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Household Consumption Function Based on Permanent Income Hypothesis: A Systematic Review

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Abstract

The Permanent Income Hypothesis was first proposed by Milton Friedman in the 1950s and has been an important theory in the field of macroeconomics. According to this theory, the spending behavior of individuals is based on their long-term average income rather than their current income. The theory posits that individuals adjust their spending patterns based on their expected lifetime income rather than temporary fluctuations in their income. Given the severe impact of COVID-19 on household consumption and income change, it becomes increasingly important to model household consumption. With this subject becoming increasingly significant, it is noteworthy to retrieve and report on the existing literature, especially within the context of explaining the Permanent Income Hypothesis (PIH) relevancy to model household consumption. This study will employ the PRISMA strategy in the systematic review of the existing literature. The finding from this review showed the literature found can be clustered into three (3) themes in answering the research questions and contributing to the existing body of knowledge in this domain. Finally, this systematic review will advance the literature and provide recommendations for policy formulation, as well as paving way for future studies within this context.

Keywords: Permanent Income Hypothesis, Household Consumption, Systematic Review, PRISMA, Literature

Introduction

The Permanent Income Hypothesis (PIH) is a theory that suggests people's consumption decisions are based on the expectations of their long-term average income, rather than their current income. According to the PIH, people smooth out their consumption over time to avoid big swings in their standard of living. Over the last few decades, there has been growing

interest in the household consumption model. The economic recession and pandemic crisis have further accelerated the concern about how they may have impacted the household consumption pattern. The knowledge of the model of the household consumption pattern would be beneficial in assisting the development of a new economic policy. The evidence on the association between household consumption and income will provide insights and critical information for both policymakers and economists into making informed decisions about fiscal and monetary policies, which will impact the overall health and long-term stability of the economy.

Meanwhile, the work in undertaking a review of the literature will provide the best evidence for informing policy and practice in any discipline (Tranfield et al., 2003). The conduct of a literature review often enables the researcher to both map and access the existing intellectual territory, and to specify a research question in developing the existing body of knowledge further. According to Cook et al (1997), systematic review differs from traditional narrative reviews as it adopted a replicable, scientific, and transparent process with detailed technology that would minimize bias through exhaustive literature research. The collective insights from a systematic review can help in the development of a reliable knowledge base by accumulating knowledge from a range of studies. Besides, the reviews confined specifically to the SCOPUS database ensure that only high-quality and context-sensitive literature are included in the review. In view of the growing concern about household consumption modeling, a systematic review on this particular subject of interest is considered timely and notably important.

With the significant amount of research published within the context of the Permanent Income Hypothesis (PIH), it is noteworthy to report on the current state of the literature and use this knowledge to outline the future study direction. In addition, the research involving the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) strategy that extensively scanned the literature will be able to contribute to the existing body of knowledge. To the best of our knowledge, the use of the PRISMA strategy in reviewing research within the context of the Permanent Income Hypothesis has been first. The finding reported from this review will no doubt be able to contribute to providing additional insight for scholars and practitioners, paving way for more future research in this context. Besides advancing the literature, the finding from this study can be used to answer the research questions: (1) Does the Permanent Income Hypothesis present in the countries studied? (2) Has there been existing reports on intertemporal consumption smoothing? (3) What are the effects of Rational Expectations Permanent Income of Hypothesis (REPIH) reported?

Research Methodology

A systematic review is a research method that can be used to identify and critically synthesize relevant literature on a certain research topic. This research methodology aims to identify all empirical evidence that fits the pre-specified inclusion criteria to answer a particular research question or hypothesis (Snyder, 2019). It is suitable to be employed when the scope of review is specific and the dataset is small enough to be manually reviewed. The following sub-sections will explain the stages involved in conducting the systematic review

Designing the Review: Inclusion Criteria

The review was first designed with the development of a set of inclusion criteria to consider the inclusion of relevant studies for this review. The inclusion criteria consist of the following: Firstly, studies are filtered based on keyword search terms to identify relevant literature for

review. Secondly, studies are limited to high-quality peer-reviewed published articles only. Meanwhile, conference proceedings, books, and book chapters are excluded. Subsequently, the article search is limited by their subject area of Economics, Econometrics, and Finance. Next, the articles are restricted to the exact keyword and only English language-written articles are included. Lastly, the abstracts and contents of articles are manually screened to determine whether they fit the objectives and scope of the review.

The objectives of this review are

- To explore the methodologies and context used in the studies on household consumption function based on the Permanent Income Hypothesis (PIH).
- To pave way for further research opportunities within this context.
- To assist practitioners and policymakers in gaining insight on the topic which aids them in designing future policies.

Conducting the Review: Search Methods

The database search will be conducted on the SCOPUS database since all articles under this database are of high-quality peer-reviewed literature. Besides that, SCOPUS has been highly regarded as one of the largest abstract and citation databases. The first step was to identify the relevant keywords and search terms based on the study's scope. A total of 130 articles were retrieved from the searches in the SCOPUS database using the combination of keywords as shown in Table 1. Next, the article search was limited strictly by the type of publications. Other publications such as conference proceedings, books, and book chapters are excluded from this review. By limiting the documents to 'Article' type only, about 119 articles remained. The article search is further limited by the subject area of Economics, Econometrics, and Finance, narrowing down the search to 106 articles. Under the restriction of the exact keyword search "Permanent Income Hypothesis", the sources search was further limited to 25 articles. Next, an initial review will be conducted on the articles by screening their abstracts. Texts and contents of relevant literature will be retrieved for a more detailed evaluation. Sources that fitted the inclusion criteria and satisfied the screening will then be selected for the systematic review. Based on the detailed filtering and restriction to the English language written articles only, a final selection of 20 articles was found relevant for the systematic review to answer three (3) research questions. (1) Does the Permanent Income Hypothesis present in the countries studied? (2) Has there been existing reports on intertemporal consumption smoothing? (3) What are the effects of Rational Expectations Permanent Income of Hypothesis (REPIH) reported? Figure 1 illustrated clearly the use of PRISMA as the search strategy.

Table 1

Keyword Search

NO.	KEYWORD SEARCH	NUMBER OF ARTICLES
1	"Household Consumption" & "Permanent Income Hypothesis"	130
2	Limit to Article type	119
3	Limit to Subject area Economics, Econometrics, and Finance	106
4	Limit to Exact keyword "Permanent Income Hypothesis"	25
5	Restrict to the English Language written article	21
6	Manually screened	20

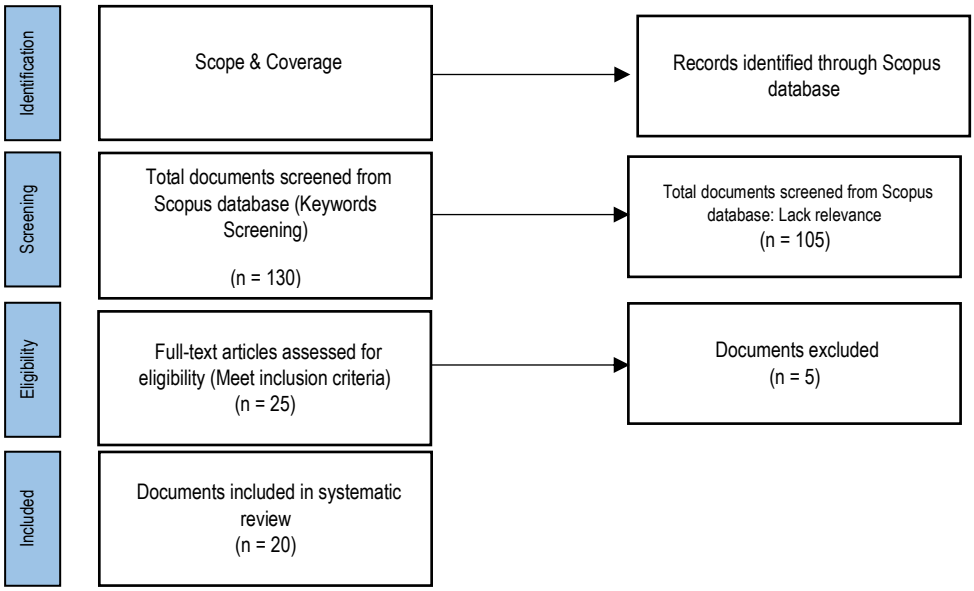

Figure 1: The PRISMA diagram used to search, screen, and select articles

Results

From the 130 articles identified with the following keywords; "Household Consumption" & "Permanent Income Hypothesis". The literature search is then restricted to article type only, leaving 119 articles. A restriction of the article by subject area of Economics, Econometrics, and Finance further limited the articles to 106 articles. Restricting the articles by the exact keyword of "Permanent Income Hypothesis", limited the search to 25 articles. These articles are manually screened and limited to the English language articles, leaving 20 articles that meet all the inclusion requirements. These 20 articles were classified into three (3) clusters, namely, (i) Application of Permanent Income Hypothesis, (ii) Intertemporal Consumption Smoothing, and (iii) Rational Expectations of Permanent Income Hypothesis. Table 2 shows the summary of the articles selected based on the inclusion criteria for the systematic review.

Table 2

Summary Table of Literature

Author(s)	Methodology(s)	Sample	Findings
Cluster 1: Application of Permanent Income Hypothesis			
Kohara and Harioka (2006)	Euler Equation Test, IV Estimations	Japanese Panel Survey of Consumers	The evidence suggested that the life cycle/permanent income hypothesis does not apply in Japan and the presence of borrowing constraints was not the main reason for its non-application.
Cho and Rhee (2017)	Panel Smooth Transition Regression (PSTR) model with fixed individual effects	19 OECD Countries	An apparent non-linear relationship was found between private consumption and disposable income.
Tran (2022)	Three-wave balanced panel dataset	Vietnamese household surveys	The importance of PIH was well supported.
Wang (2011)	Panel Analysis	10 Asian Countries	Consumption and current income are found to be strongly cointegrated. However, the PIH/LCH is not upheld in these countries following the presence of liquidity constraints.
Keho (2019)	Nonlinear Autoregressive Distributed Lag (NARDL)	Cote d' Ivoire	Findings indicated that the absolute income hypothesis is valid rather than the permanent income hypothesis.
Hamburg *et al* (2008)	Cointegrated Vector Autoregression (VECM)	Germany	Consistent with PIH, consumption was found mainly reacts to permanent innovations in assets, wealth, and income.
Falk and Lee (1998)	Vector Autoregression (VAR)	US post-World War II data	The failure to distinguish between permanent and transitory components in labor income and consumption can be misleading in evaluating the implications of REPIH.
Alvarez-Cuadrado and Long (2011)	Overlapping-Generations Economy	Modeling	Individual saving rates increase with relative income while aggregate savings are independent of income distribution.
Stuart (2017)	Error Correction Model	Ireland	Changes in personal consumption and personal disposable income are closely linked.
Huang *et al* (2008)	ARIMA	US data	Consumption vastly underreacts to permanent innovations in labour income but reacts about the right magnitude to transitory ones when

			compared with the prediction of the permanent income hypothesis.
Cluster 2: Intertemporal Consumption Smoothing			
Kazianga and Udry (2006)	OLS Regression, IV estimator, Arellano-Bond (AB) estimator	Rural households in Burkina Faso	Patterns of consumption smoothing by rural households are observed with household behaviour reported to be less consistent with the Permanent Income Hypothesis (PIH) model.
Carter and Lybbert (2012)	Thresholds estimates, Nonparametric regression	Rural households in Burkina Faso	The establishment of the co-existence of consumption and asset smoothing regimes with households above the estimated threshold almost entirely shields their consumption from weather shocks.
Deaton and Paxson (1994)	Panel data regression	Households data from the United States, Great Britain, and Taiwan	Evidence on the notion that inequality in both consumption and income grows with age is implied by the permanent income hypothesis as indicated by the data from the United States, Great Britain, and Taiwan.
Zhang and Ogaki (2004)	First-stage regression	India	Findings demonstrated favoring of Risk-Sharing Hypothesis (RSH) over the Permanent Income Hypothesis (PIH) tested at the village level.
De Veirman and Dunstan (2011)	Johansen L-max and Trace Cointegration test, Vector error correction model (VECM), Impulse-response, Permanent-transitory decomposition	New Zealand	The Permanent Income Hypothesis model was able to explain the positive empirical consumption response to a transitory shock once intertemporal substitution was allowed.
Pánková (2016)	Vector autogressive (VAR) model, Granger causality	Czech Republic, Slovakia and Austria	The Permanent Income Hypothesis (PIH) was not rejected in the case of Austria, explaining the closeness of the consumption behaviour of the Austrian households to the PIH.
Shaikh *et al*. (2018)	Time series and panel data analysis	Organization of Islamic Countries (OIC)	Findings in several countries showed that consumption responds to expected income changes which were against the intuition implied by the PIH.
Cluster 3: Rational Expectations Permanent Income Hypothesis			
Filer and Fisher (2007)	Sample-splitting techniques, Panel	Households data (US)	Violation of the REPIH model due to myopia.

	Study of Income Dynamics (PSID)		
Gausden and Hasan (2016)	Disaggregated analysis	United Kingdom data	Consumer sentiment possesses independent predictive content.
Einian and Nili (2018)	Panel IV method	Iranian data	REPIH model is not compatible with data most of the time.

Source: Author's Compilation

One of the themes that the literature is clustered on is the application of the Permanent Income Hypothesis (PIH). According to Alvarez-Cuadrado and Long (2011), there has been a growing body of empirical evidence that demonstrated departures from the basic prediction despite the theoretical dominance of PIH. Similarly, Dynan et al (2004); Altonji and Villanueva (2007) provided strong evidence of a saving rate that increases with permanent income, violating the proportionality hypothesis. The cointegration test by Wang (2011) demonstrated that consumption and current income are strongly cointegrated. The presence of liquidity constraints is observed in ten Asian countries which explained why households were not able to smooth their consumption relative to their permanent income through short-term borrowing. On the other hand, Falk and Lee (1998) formulated a version of the permanent income hypothesis (PIH) in which households decompose labour income into permanent and transitory components.

In another study, Kohara and Harioka (2006) pointed out that the permanent income hypothesis (PIH) does not apply in Japan and that the presence of borrowing constraints become the main reason why it does not apply. Stuart (2017) found that the behaviour of the savings ratio is consistent with the fundamental ideas of the perpetual income hypothesis when considered in the context of the economic and political events of the time across the sample period studied. Employing a three-wave balanced panel dataset constructed from Vietnamese household surveys, Tran (2022) found strong evidence that supports the significance of the permanent income hypothesis (PIH). The finding was consistent with the results of previous literature, where the marginal propensity to consume out of permanent income was found to be significantly higher than that for transitory income.

However, Keho (2019) using nonlinear autoregressive distributed lag (NARDL) rejected the permanent income hypothesis driven by the presence of liquidity constraints in Cote d'Ivoire. This finding was inconsistent with Hall (1978); Campbell and Mankiw (1990) which showed a similar positive response of consumption to income changes which was in line with the absolute income hypothesis instead. When compared to the prediction of the permanent income hypothesis (PIH), Huang et al (2008) showed that consumption vastly underreacts to permanent innovations in labour income but reacts to transitory ones with a reaction approximately the proper amount. Meanwhile, Hamburg et al (2008) demonstrated that consumption mostly responds to long-lasting shocks in German. Whereby, while the majority of German household asset wealth is certainly permanent, temporary shocks are mostly responsible for the variance in income throughout business cycle phases. Furthermore, it appears that permanent income shocks rather than wealth are what primarily drive German private consumption. The estimation results in Cho and Rhee (2017) highlighted that in nations like Japan, Spain, and the United States, where household deleveraging has been ongoing, the MPC has been rising since the global financial crisis.

According to Deaton and Paxson (1994), the permanent income hypothesis implies that inequality in both consumption and income would grow with age. The permanent income hypothesis postulated that the rise in inequality is a result of varying cumulative impacts of luck on consumption. De Veirman and Dunstan (2011) concluded that the Permanent Income Hypothesis (PIH) can fully explain the positive empirical consumption response to a transitory shock once intertemporal substitution is allowed. In a PIH model with intertemporal substitution, consumption peaks at the same time as net worth because consumers choose to bring spending forward because they anticipate that the first wealth growth will be followed by low returns on saving. The estimation and tests of REPIH in the study by Shaikh *et al*. (2018) challenge the existence of consumption smoothing phenomena as envisaged in REPIH. Meanwhile, Pánková (2016) demonstrated that about 85% of Austrian households consume according to the PIH, with 55% for Czech households and 52% for Slovakia.

Meanwhile, Kazianga and Udry (2006) extended the analysis on consumption smoothing by examining how livestock, grain storage, and inter-household transfers are used to smooth consumption against income risk. The result of the analysis pointed out the inconsistency of human behaviour to be explained by the permanent income hypothesis (PIH) model. On the other hand, Carter and Lybbert (2012) argued that asset smoothing is more likely to be observed rather than consumption smoothing in a neighborhood of critical asset levels at which optimal accumulation behavior bifurcates. Deaton and Paxson (1994) demonstrated that within-cohort consumption and income inequality measures do indeed increase with age. This is in accordance with the permanent income hypothesis that the increase in inequality reflected cumulative differences in the effects of luck on consumption.

According to Attanasio and Weber (2010), the Rational Expectations Permanent Income Hypothesis (REPIH) model is an intertemporal choice of modeling consumption with a limited set of assumptions. This theoretical model played a fundamental role in modern macroeconomic modeling. Based on the REPIH, the expected changes in income or lagged income should not influence current-period consumption growth (Filer and Fisher, 2007). This model's most significant implication is that consumption's marginal utility is a random walk, meaning that aside from current consumption, no information currently known can be used to predict future consumption (Hall, 1978). According to Bilgili and Baglitas (2015), rational expectations were substituted for adaptive exceptions in the model. This allows the estimation of consumption level through information obtained from the past, current, and future via the substitution done. It is contended that consumption cannot be anticipated by examination of all the probabilistic data and may instead follow a random walk. Therefore, it is argued that the information contained in consumption includes both the lagged consumption plus error term.

In the third cluster, we found a few studies (Einian and Nili, 2018; Filer and Fisher, 2007; Gausden and Hasan, 2016) that examined the compatibility of the REPIH model with access to data. Einian and Nili (2018) pointed out that the REPIH model is not compatible with data most of the time in their analysis of Iranian household data. In contrast to the REPIH model hypothesis, income changes were found to assist in the prediction of consumption change. This is dubbed as excess sensitivity in the macroeconomic literature. Meanwhile, Gausden and Hasan (2016) performed a disaggregated study on the expenditure of household spending for each durable goods, semi-durable goods, and nondurable goods and services using the United Kingdom data. The finding from their analysis suggested that the developments in consumer sentiment do possess independent predictive content.

Filer and Fisher (2007) employed sample-splitting techniques that use wealth indicators or specific individual information on credit market access to examine the effects of the REPIH. In most literature cited, the violation of the REPIH model lies in the presence of liquidity constraints. In particular, a myopic consumer has a constant marginal propensity to consume which violates the REPIH as well. When consumers are liquidity constrained, they are not able to borrow when their expected income increase but is not hindered to save when their expected income decreases. In other words, liquidity-constrained consumers are only sensitive to the anticipated increase in income. Myopia, on the other hand, differs from liquidity constrained as a myopic consumer is excessively sensitive to both expected income increases and anticipated income decreases. Empirical evidence from Filer and Fisher (2007) finding implied that renters and households with low financial assets are similar to myopic consumers rather than being liquidity constrained.

Discussion

It can be observed from the systematic review conducted that there had been past studies of interest on the significance of the Permanent Income Hypothesis (PIH) in explaining household consumption. By using the PRISMA strategy, the literature found was clustered into three (3) themes. About ten (10) articles were found and clustered under the theme 'Application of the Permanent Income Hypothesis (PIH)'. These articles generally provided evidence of the applicability of the Permanent Income Hypothesis (PIH) in different countries studied. For example, Wang (2011) explored the application of the theory in ten (10) Asian countries, Kohara and Harioka (2006) in Japan, Tran (2022) in Vietnam, Keho (2019) in Cote D'Ivoire, Pánková (2016) in Austria. Overall, the finding found varies by country with some in support of the application of the Permanent Income Hypothesis (PIH) whilst others argued that the presence of borrowing constraints can be the underlying reason leading to the rejection of PIH.

About seven (7) articles were clustered under the second theme of 'Intertemporal Consumption Smoothing'. Intertemporal consumption smoothing refers to a strategy used by households to maintain a consistent level of consumption over time, despite fluctuations in income or other sources of wealth. This involves setting aside some income or wealth during periods of high income or abundance and using it to finance consumption during periods of low income or scarcity. The goal is to avoid large fluctuations in consumption patterns over time and achieve a more stable and predictable standard of living. This theme mainly discussed in past studies extended to examine intertemporal consumption behaviour. For example, Shaikh *et al* (2018) reported that loss aversion has been found to impede forward-looking intertemporal consumption behaviour in the majority of countries. De Veirman and Dunstan (2011) extended the literature by estimating the intertemporal elasticity of substitution in consumption cycles.

The third theme, 'Rational Expectations of Permanent Income Hypothesis (REPIH)' shed light on the literature that examined on REPIH model. Rational Expectations and the Permanent Income Hypothesis suggest that people make consumption and savings decisions based on their expectations of future income, which are informed by all available information. This helps to explain why people might save more during times of economic uncertainty or when they expect their income to decrease in the future. Hence, Bilgili and Baglitas (2015) explained the random walk hypothesis could be referred to as the permanent income hypothesis with rational expectations (REPIH). This is due to the fact that in their model, reasonable expectations are used in place of adaptive exceptions. Individuals can use information from

the past, present, and future to estimate their level of consumption thanks to this substitution. In other words, consumption cannot be anticipated by examination of all the probabilistic data and may instead follow a random walk. Most of the findings reported the violation of REPIH due to the presence of liquidity constraints.

Conclusion

The systematic review has provided collective insights that aid in the development of a reliable knowledge base in answering the research questions. Based on the systematic review performed, the available literature that has been included in the review highlights the arising interest in the use of the Permanent Income Hypothesis (PIH) in explaining household consumption behaviour. It is interesting to note that whilst the theory has been dominant in the past, some studies have pointed out the rejection of the theory in some countries. These studies are imperative as they provide essential information through the modeling of the consumption function among households. According to Roche (1995), there are two (2) main reasons behind the empirical work in testing the Permanent Income Hypothesis (PIH). First, the impact on policymakers mostly relates to measures that have an impact on households' disposable income. Consumers perceive the influence on household consumption as a permanent policy if the government lowers or reduces the tax. Second, the technique (PIH) incorporates other crucial theoretical development components, such as the argument for expansionary fiscal contractions. Hence, a decline in government spending may lead to a future decrease in income taxes. Therefore, the knowledge from this review provides important policy implications as the current and future consumption among the poor is influenced by disposable income. As such, a restructuring of the economic policy toward long-term sustainability is necessary. For instance, the government can assist in improving household income through effective tax reforms.

Besides that, this systematic review has pave way for future studies to examine household consumption behaviour against the postulated Permanent Income Hypothesis (PIH) given its varied findings by countries. The model of household consumption developed will provide useful information for the policymakers to come up with efficient economic policy. For example, the government can increase taxes on high-income earners without significantly affecting their consumption. According to PIH, individuals save more when their income is higher than their long-term average income. Therefore, the government can introduce policies that incentivize people to save and invest, such as tax deductions for retirement savings. The government can also design social security and welfare programs to provide a steady stream of income to individuals over the long term, rather than short-term cash payments in line with PIH's suggestion that individuals' consumption decisions are based on their long-term average income. Finally, the government can introduce policies that promote economic growth, such as investment in infrastructure and education which can lead to increases in long-term average income, stimulating consumption and savings. In short, government policies should focus on promoting long-term economic growth and encouraging savings and investment, rather than short-term measures to boost consumption.

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