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Keeping up with the Joneses: the Relevance of Duesenberry's Relative Income Hypothesis in Ethiopia

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Abstract

Although it was mysteriously neglected and displaced by the mainstream consumption theories, the Duesenberry's relative income hypothesis seems quite relevant to the modern societies where individuals are increasingly obsessed with their social status. Accordingly, this study aims to investigate the relevance of Duesenberry's demonstration and ratchet effects in Ethiopia using a quarterly data from 1999/2000Q1-2018/19Q4. To this end, two specifications of relative income hypothesis are estimated using Autoregressive Distributed Lag (ARDL) regression model. The results confirm a backward-J shaped demonstration effect. This implies that an increase in relative income induces a steeper reduction in Average Propensity to consume (APC) at lower income groups (the demonstration effect is stronger for lower income households). The results also support the ratchet effect, indicating the importance of past consumption habits for current consumption decisions. In resolving the consumption puzzle, the presence of demonstration and ratchet effects reflects a stable APC in the long-run. Hence, consumption-related policies should be carefully designed as polices aimed at boosting aggregate demand can motivate low income households to gallop into wasteful competition so as to 'keep up with the Joneses'—the relative riches.

Key Words: *Duesenberry's demonstration and ratchet effects, relative income, APC, ARDL, Ethiopia*

1. Introduction

Until J. M. Keynes broke “conventional postulates of Olympian knowledge and aloofness” with the publication of ‘*The General Theory of Employment, Interest and Money*’ in 1936, the Classical “*Supply will create its own demand*” proposition was the main ingredient in the determination of income and employment. The great depression in 1930’s with the introduction of the importance of demand side factors like consumption in the determination of income, interest rate and employment level in a given economy nullified the Classical myth. Particularly, after the Second World War in which consumption spending took approximately two-third of world peace time GDP, the interest of many scholars and researchers turned in to consumption theory (Palley, 2008).

Keynes (1936), in his consumption function, also noted that the slope of propensity to consume tends to decline as income grows and saving became the largest share of income growth. Put differently, average consumption spending increases with an increase in income but not as much as the increase in income, implying the average propensity to consume tends to decline as income increases which makes the decision to invest in troublesome. Kuznets (1942) using long time series data for US economy, however, found that the Keynesian consumption function holds true in short run but not in long run. Quite simply, Kuznets proved that the average propensity to consume (APC) happens to be almost stable rather than decreasing as income increases in the long run (Hamilton, 2001; Santos, 2013).

Following the Keynes consumption function and Kuznets paradox, different consumption theorists such as Modigliani and Brumberg (1954), Friedman in 1950s and Duesenberry (1949) tried to come up with their own explanations to reconcile the puzzle of short-run and long-run consumption functions. The mainstream economists like Reid (1952), Modigliani (1954) and Friedman (1957) and even their descendants, with the motive of making economics an exact science, tried to settle the consumption puzzle, ignoring the social and psychological dimensions of consumption. They simply stated consumption as a function of long-run average or permanent life time income rather than current income which makes consumption more stable (Manson, 2000; Frank, 2005). The main implication of such kind of mainstream thinking is the consumption behavior of an individual is independent of the consumption preferences of others. Hence, an individual is the sole judge of his/her action in consumption decision. In this sense,

the heart of Neo-classical economics doctrine—the aggregate demand function which incorporates consumption function is simply the lateral summation of individual demand curves existing in a given economy. These kinds of teachings were not, however, isolated in vacuum space and they have been under great attacks from the heterodox economists like Veblen (1899) and Duesenberry (1949).

In the contemporary society where societal status is a focus of everyone and social arrangements are broken down or almost disappeared, the acquisition of something similar to his/her fellow neighbor become the goal of human being unless survival is under question mark. This is because an individual will progressively feel worse off or less successful as his /her neighbor upgrades the quality of goods they possess or consume. Hence, an individual in order to conform the status presented by the society or to be called “one of the boys” he will try to “keep up the Joneses” by increasing their consumption spending; making consumption to be more stable in the long-run, which is often called Duesenberry’s demonstration effect¹. In this sense, an individual consumption depends on not only on his permanent income but also his income relative to average income in the society—relative income (Duesenberry, 1949; Leibenstien, 1950; McCormick, 1983). Duesenberry (1949) in his argument for relative income hypothesis also stated that even when the individual’s income decreases, consumption turns out to be more stable than falling. This is often termed as Duesenberry’s Ratchet effect² which arises from the demonstration effect in which people don’t want to be seen consuming lower standard goods compared to their neighbors.

The Duesenberry’s relative income hypothesis seems quite relevant to the modern societies where individuals are increasingly obsessed with their social status (individual consumer behavior is primarily socially determined). Further, the Duesenberry’s conceptualization has important implications, for instance, to come up with appropriate policy prescription or to better predict the effects of policy changes like public provision taxes on wasteful spending races, tax cuts and the Pareto implications of income growth (Frank, 2005; Sanders, 2010).

¹It is relative income, not absolute one, which matters more for consumption decisions of an individual.

²Past consumption patterns (habit formation) significantly determines an individual’s current consumption.

Some empirical works like Singh *et al.* (1978); Abebe (2006); Parada and Mejia (2009) and Alimi (2015) confirmed the importance of Duesenberry's idea of consumption and its substantial empirical credibility. Nevertheless, the Duesenberry's work has not been well explored in the existing literature as it was mysteriously ignored and displaced by the mainstream consumption theories over the last 60-70 years. In particular, to our knowledge, no such study has been undertaken in Ethiopia to date. Ethiopia is, however, a country where the social bonds are very strong; informal sector occupies about 50% of the entire economy; asymmetric information persists and hence consumer rationality looks something ideal; the housing arrangements are so close and so your neighbors can see whatever you are doing and more importantly wedding ceremonies, birth day parties, and charity acts are done to show one's social status.

This study, therefore, departs from this awful mainstream neglect and makes a modest attempt to empirically investigate whether the Duesenberry's relative income hypothesis appears to be true in Ethiopian context using quarterly data over past last two decades.

2. Brief Review of Literatures

Relative income hypothesis is the theory of consumption introduced by Duesenberry in 1949, which states that the consumption level of an individual relies primarily on the highest level of previously attained income and the consumption patterns of his neighbors since individuals by nature are more concerned about their status relative to others. Unlike the absolute income hypothesis of Keynes, the Duesenberry's relative income hypothesis incorporates habit formation (past consumption patterns) and social interdependencies in the theory of consumption. In this regard, Duesenberry argued that the nature and patterns of individual consumption are highly influenced by the relative, not absolute, income effects (Mason, 2000; Khan, 2014). He strongly challenged the assumption of independent consumption behavior of individuals, one of the artificial rules of neoclassical economists, and claimed, central to his relative income hypothesis, that the social character of consumption patterns should be fully recognized to understand the problem of consumer behavior (McCormick, 2018).

The Duesenberry's relative income hypothesis had gained a great popularity in early the 1950s, nevertheless, it was quickly marginalized and dominated by other consumption theories like Modigliani and Brumberg's (1954) life cycle hypothesis and Freidman's (1957) permanent

income hypothesis, which stripped of social concerns of consumption. Further, despite its overwhelming theoretical justification, Duesenberry's theory of consumer behavior disappeared from modern economic textbooks which was often associated with increasing mathematization of economics and public acceptance of consumption theories of mainstream economists which lent themselves easily to such mathematical formulations (Mason, 2000; McCormick, 2018).

Accordingly, various studies were recently undertaken in different part of the world with a focus on empirically testing the mainstream consumption theories, particularly Friedman's (1957) Permanent income hypothesis and mixed evidences were observed. On the one hand, some studies such as Altunc and Aydin (2014) in eight members of Organization of Islamic Corporation over the period of 1980-2010; Osei-Fosu *et al.* (2014) on Ghanaian economy over 1970-2010 and Kelikume *et.al* (2017) on Nigerian economy over 1980-2015 confirmed the validity of permanent income hypothesis. on the other hand, some other studies like DeJuan *et.al* (2006) in 11 West-German states over the period 1970–1997; Paz (2006) and Gomes (2012) on Brazilian economy respectively over 1991-2004 and 1947-2010; Gupta & Ziramba (2011) on US economy over 1947-2008; Khalid and Mohammed (2011) in Pakistan over 1971-2010 found out evidences inconsistent with the Miltonian proposition of permanent income hypothesis.

After 1970s, however, some empirical works aroused a renewed interest in Duesenberry's relative income hypothesis as attempts were made to incorporate habit formation and interdependent preferences in consumer behavior models (Gaertner, 1974; Pollak, 1976; Easterlin, 1974) and as a direct result of growing interests in consumption and consumer demand (Douglas and Isherwood, 1978; Frank, 1985) (cited in Mason, 2000). Further, Singh *et al.* (1978) tried to assess the Duesenberry's relative income hypothesis in India (1952-1965), Canada (1951-1968), Netherlands (1950-1966) and West Germany (1951-1968) with different specifications. The study results indicate that Duesenberry's specification happened to hold in Canada, while the Davis (1952) specification was valid in both Canada and Netherlands.

Quite more recently, Parada and Mejia (2009) examined the Duesenberry's demonstration effect in four Latin American countries (Mexico, Brazil, Argentina and Colombia) for the period of 1980-2005. They study employed an autoregressive model and a strong evidence of Duesenberry's effect was observed only in case of Colombia. Similarly, Alimi (2015), with the help of Cagan's adaptive expectation model, revealed existence of long-run relationship between

consumption and income for Nigeria and South Africa for the period of 1980 to 2013. The study also indicates that Nigerian consumers are forward-looking (their consumption is based on future expected income), while past consumption patterns affected consumption in case of south Africa, supporting the Duesenberry's ratchet effect. In particular, in Ethiopian context, Abebe (2006) used a panel data of both urban and Rural areas in Ethiopia from 1994-2000 and confirmed that current consumption is correlated with household assets and past consumption.

In general, although it was neglected in the mainstream economics over the last 60 and 70 years, the empirical studies conducted in different parts of the world so far indicated that Duesenberry's idea of consumption seems quite relevant in today's world where modern consumers are increasingly obsessed with their status relative to their fellow neighbors—which is absolutely true in Ethiopia in particular. In this regard, it is worth quoting a paragraph from a fictional book written by an Ethiopian author, Be-alu Girma that clearly indicates such kind of consumption behavior in Ethiopia.

“ The first woman said “Did you see the villa our neighbor made by one hundred and fifty thousand birr? The car can go into her living room.” The other woman said, “Oh my dear!! Don't be quick to appreciate a pond before seeing Nile River. My neighbor built a house for two hundred thousand birr and he bought every single piece of furniture from Italy. You can fall asleep while you are still sitting on the couch. His housework is so amazing. You can see the garden outside while sitting in the living room. ...The bed room? Oh my God! You will say... is it a Paradise? And, the third woman gets in the middle of their talk and said, “Have you seen the new automatic Mercedes my neighbor had? And, his BMW looks like a water. I wish I had just only his Jaguar. . . . ”

Hence, this study aims at empirically investigating the relevance of Duesenberry's demonstration and ratchet effects in Ethiopian context over past two decades using a quarterly data.

3. Methodology

3.1 Type and Source of Data

The study used a time series quarterly data on consumption and income from National Bank of Ethiopia (NBE), and Ministry of Finance and Development (MoFED) from the first quarter of 1999/2000 to fourth quarter of 2018/19.

3.2. Theoretical Framework

Originally, as indicated earlier, Duesenberry on his book *‘Income, Saving and the Theory of Consumption Behavior’* stated that consumption not only depends on individuals income but also the income of his fellow neighbor showing the demonstration effect. In other words, consumers’ past peak income have a significant effect on their consumption pattern (Singh *et al.*, 1978) which implies that household consumption will be lower when the households relative income position is higher compared to its neighbors and vice versa—households’ consumption fall as relative income rises (Palley, 2008). The original Duesenberry’s relative income hypothesis can, therefore, be mathematically stated as;

$$(C/Y)_t = \alpha + \beta(Y/Y^0)_t, \quad \beta < 0 \quad \text{_____} \quad (1)$$

Where C, Y, and Y⁰ denote real per capita consumption, real per capita disposable income, and previous peak of real per capita disposable income respectively in period, t and α and β are parameters to be estimated, and β also represents Duesenberry’s demonstration effect.

Following the Brown (1952) indication of lagged influences on consumer demand, Duesenberry *et al.*(1960) stated that even in times of a fall in income, individuals form habit persistence in consumption from past peak consumption. This will make individuals’ their consumption pattern rigid and therefore consumption function is likely to become irreversible over time—reflecting Duesenberry’s ratchet effect. This brought the Duesenberry, Eckstein, and Fromm (DEF) specification of relative income hypothesis after substituting $(C/Y)^*_t$ for $(C/Y)_t$. Following the Nerlovian “partial adjustment” model, the DEF specification is, then, expressed as:

$$\begin{aligned} [(C/Y)^*_t - (C/Y)_{t-1}] &= \gamma[(C/Y)^*_t - (C/Y)_{t-1}] = \gamma[\alpha + \beta(Y/Y^0) - (C/Y)_{t-1}] \\ &= \alpha \gamma + \beta \gamma (Y/Y^0)_t - \gamma (C/Y)_{t-1} \quad \text{_____} \quad (2) \end{aligned}$$

Now, rearranging equation (2) and defining $\alpha' = \alpha \gamma$, $\beta' = \beta \gamma$ and $\gamma' = 1 - \gamma$, the DEF specification becomes:

$$(C/Y)_t = \alpha' + \beta'(Y/Y^0)_t + \gamma' (C/Y)_{t-1} \quad \text{_____} \quad (3)$$

Where β' represents Duesenberry’s demonstration effect while γ' denotes the ratchet effect.

On the other hand, Daves (1952) noted that households' standard of living and their consumption habits are much more reflected by past peak consumption rather than past peak income. Further, in poor countries like Ethiopia where the informal economy takes more than 50% of employment share, households are unwilling to reveal their income. Consequently, the Davis specification looks quite convincing and can be re-expressed, after substituting past peak consumption for past peak income, as:

$$(C/Y)_t = \alpha + \beta(Y/C^0)_t, \beta < 0 \text{_____} (4)$$

Once more, applying the same Nerlovian "partial adjustment" model on Equation (4), we obtain the Singh and Kumar (1971) SK specification of relative income hypothesis as:

$$(C/Y)_t = \alpha' + \beta'(Y/C^0)_t + \gamma'(C/Y)_{t-1} \text{_____} (5)$$

Similarly, β' and γ' represent Duesenberry's demonstration and ratchet effects respectively.

Hence, we use the DEF and Davis-SK specifications, which allow us to test the demonstration and ratchet effects, for our empirical analysis. These specifications are based the assumption that APC is a linear function of relative income, implying the demonstration effect is the same across households within different income brackets.

As noted in McCormick (2018), however, lower-income people remain at constant pressure to consume more, while people at higher-income group feel less and less pressure to spend even more than they already did as richer people have fewer encounters with people consuming better-quality goods. This reflects that richer people will save more compared to their poor counter parts. In poor countries like Ethiopia where households with lower income dominate the economy expected to have higher APC than that of higher income households. This is because they (lower income households) may be forced to spend their entire income on necessity goods.

The above arguments, in general, strongly suggest that a linking APC and relative income in the linear form is quite restrictive and less flexible to suitably explain the demonstration effect. As a consequence, in this study, APC is expressed as a quadratic form of relative income to check whether demonstration effect varies across different level of relative income. Accordingly, the DEF and Davis-SK specifications of relative income hypothesis can be re-stated as follows:

DEF specification: $(C/Y)_t = \alpha + \beta_1(Y/Y^0)_t + \beta_2(Y/Y^0)^2 + \gamma'(C/Y)_{t-1}$ _____ (6)

Davis S-K specification: $(C/Y)_t = \alpha + \beta_1(Y/C^0)_t + \beta_2(Y/C^0)^2 + \gamma'(C/Y)_{t-1}$ _____ (7)

Here, we expect $\beta_1 < 0$ and $\beta_2 > 0$ as Duesenberry's demonstration effect is likely to be stronger at lower segment of income groups.

3.3 Econometric Method: ARDL Model

To empirically test the relevance of Duesenberry's relative income hypothesis in Ethiopia, the study used Autoregressive Distributed Lag (ARDL) regression model as a preferred econometric estimation model. ARDL model is the most popular OLS-based dynamic regression model applied to estimate the long run and short run relationship among variables in a single-equation setup. It can be applicable in non-stationary time series and for time series with mixed order of integration. It also generates more efficient model results in small and finite samples. Further, ARDL model can be used for a combination of endogenous and exogenous variables (Nkoro and Uko, 2016; Shrestha and Bhatta, 2019).

The generalized ARDL (p, q) model can be specified as:

$$Y_t = \alpha_0 + \sum_{i=1}^p \delta_i Y_{t-i} + \sum_{i=0}^q \theta_i X_{t-i} + \varepsilon_t \text{ _____ (8)}$$

Where p and q are lag of dependent (Y_t) and independent variables (X_t) and θ_i s are coefficients of independent variables. Further, The model specified in equation (8) can be re-parameterized in a Vector Error Correction system to integrate the short run adjustments along with the long run relationship in a single equation without losing long run information (Nkoro and Uko, 2016; Shrestha and Bhatta, 2019).

Hence, the error correction based ARDL model can be finally stated as:

$$\Delta Y_t = \alpha_0 - \varphi(Y_{t-1} - \beta_i X_t) + \sum_{i=1}^{p-1} \delta_i \Delta Y_{t-i} + \sum_{i=0}^{q-1} \theta_i \Delta X_{t-i} + \varepsilon_t \text{ _____ (9)}$$

Where $\Delta Y_t = Y_t - Y_{t-1}$, the speed of adjustment coefficient, $\varphi = 1 - \sum_{i=1}^p \delta_i$ and the long run coefficients, $\beta_i = \frac{\sum_{i=1}^p \beta_i}{\varphi}$, δ_i and θ_i represent the short-run coefficients of lagged dependent and independent variables respectively. Note that the speed of adjustment (error correction term) shows how quickly variables converge/diverge to equilibrium. The highly significant error correction term with a negative sign indicates the existence of a stable long-run relationship.

4. Empirical results and Discussion

4.1. Descriptive results

Prior to the main econometric results, the summary of statistics of the variables considered in the study, average consumption for different relative income groups (Demonstration effect), and the relationship between current and past consumption (Ratchet effect) are shown in Table 1, Figure 1 and Figure 2 respectively.

Table 1: Summary Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
APC	80	0.619	0.021	0.576	0.654
Y/Yo	79	1.043	0.029	0.960	1.137
Y/Co	79	1.687	0.064	1.528	0.841
Non-food Price	80	85.8	55.37	31.3	212.8
Real saving rate	80	-6.795	9.718	-34.24	15.47

Figure 1 depicts that APC tends to be higher when the relative income is lower and the converse is true. This implies when a given household's relative income is lower; its average consumption tends to be higher. Similarly, households having a higher relative income will have a lower average consumption.

Fig. 1: APC vs. Relative Income (Demonstration effect)

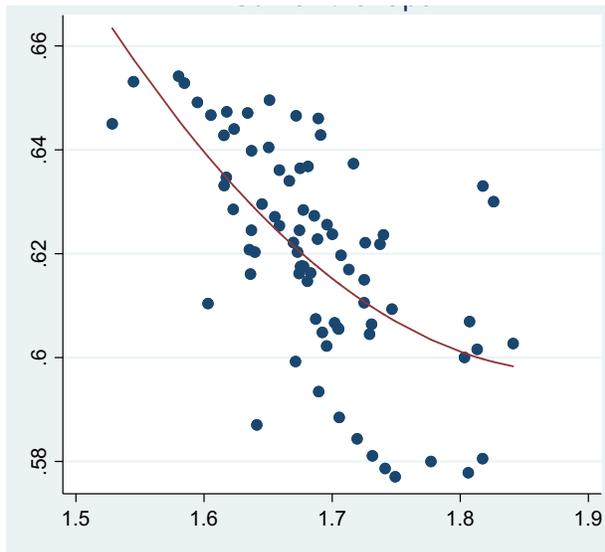
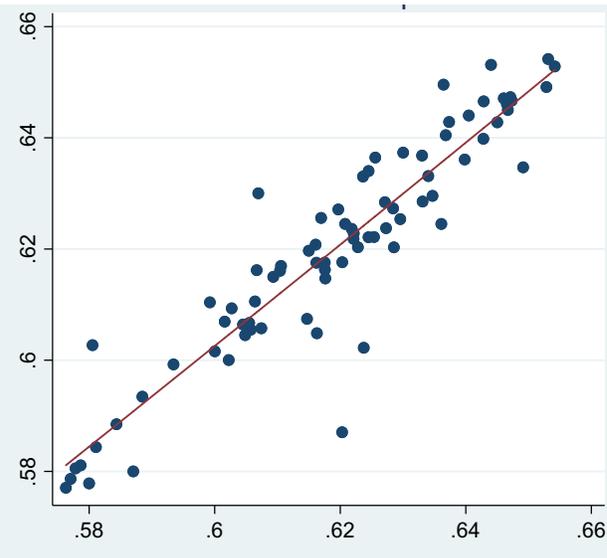


Fig. 2: APC vs. Lag of APC (Ratchet Effect)



On the other hand, as shown in figure 2, average consumption has a positive and linear relationship with past peak consumption which is ascertained later by the econometric result.

4.2 Econometric Results

Preliminary tests such as Unit-root test and cointegration tests are carried out first to check the stationarity of each variable and presence of long-run relationship among variables of the study.

4.2.1 Unit root test results

Performing unit root test is very important to check the order of integration of the variables and to avoid the possibility of spurious regressions. Augmented Dickey Fuller (ADF) unit root test is the most widely used stationary test although it has poor size and power properties. To overcome these limitations of standard ADF test, therefore, a modified Dickey–Fuller unit root test proposed by Elliott, Rothenberg, and Stock (1996) in which the series has been transformed by a generalized least-squares regression called Dickey-Fuller generalized least square (DF-GLS) test was performed to check the existence of unit root in each of the time series.

Table 2: DF-GLS unit root test results

Variables	DF-GLS unit-root test		Order of Integration
	Intercept	Intercept + trend	
APC	I(0)	-0.807	I(1)
	I(1)	-3.801*	
Y/Yo	I(0)	-1.577	I(1)
	I(1)	-5.505*	
(Y/Yo) ²	I(0)	-1.597	I(1)
	I(1)	-5.500*	
Y/Co	I(0)	-2.664*	I(0)
	I(1)	-	
(Y/Co) ²	I(0)	-2.665*	I(0)
	I(1)	-	
ln (Non-Food price)	I(0)	-0.497	I(1)
	I(1)	-5.145*	
Real saving Rate	I(0)	-2.205**	I(1)
	I(1)	-3.783*	

Note: *, and ** denote statistical significant at 1%, and 5% significant levels respectively. I (0) and I (1) represent at levels and first differences respectively. The critical values of DF-GLS test at 1%, 5% and 10% levels are: -2.597, -1.945, -1.614 for intercept and -3.679, -3.113 and -2.818 for both intercept and trend respectively.

The DF-GLS unit root test assumes a null hypothesis of non-stationary, which can be rejected when test statistics values are greater than the critical values. Accordingly, table 2 indicates that all variables except Y/Co and its square become stationary at their first differences. That is, mixed order of integration is observed among variables.

4.2.2 Cointegration test

The ARDL bounds cointegration test is used to check the existence of a long-run cointegrating relationship among our variables. This cointegration test is preferred to other cointegration tests in that it can be applicable for non-stationary variables or for mutually integrated variables. It assumes a null hypothesis of no cointegration and it can be rejected if the F-statistic and t-statistic are greater than the critical value for upper bound, I (1). As reported in Table 3, both the F-bounds test and t-bounds test results indicate the existence of a stable long-run relationship among the variables in both relative income specifications.

Table 3: ARDL Bounds test for cointegration

DEF specification	Lower bound, I(0)	Upper bound, I(1)
F-Bounds test statistic =3.94	3.74 @ 1% significant level 2.86 @ 5% significant level	5.06 @ 1% significant level 3.52 @ 5% significant level
t-bounds test statistic = -4.62	-3.43 @ 1% significant level -2.86 @ 5% significant level	-4.60 @ 1% significant level -3.99 @ 5% significant level
S-K specification		
F-Bounds test statistic =5.39	4.40 @ 1% significant level 3.47 @ 5% significant level	5.72 @ 1% significant level 4.57 @ 5% significant level
t-bounds test statistic = -5.39	-3.96 @ 1% significant level -3.41 @ 5% significant level	-4.96 @ 1% significant level -4.36 @ 5% significant level

4.2.3 ARDL estimations Results

Table 4 shows estimation results of ARDL regression model across the two specifications of Duesenberry's relative income hypothesis. As mentioned earlier in section 3.2, the quadratic form is supposed to be more appropriate to explain the demonstration effect. As a result, both the linear and quadratic terms of relative income are incorporated in each specification. A one period lag of APC is also included to capture the Duesenberry's ratchet effect. The coefficient of error term is highly significant and negative, indicating the existence of stable long run relationship.

Duesenberry's demonstration effect

As reported in table 4, the linear term of relative income in both specifications is found significant and negative, indicating a strong evidence of demonstration effect in Ethiopia. Once considering both the linear and quadratic terms, however, the demonstration effect follows a backward-J pattern with APC across the two specifications as the negative linear term clearly dominates the positive quadratic term—reflecting that an increase in relative income causes a steeper reduction in APC at lower income groups and it turns out to flatten at higher income groups. The Duesenberry's demonstration effect, in general, happens to be more pronounced (stronger) in the lower income brackets. This finding looks quite convincing as Ethiopia is one of low income countries (see also figure 1).

Duesenberry's ratchet effect

In both DEF and Davis-SK specifications, the past peak consumption significantly affects the average consumption (as the first period lag of APC is significant and positive). In this sense, the

Duesenberry's ratchet effect appears to be true in Ethiopia—reflecting the importance of habit persistence (past consumption patterns) in the current consumption decisions. Similar results were reported in Abebe (2006); Parada and Mejia (2009); Alimi (2015).

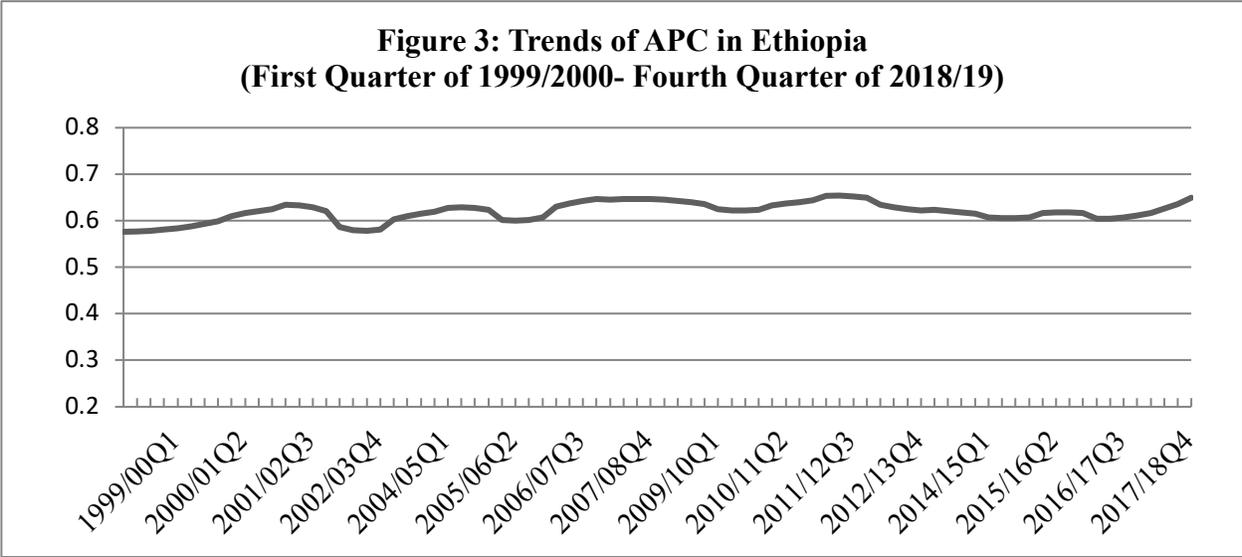
Table 4: ARDL estimation Results across different specification

	DEF specification ARDL (6, 5, 4, 0, 5)	S-K specification ARDL(6, 0, 5, 0, 5)
Long run estimates		
Y/Y ₀	-18.45** (7.506)	-
(Y/Y ₀) ²	8.911** (3.574)	-
Y/Co	-	-5.544** (2.411)
(Y/Co) ²	-	1.706** (0.732)
ln (Non-food price)	0.01*** (0.005)	0.105** (0.046)
Real saving rate	-0.001** (0.000)	-0.002* (0.000)
Short run estimates		
Δ (L. APC)	0.606* (0.122)	0.506* (0.151)
Δ (Y/Y ₀)	-4.35** (1.723)	-
Δ (Y/Y ₀) ²	2.101** (0.826)	-
Δ (Y/Co)	-	-1.063** (0.420)
Δ (Y/Co) ²	-	0.327** (0.123)
Δ (ln Non-food price)	0.002*** (0.001)	0.02** (0.008)
Δ (Real saving rate)	-0.0002 (0.000)	-0.000*** (0.000)
Error-Correction Term	-0.236* (0.051)	-0.192* (0.036)
Model Diagnostic tests		
R ² [adj-R ²]	0.952 [0.929]	0.952 [0.933]
F-test [p-value]	40.591 [0.000]	49.185 [0.000]
Breusch-Godfrey Serial Correlation LM Test [P-Value]	0.137 [0.872]	0.371 [0.692]
Heteroscedasticity Test: ARCH [P-Value]	0.026 [0.871]	0.045 [0.833]
Ramsey RESET Test [P-Value]	1.386 [0.245]	0.142 [0.708]
Stability: CUSUM of squares test	Stable	Stable

Note: The figures shown in brackets are standard errors. *, ** and *** denote significant at 1%, 5% and 10% levels respectively. The optimal lag structure for each model is automatically selected based on Akaike Information Criteria (AIC). The null hypothesis for Breusch-Godfrey Serial Correlation LM test is that there is no problem of serial correlation. The ARCH heteroscedasticity test assumes a null hypothesis of no problem of heteroscedasticity. The null hypothesis for Ramsey RESET test is that the model is correctly specified. Hence, the model is free from the problems of autocorrelation, and heteroscedasticity. In addition, the model is correctly specified and stable.

In general, the Duesenberry's relative income hypothesis in terms of demonstration and ratchet effects suggests that the proportion of consumption expenditure to income in the society remains constant in the long run. Quite simply, thanks to the demonstration effect, a rise in the level of income does not significantly increase the consumption-income ratio, while the ratchet effect

triggers the proportion of consumption to income not to decrease much with a fall in income. More importantly, in addressing the consumption puzzle (Keynes consumption function and Kuznets paradox), the presence of Duesenberry’s Demonstration and ratchet effect indicate a stable APC in the long-run. Figure 3 further provides a visual evidence for a roughly constant APC trend observed in Ethiopia over the study period.



5. Concluding Remarks

This study is a modest attempt to empirically test the Duesenberry’s demonstration and ratchet effects in Ethiopia using quarterly data over the past two decades. In doing so, two different specifications of relative income hypothesis are estimated with the help of ARDL estimation techniques. The results robustly indicate that demonstration effect happens to be valid and displays a backward-J pattern in Ethiopian context. The ratchet effect is also supported in the study implying the importance of past consumption patterns in current consumption behavior. Here, the consumption-income ratio is not likely to increase with a rise in income due to the demonstration effect while it does not significantly decrease with a decline in income as a result of ratchet effect. This makes the society’s average consumption expenditure stable in long run.

The presence of Duesenberry’s demonstration effect in backward J-curve pattern; the two forces tend to move in opposite direction. That is, Households with lower relative income have higher APCs, while households with higher income have lower APCs, which might be one reason for a

constant APC in long run. Hence, the traditional Duesenberry function which state consumption is a linear function of relative income should be replaced by a non-linear consumption function so as to capture the difference in APC trends for different relative income groups. Further, policy makers who want have Pareto efficient allocation of economic resources must watch carefully their policy prescriptions before Applying it. This is because in Society's like Ethiopia where the Demonstration effect happen to hold in a significant manner, an increase in income or tax cuts for different income groups might motivate households (specially low income groups) to gallop in to wasteful competition so as to 'keep up with the Joneses'.

In addition, following the significance of relative income and past peak consumption in determination of consumption, it is important to note that consumption not only depends on life time permanent income like Friedman and Modigliani stated in their Permanent and life cycle consumption hypothesis, respectively but also on the household relative income position in the society. Hence, neo-classical aggregate demand curve, the lateral summation of individual demand, states consumption behavior of an individual is independent of the consumption preferences others might be nullified.

Since the authors dealt with macro-economic data in this study, further micro economic analysis is required to verify the relevance of Duesenberry relative income hypothesis and to come up with appropriate aggregate consumption analysis based on interdependence of preferences.

Conflict of interests

The authors declare no competing interest.

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Figures

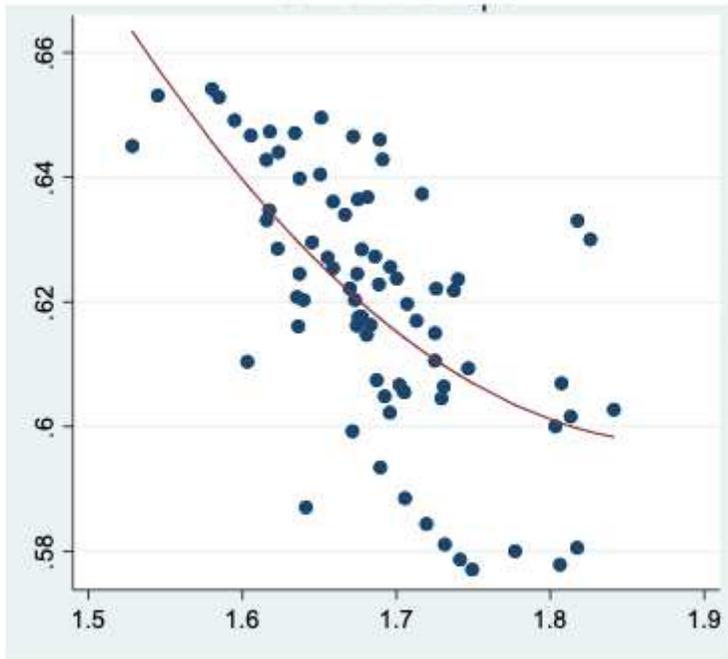


Figure 1

APC vs. Relative Income (Demonstration effect)

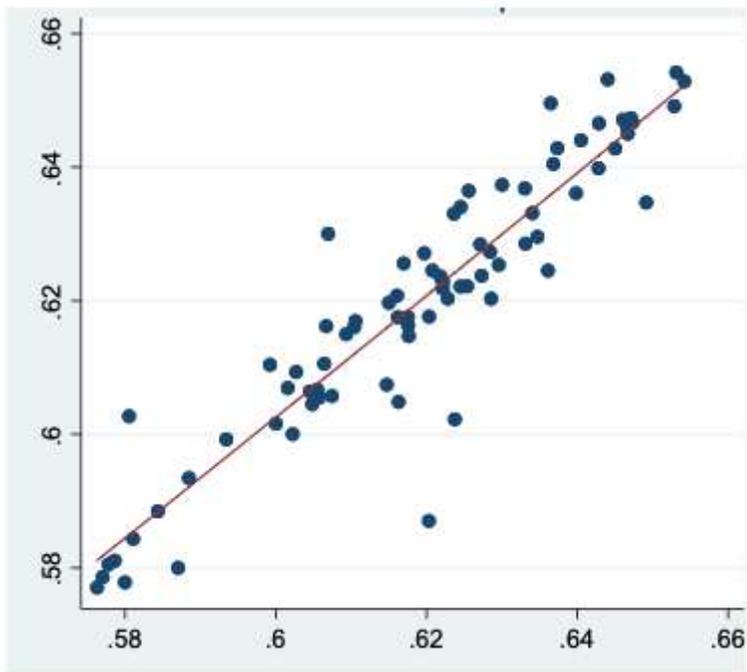


Figure 2

APC vs. Lag of APC (Ratchet Effect)

**Figure 3: Trends of APC in Ethiopia
(First Quarter of 1999/2000- Fourth Quarter of 2018/19)**

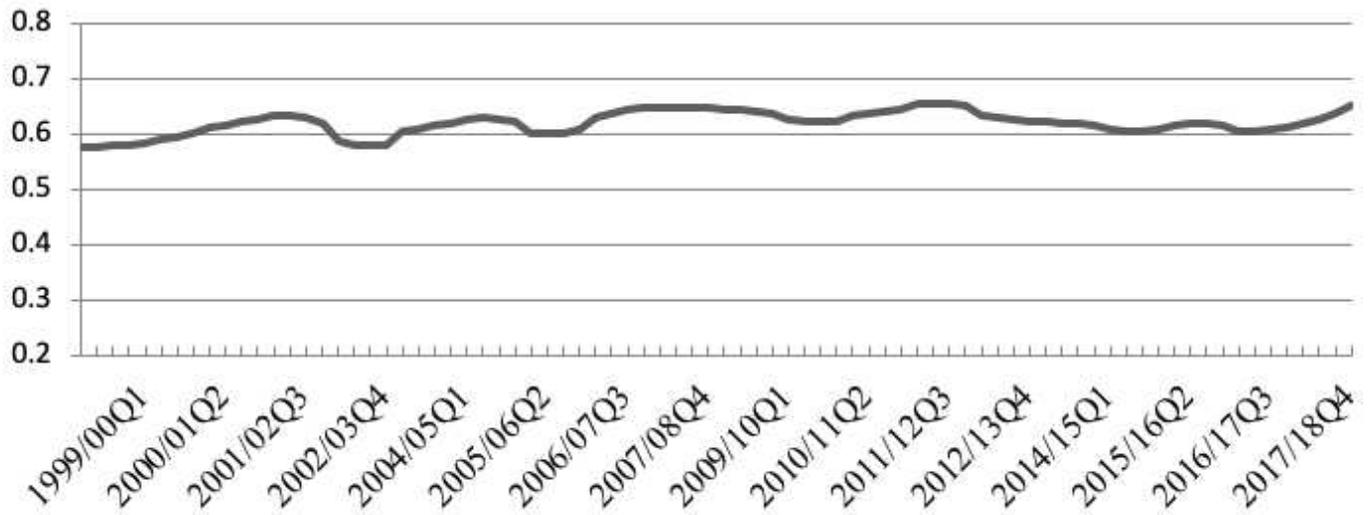


Figure 3

Trends of APC in Ethiopia (First Quarter of 1999/2000- Fourth Quarter of 2018/19)