Keeping up with the Joneses: macro-evidence on the relevance of Duesenberry’s relative income hypothesis in Ethiopia*

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Abstract
Despite being mysteriously ignored and displaced by mainstream consumption theories, Duesenberry’s relative income hypothesis appears to be highly relevant to modern societies where individuals are becoming increasingly obsessed with their social status. Accordingly, this study aims to provide some evidence on relative income hypothesis by investigating the relevance of Duesenberry’s demonstration and ratchet effects in Ethiopia using quarterly data from 1999/2000Q1 to 2018/19Q4. We estimate two specifications of the relative income hypothesis using the traditional Autoregressive Distributed Lag (ARDL) model and the dynamic ARDL simulations approach. The findings confirm a Backward-J-shaped demonstration effect, implying 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 groups). 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. Therefore, consumption-related policies should be carefully designed, as policies aimed at boosting aggregate demand can motivate low-income households to gallop into a wasteful competition to ‘keep up with the Joneses’—the relative riches.

Keywords Duesenberry’s demonstration and ratchet effects · Relative income · APC · Consumption puzzle · Dynamic ARDL simulation

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Introduction

The classical preposition, “Supply will create its own demand” played a key role in the determination of income and employment 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 great depression in the 1930s, which marked the importance of demand-side factors (like consumption) in determining income, interest rate, and employment level in a given economy, nullified the Classical myth. In particular, after World War II, consumption accounted for approximately two-thirds of global peacetime GDP. This turned the interest of many scholars and researchers in the theory of consumption (Palley 2008).

In his consumption function, Keynes (1936) also observed that the slope of propensity to consume tends to decline as income grows, and saving becomes the largest share of income growth. To put it another way, average consumption spending increases with income but less proportionately, implying that the average propensity to consume (APC) declines as income rises. Using long time series data for the US economy, Kuznets (1942) found that the Keynesian consumption function appears to be valid only in the short run. Quite simply, Kuznets proved that the APC remains stable in the long run rather than decreasing (Hamilton 2001; Alimi 2013).

Following the Keynes consumption theory and Kuznets paradox, different consumption theorists such as Modigliani and Brumberg (1954), Friedman in the 1950s, and Duesenberry (1949) attempted to reconcile the puzzle of short-run and long-run consumption functions. With the motive of making economics an exact science, mainstream economists such as Reid (1952), Modigliani and Brumberg (1954), and Friedman (1957), as well as their descendants tried to settle the consumption puzzle while ignoring the social and psychological dimensions of consumption. They simply stated consumption as a function of long-run average or permanent lifetime income rather than current income (Manson 2000; Frank 2005). The main implication of such mainstream thinking is that an individual’s consumption behavior is independent of the consumption preferences of others. As a result, an individual is the sole judge of his/her actions in making consumption decisions. In this sense, the heart of Neo-classical economics doctrine—the aggregate demand function which incorporates the consumption function is simply the lateral summation of individual demand curves. However, these teachings were not isolated in a vacuum and have been heavily criticized by heterodox economists like Veblen (1899) and Duesenberry (1949).

In contemporary society, where social status is a focus for everyone, and social arrangements have been broken down or nearly disappeared, acquiring something similar to his/her fellow neighbor has become the goal of a human being unless survival is in doubt. This is because an individual will feel worse off or less successful as his/her neighbor improves the quality of goods they own or consume. Hence, to conform to the status presented by the society or to be labelled “one of the boys”, an individual will try to “keep up with the Joneses” by increasing his consumption spending. This makes his consumption more stable in the long run, which is often referred to as Duesenberry’s demonstration effect.¹ In this sense, an individual consumption depends not only on his permanent income but also on his income relative to the average income in the society (relative income) (Duesenberry 1949; Leibenstein 1950; McCormick 1983). In his argument for the relative income

¹ It is relative income, not absolute one, which matters more for consumption decisions of an individual.
hypothesis, Duesenberry (1949) also stated that even when the individual’s income decreases, consumption remains stable rather than falling. This is known as Duesenberry’s Ratchet effect which arises from the demonstration effect in which people do not want to be seen consuming lower-quality goods than their neighbors.

Duesenberry’s relative income hypothesis seems quite relevant to modern societies where individuals are becoming increasingly obsessed with their social status—an individual’s behavior is primarily socially determined. Duesenberry’s conceptualization has also important implications for developing appropriate policy prescriptions or better predicting the effects of policy changes such as public provision taxes on wasteful spending races, tax cuts, and the Pareto implications of income growth (Frank 2005; Sanders 2010).

In this regard, some empirical works such as 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, Duesenberry’s work has received little attention in the existing literature as it has been mysteriously ignored and displaced by the mainstream consumption theories over the last 60–70 years. In particular, to our knowledge, no such study has ever been undertaken in Ethiopia although it is a country where the social bonds are very strong; the informal sector occupies about half of the total economy; asymmetric information persists, and hence, consumer rationality looks something ideal. In addition, the housing arrangements are so close that your neighbors can see whatever you are doing and, more importantly wedding ceremonies, birth day parties, and charity acts are performed to show one’s social status. This study, therefore, departs from this heinous mainstream neglect and makes a modest attempt to provide some macroeconomic evidence on whether the Duesenberry’s relative income hypothesis appears to be true in Ethiopian context using quarterly data over past last two decades.

**Brief Review of Literatures**

The 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 are naturally more concerned with their status relative to others. In contrast to Keynes’s absolute income hypothesis, Duesenberry’s relative income hypothesis incorporates habit formation (past consumption patterns) and social interdependence into the theory of consumption. In this regard, Duesenberry argued that the nature and patterns of individual consumption are highly influenced by the relative income effects, rather than absolute ones (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 that, central to his relative income hypothesis, the social character of consumption patterns should be fully recognized to understand the problem of consumer behavior (McCormick 2018).

Although Duesenberry’s relative income hypothesis had gained great popularity in the early 1950s, it was quickly marginalized and dominated by other consumption theories like Modigliani and Brumberg (1954) life cycle hypothesis and Freidman’s (1957) permanent income hypothesis, both of which stripped of social concerns of consumption.

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2 Past consumption patterns (habit formation) significantly determines an individual’s current consumption.
Furthermore, despite its overwhelming theoretical justification, Duesenberry’s theory of consumer behavior disappeared from modern economic textbooks that have often been 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 have recently been undertaken in different parts of the world with a focus on empirically testing the mainstream consumption theories, particularly Friedman’s (1957) Permanent income hypothesis. These studies have revealed mixed evidence. On the one hand, some studies such as Altunc and Aydin (2014) in eight members of Organization of Islamic Corporation over 1980–2010; Osei-Fosu et al. (2014) on the Ghanaian economy over 1970–2010 and Kelikume et al. (2017) on the 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 1970–1997; Paz (2006) and Gomes (2012) on the Brazilian economy, respectively, over 1991–2004 and 1947–2010; Gupta and Ziramba (2011) on US economy over 1947–2008; Khalid and Mohammed (2011) in Pakistan over 1971–2010 found out evidence inconsistent with the Miltonian proposition of permanent income hypothesis.

After the 1970s, however, some empirical works aroused a renewed interest in Duesenberry’s relative income hypothesis following some attempts 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). Further, Singh et al. (1978) tried to assess Duesenberry’s relative income hypothesis with different specifications in India (1952–1965), Canada (1951–1968), Netherlands (1950–1966), and West Germany (1951–1968). 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.

In addition, Parada and Mejia (2009) examined the Duesenberry’s demonstration effect in four Latin American countries (Mexico, Brazil, Argentina, and Colombia) from 1980 to 2005 using an autoregressive model, and a strong evidence of Duesenberry’s effect was observed only in the case of Colombia. Similarly, Alimi (2015), with the help of Cagan’s adaptive expectation model, revealed the existence of a long-run relationship between consumption and income for Nigeria and South Africa over 1980–2013. The study also indicates that Nigerian consumers are forward-looking (their consumption is based on future expected income), whereas consumption was influenced by past consumption patterns in the case of South Africa, supporting Duesenberry’s ratchet effect. In the Ethiopian context, Abebe (2006) used panel data of both urban and rural areas from 1994–2000 and confirmed that current consumption is correlated with household assets and past consumption.

In general, despite being neglected in mainstream economics for the last 60–70 years, empirical studies conducted in different parts of the world have indicated that Duesenberry’s idea of consumption seems to be 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, Bealu Girma.

“... The first woman asked “Did you see the villa our neighbor built with one hundred and fifty thousand Ethiopian Birr (ETB)? The car can enter her living room.” The other woman exclaimed, “Oh my dear!! Don’t rush to enjoy a pond before seeing the Nile River. My neighbor spent two hundred thousand ETB for his house and imported every piece of furniture from Italy. You may fall asleep while sitting on the
couch. His housework is so incredible. While sitting in the living room, you can see the garden outside. The bedroom? Oh my God! “is this a Paradise?” you may wonder. The third woman interrupted their conversation and said, “Have you seen my neighbor’s new automatic Mercedes? And, his BMW looks like 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 the Ethiopian context over the past two decades.

**Methodology**

**Type and source of data**

The study made use of quarterly data on consumption and income from the National Bank of Ethiopia (NBE) and the Ministry of Finance and Development (MoFED) from the first quarter of 1999/2000 to the fourth quarter of 2018/19. We converted the annual data to quarterly data using quadratic-match sum and average conversion methods for some variables that a quarterly data were not available.

**Theoretical framework**

Originally, Duesenberry stated in his book ‘*Income, Saving and the Theory of Consumption Behavior*’ that consumption depends not only on individuals income but also the income of his fellow neighbor, indicating the demonstration effect. In other words, consumers’ past peak income has 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 than its neighbors and vice versa—household’s consumption falls as relative income rises (Palley 2008). Hence, the original Duesenberry’s relative income hypothesis can be mathematically stated as follows;

\[
(C/Y)_t = \alpha + \beta \left(\frac{Y}{Y_0}\right)_t, \quad \beta < 0
\]  

where \( C, Y, \) and \( Y_0 \) denote real per capita consumption, real per capita disposable income, and previous peak of real per capita disposable income, respectively, in period \( t. \) \( \alpha \) and \( \beta \) are parameters to be estimated, and \( \beta \) represents Duesenberry’s demonstration effect.

Following Brown (1952) observation of lagged influences on consumer demand, Duesenberry et al. (1960) stated that individuals form habit persistence in consumption from past peak consumption even in times of a fall in income. As a result, individuals’ consumption pattern become rigid, and consumption function appears to be irreversible over time—reflecting Duesenberry’s ratchet effect. This resulted in 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:

\[
\left[(C/Y)_t^* - (C/Y)_{t-1}\right] = \gamma \left[(C/Y)_t^* - (C/Y)_{t-1}\right] = \gamma \left[\alpha + \beta \left(\frac{Y}{Y_0}\right)_t - (C/Y)_{t-1}\right]
\]

\[
\gamma = \alpha \gamma + \beta \gamma \left(\frac{Y}{Y_0}\right)_t - \gamma (C/Y)_{t-1}
\]
Now, rearranging Eq. (2) and defining $\alpha' = \alpha \gamma$, $\beta' = \beta \gamma$ and $\gamma' = 1 - \gamma$, the DEF specification becomes:

\[
(C/Y)_t = \alpha' + \beta' (Y/Y^0)_t + \gamma' (C/Y)_{t-1}
\]  

(3)

where $\beta'$ represents Duesenberry’s demonstration effect while $\gamma'$ denotes the ratchet effect.

Davis (1952), on the other hand, argued that households’ standard of living and their consumption habits are much more reflected by past peak consumption rather than past peak income. Moreover, in poor countries like Ethiopia where the informal economy takes more than half of the employment share, households are unwilling to reveal their income. Consequently, the Davis specification appears to be quite convincing and can be stated as follows, after substituting past peak consumption for past peak income:

\[
(C/Y)_t = \alpha + \beta (Y/C^0)_t, \quad \beta < 0
\]  

(4)

Applying the same Nerlovian “partial adjustment” model on Eq. (4) again, we obtain the Singh and Kumar (1971) SK specification of relative income hypothesis as:

\[
(C/Y)_t = \alpha' + \beta' (Y/C^0)_t + \gamma' (C/Y)_{t-1}
\]  

(5)

Similarly, $\beta'$ and $\gamma'$ represent Duesenberry’s demonstration and ratchet effects, respectively.

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

As pointed out in McCormick (2018), however, lower-income people remain under constant pressure to consume more, while people in higher-income groups feel less and less pressure to spend more as richer people have fewer encounters with people consuming better-quality goods. This reflects that richer people will save more proportion compared to their poor counterparts. In poor countries such as Ethiopia—where households with lower-income dominate the economy—APC is expected to be higher. This is because they (lower-income households) may be forced to spend their entire income on necessity goods. These arguments, in general, strongly suggest that 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 the demonstration effect varies across different levels of relative income. Accordingly, the DEF and Davis-SK specifications of the relative income hypothesis can be re-written 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 the lower segment of income groups.
Econometric method: ARDL model

The study used Autoregressive Distributed Lag (ARDL) regression model as a preferred econometric estimation model to empirically test the relevance of Duesenberry’s relative income hypothesis in Ethiopia. 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. The generalized ARDL \((p, q)\) model can be specified as:

\[
Y_t = \alpha_0 + \sum_{i=1}^p \delta_i Y_{t-i} + \sum_{i=0}^q \theta_i X_{t-i} + \epsilon_t
\]  

where \(p\) and \(q\) are lag of dependent \((Y_t)\) and independent variables \((Y_t)\), and \(\theta, \delta\) are coefficients of independent variables. Further, the model specified in Eq. (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 2018).

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

\[
\Delta Y_t = \alpha_0 - \varphi (Y_{t-1} - \beta_1 X_{t-1}) + \sum_{i=1}^{p-1} \delta_i \Delta Y_{t-i} + \sum_{i=0}^{q-1} \theta_i \Delta X_{t-i} + \epsilon_t
\]  

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, \(\beta_1 = \frac{\sum_{i=1}^{p} \delta_i}{\varphi}\), \(\delta_i\) and \(\theta_i\) represent the short-run coefficients of lagged dependent and independent variables, respectively. The highly significant error correction term with a negative sign indicates the existence of a stable long-run relationship.

Empirical results and discussion

Descriptive results

The summary of statistics of the variables considered in the study is provided in Table 1.

Average consumption for different relative income groups (Demonstration effect) and the relationship between current and past consumption (Ratchet effect) are demonstrated in Figs. 1 and 2, respectively. 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 is at a lower...
relative income position, his/her average consumption tends to be higher. Conversely, households having a higher relative income will have a lower average consumption. On the other hand, as shown in Fig. 2, average consumption has a positive and linear association with past peak consumption which is ascertained later by the econometric results.
Econometric results

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

Unit root test results

Performing a 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 the poor size and power properties. To overcome these limitations of the 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 Dicky-Fuller generalized least square(DF-GLS) test was performed to check the existence of unit root in each of the time series. The DF-GLS unit root test assumes

| Variables | Intercept | Intercept + trend | Order of integration |
|-----------|-----------|-------------------|----------------------|
| APC       | I(0)      | −0.807            | −2.226               | I(1)               |
|           | I(1)      | −3.801*           | −3.667**             |                     |
| Y/Yo      | I(0)      | −1.577            | −2.152               | I(1)               |
|           | I(1)      | −5.505*           | −5.633*              |                     |
| (Y/Yo)^2  | I(0)      | −1.597            | −2.164               | I(1)               |
|           | I(1)      | −5.500*           | −5.619*              |                     |
| Y/Co      | I(0)      | −2.664*           | −3.479**             | I(0)               |
|           | I(1)      | –                 | –                    |                     |
| (Y/Co)^2  | I(0)      | −2.665*           | −3.482**             | I(0)               |
|           | I(1)      | –                 | –                    |                     |
| ln (non-food price) | I(0) | −0.497            | −2.116               | I(1)               |
|           | I(1)      | −5.145*           | −5.446*              |                     |
| Real saving rate | I(0) | −2.205**          | −2.493               | I(1)               |
|           | I(1)      | −3.783*           | −4.012*              |                     |

* and ** denote statistical significance 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.
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. Note that we also checked for the possibility of structural break using Zivot-Andrews unit-root test. But, the test does not detect any structural break point in our data and thus there is no endogenously-identified structural break.

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 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.

ARDL estimations results

Table 4 displays the estimation results of the ARDL regression model for the two specifications of Duesenberry’s relative income hypothesis. As mentioned earlier in the theoretical framework, 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 Duesenberry’s ratchet effect. The coefficient of the error term is highly significant and negative, indicating the existence of a 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 strong
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. This reflects that an increase in relative income causes a steeper reduction in APC at lower-income groups, while APC tends to flatten at higher-income groups. The Duesenberry’s demonstration effect, in general, happens to be more pronounced 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. This reflects that an increase in relative income causes a steeper reduction in APC at lower-income groups, while APC tends 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 given that Ethiopia is a low-income country (see also Fig. 1).

Duesenberry’s ratchet effect In both DEF and Davis-SK specifications, the past peak consumption has a significant effect on the average consumption (as the first period lag of APC is significant and positive in both short- and long run). In this sense, the results support the Duesenberry’s ratchet effect 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).

Robustness checks: dynamic simulated ARDL model estimates

In this section, we applied the novel dynamic simulations of ARDL model—a newly proposed approach by Jordan and Philips (2018)—to check the robustness of our findings obtained from the conventional ARDL regression. Dynamic simulated ARDL model is a flexible approach that helps to mitigate the difficulties in the traditional ARDL models in interpreting the short run and long run effects of regressors due to their complex dynamic specifications (multiple lags, first differences, and lags of these differences). This novel approach was introduced to dynamically simulate the effects of a counterfactual changes in the regressors using stochastic simulation techniques (Jordan and Philips 2018).

As shown in Table 5, the results of dynamic simulated ARDL model are quite comparable to the results reported in the traditional ARDL model. In particular, the linear and quadratic coefficients of relative income have the expected signs in both short run and long run across DEF and S-K specifications, suggesting the existence of Duesenberry’s

| Table 5 Dynamic simulated ARDL results |
|---------------------------------------|
| DEF specification | S-K specification |
| Long run estimates | | |
| L.APC | 0.871* | 0.913* |
| Y/Yo | −2.759** | − |
| (Y/Yo)^2 | 1.337* | − |
| Y/Co | − | −0.926** |
| (Y/Co)^2 | − | 0.28** |
| Short run estimates | | |
| Δ (L. APC) | 0.426* | 0.71* |
| Δ (Y/Yo) | −2.913* | − |
| Δ (Y/Yo)^2 | 1.424* | − |
| Δ (Y/Co) | − | −1.846* |
| Δ (Y/Co)^2 | − | 0.561* |
| Pesaran et al. (2001) cointegration test | F-stat: 8.370 | F-stat: 10.83 |
| δR^2 [adj-R^2] | 0.914 [0.906] | 0.924 [0.917] |
| F-test [p-value] | 106.4 [0.000] | 122.01 [0.000] |

*, ** denote significance at 1% and 5% levels, respectively
demonstration effect with a Backward-J pattern. Similarly, the dynamic ARDL simulations results confirm the Duesenberry’s ratchet effect as the lag of APC is found to be significant with a positive short and long run coefficient.

On the other hand, the dynamic simulated ARDL approach generates a plot displaying the predicted effects of counterfactual shocks to each regressor on the dependent variable. In our case, plots in Fig. 3 show the predicted changes in APC as a result of a positive shock to relative income in the DEF and S-K specifications. As clearly depicted in Fig. 3, a + 1 shock to relative income appears to cause a steeper decline in APC in short run (in the first few years). After \( t > 10 \), however, the counterfactual shock in relative income has no significant effect on APC, particularly in the DEF specification. This implies that APC will not respond to changes in relative income and remain stable over time.
In general, in Duesenberry’s relative income hypothesis, the presence 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, due to the demonstration effect, a rise in the level of income does not significantly increase the consumption-income ratio, while the ratchet effect induces 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 existence of Duesenberry’s Demonstration and ratchet effect indicates a stable APC in the long run. Figure 4 further provides visual evidence for a roughly constant APC trend observed in Ethiopia over the study period.

Concluding remarks

This study is a modest attempt to empirically test Duesenberry’s demonstration and ratchet effects and provide some macroeconomic evidence on consumption in the Ethiopian context using quarterly data over the past two decades. In doing so, two different specifications of the relative income hypothesis are estimated with the help of traditional and dynamic simulated ARDL models. The study results robustly indicate that the demonstration effect is valid and displays a backward-J pattern. The findings also support the Duesenberry’s ratchet effect, suggesting the importance of past consumption patterns in current consumption behavior. Consequently, in the long run, the consumption-income ratio is unlikely to increase significantly 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 the ratchet effect. This makes society’s average consumption expenditure stable in long run. This is visualized in plots generated from dynamic ARDL simulations—APC does not appear to respond to the shocks in relative income over time.

Given the presence of Duesenberry’s demonstration effect in a backward J-curve pattern, the two forces tend to move in opposite directions. That is, households with lower relative income have higher APCs, while households with higher income have lower APCs, which could explain why APC remain constant in long run. Hence, the traditional Duesenberry function which states consumption is a linear function of relative income need to be replaced by a nonlinear consumption function so as to capture the differences in APC trends across different relative income groups. Furthermore, policymakers who want to have Pareto efficient allocation of economic resources must scrutinize carefully their policy prescriptions before implementing them. This is because, in societies where the Demonstration effect happens to hold significantly, an increase in income or tax cuts for different income groups may motivate households (especially in low-income groups) to gallop into a wasteful competition to ‘keep up with the Joneses’.

In addition, following the significance of relative income and past peak consumption in determining consumption, it is important to note that consumption depends not only on lifetime permanent income as Friedman and Modigliani stated in their Permanent and life cycle consumption hypothesis, but also on the household relative income position in the society. Hence, the neo-classical aggregate demand curve—that states that individual’s consumption behavior is independent of the consumption preferences others—need to be revised accordingly.
Finally, since the authors dealt with macro-economic data in this study, further micro-
economic analysis is required to validate the relevance of Duesenberry relative income
hypothesis and to develop appropriate aggregate consumption analysis based on the inter-
dependence of preferences.

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Declarations

Conflict of interest The authors declare no competing interest.

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