RECOMMENDATION

Inter-Linkage Coordinate Space is an alternative tool that policymakers should utilise to examine every economic policy to improve the understanding of its impact on the overall economy. With this graphical form introduced in Econographicology, it may provide policymakers with a powerful visual tool to analyse the given policy problem and deliver a better explanation to the audience from a non-economic background. However, there are four specific limitations of Inter-Linkage Coordinate Space as part of Econographicology tools through this study.

The first limitation for this study is the lack of data availability of public transfer payment. The current data is between 2008 to 2018, and it is collected separately from the Ministry of Finance and JAWHAR portal. Prior to 2008, the data is unavailable. If the data for all six variables contain more than ten periods, the result may be different and will provide more abundant information for analysis.

The second limitation for this study is the technique in constructing the Inter-Linkage Coordinate Space. Given the limited data availability, Inter-Linkage Coordinate Space is not able to be constructed through specific software made for Econographicology. This problem led to a manual drawing of Inter-Linkage Coordinate Space for this study and the researcher made use of all available tools from Microsoft Word software to draw every diagram related to Inter-Linkage Coordinate Space. With the help of specific software for Econographicology, it is possible to draw Inter-Linkage Coordinate Space meticulously according to the right scaling and data plotting.

The third limitation of the tools used under Econographicology for this study is the maximum number of periods that can fit in the Inter-Linkage Coordinate Space. This research fitted a total of ten numbers of periods. If there are more number of periods to be included in this manual constructed Inter-Linkage Coordinate Space, it will cause the diagram to be off-scale and the diagram will be cramped with drawing that defeats the purpose of simplifying the process to understand an economic policy through one graphical form. Sophisticated software to include more number of periods may be possible to improve the scaling and accuracy of Inter-Linkage Coordinate Space.

The final limitation of the Econographicology tool that is being used in this study is the accuracy of data plotting. Given the manual constructed Inter-Linkage Coordinate Space, the data plotted is based on the simple scaling from Microsoft Word software. With the help of Econographicology software, the data plotting can be improved, and a better scaling and accuracy can be reached for a refined Inter-Linkage Coordinate Space result.

Besides the limitation of Inter-Linkage Coordinate Space, there are areas for future research that one can explore from this study. Since this study has shown the "Ripple-Effect" and "Dynamic Economic Wave" of public transfer payment policy graphically, future research should explore mathematical modelling of this research through Econophysic. An exploration of mathematical modelling of wave theory under fluid dynamics and quantum mechanics can be considered to integrate with mathematical economic modelling. For instance, an attempt to measure the wavelength of the economic wave should be made and this wavelength can represent the magnitude of the domino-effect in a given economic policy. Theoretically, one can argue that the shorter the wavelength, the stronger the domino-effect of a given economic policy. Once the

wavelength of the economic wave is quantifiable, future research can also expand to calculate the velocity of the wave given the wave frequency remains constant. For example, Craik (2004) suggested that wave theory propose the formula of wave velocity as the product of wave frequency and wavelength; it is plausible to quantify the wave velocity as well, and this can be interpreted as the velocity of the domino-effect in a given economic policy. Conceptually, the higher the velocity of the wave, the faster the domino-effect occurs in given economic phenomena. Therefore, wave theory under fluid dynamic is an area that can be utilised to explore further the application of Econographicology.

On the other hand, there are two specific policy recommendations that can be derived from this study. Given the result of Inter-Linkage Coordinate Space for public transfer payment policy, it had shown that there was a temporary spike towards B40 household income level when BR1M was introduced as cash transfer in the period five before it return back to the lower rate, it is a proof that cash transfer can boost the income of the B40 household only for a short term. Hence, it is crucial for the government not to over-relying towards public transfer payment policy to increase the standard of living of the B40 households instead introduce a more productive policy that can uplift the B40 community such as through entrepreneurship. With proper guidance and training provided by the government, it is possible to ensure that the B40 household attain the ability to generate their own income and move out from the B40 bracket in the long run.

Besides, public transfer payment policy has been shown to impact the overall economy through the "Ripple-Effect" in the Inter-Linkage Coordinate Space. The policy recommendation from this study is for policymakers to adopt Econographicology as a tool to assist them in analysing any economic policy. For starters, the Economic Planning Unit (EPU) from the prime minister department should be the first agency to employ

Econographicology modelling since EPU is the central government agency that handles the long-term planning for the Malaysian economy. If EPU makes use of Econographicology successfully for long-term planning of the Malaysian economy, it will pave the way for Econographicology as policy modelling to be used by other ministries and government agencies in Malaysia. On top of that, it will be a milestone achievement for Econographicology as the sub-branch of Econophysic to be applied nationally as policy modelling. With Econographicology tools, it can improve the understanding of the policymakers towards any policy problems and help them to provide a better policy solution for the betterment of the nation in the long run. Therefore, this study concludes that Econographicology should be utilised widely by academicians, researchers, and policymakers for education as well as policy modelling purposes.

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