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Debt, Wealth, Income Distribution and Demand: A post-Keynesian Empirical Study on Turkiye

Borç, Servet, Gelir Dağılımı ve Talep: Türkiye Üzerine Post-Keynesyen Ampirik Bir Çalışma

Ozan Ekin KURT[1]

ABSTRACT

The aim of this article is to examine effects of wealth, personal income distribution, and households' and firms' debt stock on aggregate demand and its components in Türkiye and characterize its demand regime. For this purpose, we examined the Turkish economy over the 1988-2019 period within a post-Keynesian framework. Our findings suggested that the proxy variable for wealth has a small but positive effect on consumption, but no effect on investment. We observed that of four personal income distribution indicators employed in econometric investigations, only one of them had some minor effect on consumption but none of them had any significant effect on investment. Household debt, probably due to mortgages, turned out to have a positive effect on total investment expenditures, which also consists of newly constructed residences, but no effect on consumption expenditures. Our econometric estimations also pointed out that business debt has a negative effect on investment. The synthesis of findings suggested that the demand regime is profit-led in Türkiye. However, calculation of growth contributions of variables indicate that functional income distribution has a minor role, but wealth and debt variables have a major role in determination of aggregate demand.

Keywords: Post-Keynesian economics, Income distribution, Debts, Aggregate demand
JEL Classification: E11, E12, E21

[1]Assistant Professor, Yeditepe University, Faculty of Economics and Administrative Sciences Department of Economics, Istanbul, Turkiye

ORCID: O.E.K. 0000-0003-4943-5681

Corresponding author:
Ozan Ekin KURT,
Yeditepe University, Faculty of Economics and Administrative Sciences Department of Economics, Istanbul, Turkiye
E-mail: ozan.kurt@yeditepe.edu.tr, ozanekinkurt@gmail.com

ÖZ

Bu makalenin amacı Türkiye'de servet, kişisel gelir dağılımı ve hanehalkı ve şirket borç stoklarının bütünleşik talep ve bileşenlerinin üzerindeki etkisini incelemek ve ülkenin talep rejimini tespit etmektir. Bu amaçla Türkiye ekonomisinin 1988-2019 dönemini post-Keynesgil bir çerçeve içerisinde inceledik. Bulgularımız, servet için kullanılan vekil değişkenin tüketim üzerinde küçük ama pozitif bir etkisi olduğunu, lakin yatırım üzerinde bir etkisi olmadığını ortaya koydu. Ekonometrik analizde kullanılan dört kişisel gelir dağılımı göstergesinden

yalnızca birinin tüketim üzerinde çok küçük bir etkisi olduğunu ve hiçbirinin yatırım üzerinde istatistiksel olarak anlamlı bir etkisi olmadığını gözlemledik. Hanehalkı borçlarının muhtemelen ipotekler nedeniyle yeni yapılan gayrimenkulleri de içeren yatırım harcamaları üzerinde pozitif bir etkisi olduğu, fakat tüketim harcamaları üzerinde hiçbir etkisi olmadığı ortaya çıktı. Ekonometrik tahminlerimiz aynı zamanda işletme borçlarının yatırımlar üzerinde negatif bir etkisi olduğuna işaret etti. Bulgularımızın bireşimi Türkiye'de talep rejiminin kâr-çekişli olduğunu gösterdi. Ancak değişkenlerin büyümeye katkılarının hesabı, bütünleşik talebin belirlenmesinde fonksiyonel gelir dağılımının ikincil, servet ve borç değişkenlerinin ise birincil bir rolü olduğuna işaret etmektedir.

Anahtar kelimeler: Post-Keynesyen iktisat, Gelir dağılımı, Borçlar, Bütünleşik talep

JEL Sınıflaması: E11, E12, E21

1. Introduction

The role of income distribution in determination of aggregate demand and output is one of the central topics in the post-Keynesian stream of heterodox economics. The declining share of labor income in total production and the concomitant rising income and wealth inequalities during the last four decades contributed to the generation of immense theoretical and empirical research in this tradition. Following the 2007-09 economic and financial crisis, a vast empirical literature flourished that focused on the measurement and evolution of functional and personal distributions of income and their effects on output and accumulation in mature and emerging capitalist economies, including Turkiye. These developments went hand in hand with the process of liberalization and financialization of economies and the subsequent literature that emerged in this field. Different dimensions of financialization have been integrated into the post-Keynesian models and, consequently, empirical studies have also started to address them. Taking into account the developments in the Turkish economy in the neoliberal period, which are, despite its specificities, in general, in line with the trends in the global economy, the present study aims to analyze the effects of debt, wealth and personal income distribution on aggregate demand and determine the prevailing demand regime in Turkiye. For this purpose, we employed the post-Keynesian model by Stockhammer and Wildauer (2016), which is based on the seminal work of Bhaduri and Marglin (1990).

Post-Keynesian models of growth emphasize the function of labor income as a source of demand, whereas it is only considered a cost of production in the neoclassical theory. The Bhaduri-Marglin (1990) model addresses this dual role of labor income and asserts that it is possible that an increase in the labor's share in total income might lead to an increase or a decline in demand and output. If the former is the case, the demand regime is *wage-led*; otherwise, it is *profit-led*. Based on this analytical separation, the model has been extended in several directions during the last three decades. The main directions of extension, albeit not exhaustive, of this model are integration of savings out of wages, open economy issues, technical progress, the role of interest and credit, and financialization into

these models (Hein, 2014, Chapters 7-10).[1] Stockhammer and Wildauer (2016) developed this *workhorse* (Stockhammer, 2017) model of Bhaduri-Marglin and integrated wealth, debt, and personal income inequality measures. They employed this model to empirically examine a panel of 18 OECD countries and determined the characteristics of demand regimes and main drivers of growth in these countries.

The significance of the study by Stockhammer and Wildauer stems from the fact that it formalizes and extends the debt cycles of Minsky (2016[1978]) by integrating household debt and personal income distribution measures into a new model, and that it applies it to a panel of countries. Several post-Keynesian authors have already addressed the importance of Minsky's framework for the analysis of economic fluctuations and attempted to formalize and improve it. Fazzari, Ferri, and Greenberg (2008), based on Minskyan insights and within a Keynesian framework in which cash flows are endogenously determined, proposed a nonlinear model with an investment function that incorporates financial effects and a labor market that generates inflation from an expectations-augmented Philips curve and hysteresis. They ran simulations of their model in order to reveal its dynamic properties. Dymski (2010), though not proposing a formal model, examined the evolution of the institutional framework of the financial system and the mortgage market in the US from the 1970s until the burst of the 2007-09 global crisis. He showed the missing dimensions in Minsky's analysis, such as the impact of racial exclusion and cross-border remittances on financial dynamics and the differences between financial and non-financial institutions' balance sheets, and incorporated them into a new improved framework. Ryoo (2013) formalized and developed Minsky's approach through Kaleckian and Kaldorian channels. Recognizing the importance of household debt and mentioning its absence in their model, the author simulated both versions of his model and found that financial variables are crucial determinants of aggregate demand and decisive in generating cycles and instability. These studies, however,

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[1] Hein (2017) provides a review of important developments in post-Keynesian macroeconomics during the last three decades.

focused on improvement of the Minskyan theoretical framework and/or simulated the implied models by the latter but did not conduct econometric analysis on any country. Nishi (2012) examined the Japanese economy through a structural VAR (vector autoregression) model that established the relationship among income distribution, (business) debt ratio, and capital accumulation. This model distinguished between two axes: income distribution-capital accumulation axis, which might either be wage-led or profit-led, and debt-capital accumulation axis, which might either be debt-burdened or debt-led. Onaran, Stockhammer, and Grafl (2011), in their econometric analysis of the US economy, made two important changes in the post-Keynesian workhorse model. They distinguished between rentier income and non-rentier profits in consumption and investment functions and integrated households' net financial and wealth into the former. Stockhammer and Wildauer (2016) mentioned that this was the closest study to theirs, however, the role of personal income distribution was not addressed and only a single economy was analyzed in that study.

The evolution of income distribution and debt stock measures in Turkiye deserves to be discussed along with the political economy of developments since 1980s, which mark the beginning of the neoliberal era. The share of labor in total income in Turkiye has been declining despite some periods of temporary recovery (see Figure 1)[2] in this period. Personal income inequality measures and their interpretation require special attention and discussions on them are elaborated below (see Figure 2). Following the periodization of Boratav (2016), the neoliberal era can be examined under four phases: the coup of 1980 and the single party governments of ANAP (*Motherland Party*) during 1980-88, the capital account liberalization and revival of populism during 1989-1997, the IMF's return and the five lost years of 1998-2002, and the AKP's (*Justice and Development Party*) rule in the post-2002 period.[3] The debt measures on household and non-financial sector call attention in this last period (see Figure 3).

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[2] Onaran (2009) notes that the wage share series for the overall economy are not available before 1987 and the AMECO data is available from 1988 on. See the Appendix.
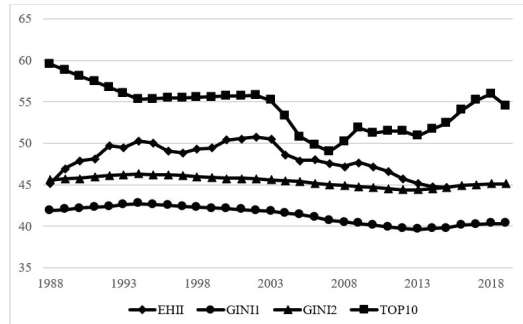
[3] For an examination of the Turkish economy before 1980, see Boratav (2018).

Figure 1. Adjusted wage share (% of GDP at factor cost) in Turkiye (1988-2019)
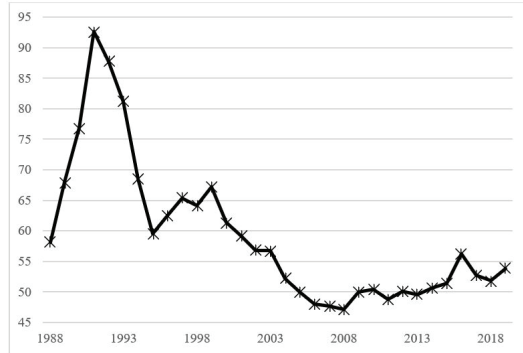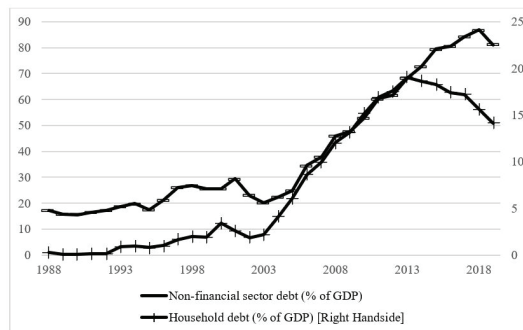

Source: See the Appendix.

Figure 2. Measures of personal income distribution in Turkiye (1988-2019)

Notes: An increase in the Gini indices (EHII, GINI1, and GINI2) means a more unequal degree of personal income distribution.
Source: See the Appendix.

Figure 3. Household and non-financial sector debt (% of GDP) in Turkiye (1988-2019)

Source: See the Appendix.

Following the economic "stabilization measures" decision of the then government in 1980 and the coup d'état that took place towards the end of the same year, a "complete (policy) shift" (Kepenek, 2011) was put into practice by abandoning ISI (import substituting industrialization) and implementing the neoliberal recipes of the IMF in Turkiye. The coup that was followed by a 3-year rule by the military regime was replaced by ANAP governments and Prime Minister Turgut Özal, who had served as the Deputy Prime Minister in charge of economic affairs of the military regime. This period can be further subdivided into three stages: the post-crisis adjustment between 1981 and 1982, the export-led growth period of 1983 to 1987, and the exhaustion in 1988 (Boratav, Yeldan and Köse, 2000). The economy was geared towards exports, with the aim of integration into global markets along with a regulated foreign exchange market and capital controls being maintained until 1989 (Boratav et al., 2000). However, the main "achievement" of this authoritarian period was suppressing wages through dismantling the organized labor and breaking its bargaining power. Over the 1979-88 period, the industrial wage share declined from 38% to 15% (Oyvat, 2011).

The revival of the labor movement, the capital account liberalization, and thus the declaration of the "convertibility" of the Turkish lira in 1989 marked the beginning of a second phase in the neoliberal era. This period can be divided into three subperiods: unregulated financial liberalization during the 1989-1993 period, the crisis in 1994, and the post-crisis adjustment period during 1995-97 (Boratav et al., 2000). A few years before and during the coalition governments period that reopened in 1991, the losses in the wage share were compensated for by the struggles of workers and unions[4] and the consequent pressure that led to implementation of "populist" policies by these governments. The capital account liberalization had increased the fragility of the Turkish economy and resulted in the burst of the 1994 crisis. Boratav (2016) states that the neoliberal recommendations of the IMF were not complied with in this period and indexation of wages provided some protection to vulnerable groups. However, this phase ended with the return of IMF in 1998. Although the hikes in the labor

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[4] See Arslan (2006) for a detailed account of the labor struggles in Turkiye during the 1989-95 period.

income share during the 1989-93 period could not be sustained after the 1994 crisis, a partial recovery was achieved until 1999.

The beginning of the third phase was also that of the "longest period under IMF surveillance" (Ekzen, 2016). The staff monitoring program signed with the IMF in 1998 was the first step in relations that would continue for a decade (Boratav, 2016). This period was prone to new crises that surfaced in November 2000 and February 2001 after the 1999 earthquake that had hit industrial regions of Turkiye. Akyüz and Boratav (2003) stated that the IMF program "plunged the economy into an unprecedented recession" in 2001 due to defects in its design and ignorance of lessons from other crises in emerging markets. Following the 2001 crisis, a new program that is based on IMF directives was accepted and Kemal Derviş, a World Bank economist-cum-Minister of Economic Affairs of Turkiye, started to apply it. This program, which had been baptized "Transition to the Strong Economy Program," continued under the AKP rule that replaced the then triple coalition government after the November 2002 snap parliamentary election. The labor income share that recovered during the 1990s turned back its previous levels and a steady decline period started and continued during the next phase.

The fourth phase has completed its two decades under the rule of the single party governments of the AKP and continues. Boratav (2018) divided this period into two subperiods: 2003-07 and after.[5] The first subperiod was characterized by high capital flows to peripheral countries. In 2005 a new credit agreement was signed with IMF and the fiscal policy recommendations of the latter were followed (Boratav, 2016). The overrated[6] growth performance of the economy in this

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[5] He refers to the former period as the *Tulip Era*, which is also the name of the period from 1718 to 1730 during the rule of the Ottoman Empire. The tulip was a symbol of "both conspicuous consumption and cross-cultural borrowings" (Quataert, 2005, p. 44).

[6] Cömert, Çelik, and Şengül (2022), though not taking into account income or wealth distribution measures, meticulously examined the macroeconomic performance of Turkiye by focusing on growth, unemployment, inflation, public and external debt measures, foreign reserves, current account, and financial flows in comparison with a set of 25 similar countries for the 2002-20 period. They underlined that the Turkish economy was only above the median of the sample for growth, public debt, and financial flows over this period. The average public debt ratio (54%) was even larger than the median rate of the sample (42%) in the Tulip Era of 2002-07.

period, with an average rate of more than 7%, was actually due to the utilization of the excess capacity that emerged during the 1998-2002 period and capital inflows (Boratav, 2016). The decline in the labor share of income continued in this period. We do not opt for further periodization of the second period of this last phase; however, the economic milestones of the post-2007 period have been the 2008-09 global economic and financial crisis and the 2018 currency crisis until the burst of the COVID crisis in 2020.[7] The Turkish economy contracted by around 2% during the 2008-09 period, however, during the recovery period of 2010-13 the average growth rate amounted to more than 8% but dropped to an average of 4% over the 2014-20 period (Cömert et al., 2022)[8]. Labor's share in income fell to its lowest rate of 47% in 2008 and recovered in 2009 by around 3%. It fluctuated around 50% until 2016, when a temporary hike of 5% was observed in 2016, however, a downward trend has been continuing since then. The latest available data by AMECO for 2021 was even lower than 47%. Boratav (2022) stressed that unions and working-class organizations lost their power during the AKP years to such an extent that, contrary to the 1990s, their capacity to prevent losses in labor income vanished. Consequently, distributional dynamics have passed under the control of the monetary authority, the banking system, and non-financial companies to which cheap loans flowed (p.10).

The rising indebtedness of households and firms has been another important phenomenon in the world during the neoliberal era and in Turkiye, especially during the AKP years. We observe that the debt to GDP ratios of households and firms were almost constant until the early 1990s and increased at a very slow pace until the crises of 2000 and 2001. However, since 2003 these two ratios have been growing at much higher rates. The household debt-ratio started to decline after 2013, however, firms' indebtedness continued to increase until the 2018 currency crisis. The increasing amounts of consumer loans of households and

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[7] Since the sample period of the econometric analysis does not cover the post-COVID period, we confine our discussions to the developments before this period.

[8] Cömert et al. (2022) underlined that this was due to the use of new and highly criticized national income series which were adopted by TURKSTAT (Turkish Statistical Institute) in late 2016. Boratav et al. (2018) discuss problems of these new series.

underlying reasons have been addressed by Karaçimen (2014). She pointed at the declining incomes of households on the demand side and banks' orientation towards consumer lending due to intensifying neoliberal integration into world markets on the supply side. Orhangazi and Yeldan (2021) related the rising debt ratios in the 2000s to the increase in capital inflows, which led to expansion of domestic credits through two channels (p.475). First, capital inflows brought about an increase in asset prices, which served as collaterals receiving higher amounts of credits. The decline in the borrowing rates of households and firms also owe to this mechanism. Second, an important fraction of the capital inflows was transformed into domestic credits by banks. Housing loans constituted an important share within the banking sector credits. The share of loans for housing was less than 1% of GDP before 2004 and increased to around 6% in 2013 (Erol, 2019, p. 256). In 2004 the quantity of outstanding loans for housing, along with personal loans, outstripped that of car loans in Turkiye and over the 2005-2014 period the share of housing loans in total consumer loans fluctuated between 44 and 49% (ibid, p. 258). However, according to the quarterly *Turkish Banking Sector Main Indicators* reports issued by the BRSA (2017-2022), this share declined from 40% to 30% during the September 2017-March 2022 period.

As stated above, the trends in personal income inequality measures in Figure 2 must be interpreted with caution. The income share of the richest 10% in total income decreased until the 2007-09 crisis, however, it has been increasing since then. A similar trend is also observed for the top 1% share (Orhangazi and Yeldan, 2021, p.486). Of the three different measures of the Gini coefficient, *EHII* (Estimated Household Income Inequality) was steady during 1990s and it has been decreasing since 2003. The other two measures ($GINI_1$, which is based on household disposable income after taxes and transfers, and $GINI_2$, which is based on household disposable income before taxes and transfers) indicate a slow downward trend, which seems to move upwards towards more inequality after 2013. However, these figures and trends must be interpreted cautiously since serious problems with the calculation of the top income shares and Gini coefficients were addressed in the literature. Vermeulen (2018) showed that the samples used for calculating the wealth distributions were biased and

underestimated inequalities due to exclusion of extreme observations. The inclusion of individuals in the Forbes World's billionaires list significantly alters the picture and points at the real extent of inequalities. It goes without saying that the arguments for the distribution of wealth, a stock variable, inevitably apply to that of income, a flow variable. Duman (2015), cited in BSB (2015, p. 116-9), pointed at the problems with the Turkish data, recalculated the Gini index and showed that had the top 1% income distribution followed the distribution of the billionaires in the Forbes Turkiye list, the Gini index would have been 10% higher. Another criticism of the Gini index for Turkiye was put forward by Onaran and Oyvat (2016), who, according to their calculations based on TURKSTAT data, stated that 60% to 67% of total income in Turkiye over the 2002-13 period were not taken into account by the surveys conducted by this institution.[9] Despite the problems with the data, they noted that increases in transfer payments played a role in the decline in the Gini index. They also argued that redistribution of income towards poorer has been achieved through the decline in the income shares of organized blue-collar and white-collar/professional workers, thus top income shares increased without putting the burden on the poorest. They noted that over the 2006-13 period, income shares of the top 20% and the bottom 40% of households increased, while that of the middle 40% declined (p. 293-4).

The empirical studies conducted in the post-Keynesian tradition on Turkiye so far have not taken into account the roles of wealth, personal income distribution and debt in determination of the aggregate demand and its components and characterization of the country's demand regime. Given the economic developments in Turkiye during the last four decades, the model by Stockhammer and Wildauer proposes a more suitable framework within the post-Keynesian paradigm for the analysis of the Turkish economy.

In order to estimate this model, we adopted an empirical strategy that estimates the parameters of the model through single (separate) equations. We initially determined the stationarity properties of the time series employed, then

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[9] $GINI_1$ and $GINI_2$ are partially based on the data provided by TURKSTAT. See the Appendix for the data.

tested existence of cointegration among them and if there was no sign of the latter, we estimated difference equations.

The remaining part of the article is organized as follows. The following section presents the post-Keynesian model by Stockhammer and Wildauer (2016), on which our empirical analysis is based. The third section provides a review of related empirical studies in the literature. The fourth section presents data and the econometric approach. The fifth section presents econometric findings and synthesizes them. The sixth and final section provides a conclusion.

2. Theoretical Model

We present the model by Stockhammer and Wildauer (2016) in this section. This open economy model decomposes the aggregate demand (or income) (Y) into its components as follows:

$$Y = C + I + X - M \tag{1}$$

where C is private consumption, I is investment expenditures, X is exports, and M is imports[10]. Government expenditures are not included in the model.
The consumption function is as follows:

$$C = C(Y, WS, Q, WH, WF, DH, \Delta DH)$$

$$\text{with } \frac{\partial C}{\partial Y}, \frac{\partial C}{\partial WS}, \frac{\partial C}{\partial WH}, \frac{\partial C}{\partial WF}, \frac{\partial C}{\partial \Delta DH} > 0, \frac{\partial C}{\partial DH} < 0, \frac{\partial C}{\partial Q} = ? \tag{2}$$

where WS is the wage share[11], Q is a measure of personal income inequality, WH is housing wealth, WF is financial wealth, and DH is household debt. All else being equal, a higher level of income leads to a higher level of aggregate consumption. An increase in the wage share has a positive effect on consumption since the marginal propensity to consume out of wages, or in a more general sense, labor income is higher than that of capital income (including rents, dividends and

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[10] Stockhammer and Wildauer (2016) treated exports and imports together as net exports (NX) in the theoretical part, however, they estimated the export and import functions separately in the empirical part. We opted for presenting these two components separately from the outset.

[11] The wage share series employed in the empirical analysis is adjusted to include other labor income such as those of the self-employed along with wages. In the literature this adjusted measure is called *adjusted wage share* or *adjusted labor (income) share*.

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interests) at a given income level[12] (Stockhammer and Wildauer, 2016). These are standard assumptions in post-Keynesian models.

The novelty of the model by Stockhammer and Wildauer (2016) is that they incorporated the effects of personal income inequality, household debt, and wealth on consumption. They argue that personal income inequality is pertinent to this function for two reasons. First, since average and marginal propensities to consume differ in size across income groups, a more unequal personal income inequality should have a negative impact on consumption. Second, a counter-effect might also be relevant if households imitate the consumption behavior of those who have higher levels of income compared to theirs. In the literature, the latter effect is referred to as conspicuous consumption or consumption cascades[13]. This effect was integrated into several empirical studies in the literature (Stockhammer and Wildauer, 2016).

Stockhammer and Wildauer (2016) evaluated different hypotheses pointing in opposite directions on the effects of household debt and wealth on aggregate consumption. They argue that household debt might positively affect consumption since it is a source of finance, however, it might also decrease consumption since it brings servicing costs (interest payments). The authors distinguished between the effects of level of and change in debt stock on consumption and concluded that the overall effect cannot be known before empirical investigation. As for the household wealth, addressing the discussions in the literature they made a distinction between housing wealth and financial wealth. The mainstream hypothesis is that it is the net wealth that affects consumption, which takes into account household debt stock. The authors address another hypothesis based on the views of Hyman Minsky, who stressed the positive impact of rising asset prices on firms' borrowing. Adopting this

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[12] In some empirical studies (e.g., Stockhammer, Onaran, and Ederer, 2009, among others) labor and capital incomes enter separately into the consumption function in order to estimate their respective marginal propensities to consume.

[13] The famous idiom "keeping up with the Joneses" is also used to refer to this effect in the literature. Stockhammer and Wildauer (2016) drew their framework from the earlier studies of Duesenberry (1949), Frank (1985), and Frank, Levine, and Dijk (2014).

approach to household behavior, they argue that rising housing wealth of households leads to easier borrowing for consumption. Finally, they state that housing wealth serves as important collateral for obtaining consumer loans and expect that the positive impact of an increase in housing wealth on consumption is stronger compared to that of financial wealth on consumption.

The investment function is:

$$I = I(Y, WS, i, Q, WH, WF, DH, DB)$$

$$\text{with } \frac{\partial I}{\partial Y}, \frac{\partial I}{\partial WF}, \frac{\partial I}{\partial \Delta DH} > 0, \frac{\partial I}{\partial i}, \frac{\partial I}{\partial DB}, \frac{\partial I}{\partial DH} < 0, \frac{\partial I}{\partial WS}, \frac{\partial I}{\partial Q}, \frac{\partial I}{\partial WH} = ? \tag{3}$$

where *i* is the long-term real interest rate and DB the business debt stock. An increase in the former leads to higher cost of borrowing and thus, all else being equal, discourages investment. Increasing business debt stock is expected to decrease investment, however, accelerating debt accumulation is hypothesized to have a positive effect on it. A higher level of income boosts investment. In the standard workhorse model, increasing the wage share is expected to have a negative effect on investment due to lowering profitability, however, distinguishing between residential investment and business investment, Stockhammer and Wildauer (2016) pointed at three issues. First, they argue that although business investment is expected to be negatively influenced by the wage share, the latter might increase the residential investment if the wage income is spent for this purpose. This effect renders the net effect of the wage share on total (business and residential) investment ambiguous. Second, since the conspicuous consumption argument also applies to residential investment, the implied effect is also expected to manifest itself in the investment function. In other words, the ambiguity of the effect of personal income inequality applies to the investment function, as well. Third, rising property prices are assumed to increase the cost of residential investment and this might have a negative impact on investment, however, higher property prices might also increase the probability of receiving credits. Since this might positively affect residential investment, the overall effect of housing wealth on investment is not known *a priori*.

The exports and imports functions are as follows, respectively:

$$X = X(Y^f, WS, EX, WH)$$
$$\text{with } \frac{\partial X}{\partial Y^f} > 0, \ \frac{\partial X}{\partial WS}, \frac{\partial X}{\partial EX}, \frac{\partial X}{\partial WH} < 0 \tag{4}$$

$$M = X(Y, WS, EX, WH)$$
$$\text{with } \frac{\partial M}{\partial Y}, \frac{\partial M}{\partial WS}, \frac{\partial M}{\partial EX}, \frac{\partial M}{\partial WH} > 0 \tag{5}$$

where Y^f is a measure of foreign demand and EX is the nominal effective exchange rate[14]. A higher foreign demand is expected to stimulate exports while a higher domestic income is expected to boost imports. An increase in the wage share is expected to have a negative impact on competitiveness through prices on (net) exports. The nominal exchange rate is also expected to have a negative effect on net exports under usual assumptions. In the literature, exports and imports (or net exports) functions are modelled along with auxiliary price equations in some studies (see e.g., Stockhammer et al., 2009; Jetin and Kurt, 2016), however, Stockhammer and Wildauer (2016) kept the model simple and focused on the effects of personal income inequality, debt, and wealth. Higher housing wealth, induced by rising property prices, is expected to increase domestic prices and have a negative impact on net exports.

The equilibrium level of income (or output) (Y*) is obtained by substitution of equations 2-5 into equation 1. Differentiation of Y* with respect to WS gives the following expression:

$$\frac{dY}{dWS} = \frac{f_1}{1-f_2} \tag{6}$$

where and , since is nil in the latter. captures the impact of a change in the functional distribution of income at its given level and is termed "private excess demand" in the literature. If it is positive, the demand regime of a country is wage-led, otherwise it is profit-led. is the multiplier that gives the impact of an increase in the wage share on output. The denominator of this expression must be positive for stability.

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[14] An increase in this variable implies appreciation of domestic currency.

3. Review of Empirical Research

In this section we provide a review of studies related to our empirical analysis. Our review does not aim to be exhaustive and surveys the related post-Keynesian empirical literature under three groups. The categorization is based on the use of different econometric methodologies for the characterization of the demand or accumulation regimes in a single or a group of countries. We address all the studies conducted so far in this tradition on the Turkish economy.

The first group of empirical studies estimates single equations for each component of aggregate demand and some of them are accompanied by auxiliary price equations. The pioneer empirical study in this vein by Bowles and Boyer (1995) examined the demand regimes of France, Germany, Japan, the UK, and the US. Hein and Vogel (2008) analyzed Austria, France, Germany, the Netherlands, the UK, and the United States. Stockhammer et al. (2009) studied the Eurozone as a single economic area and found the demand regime to be wage-led. Onaran et al. (2011), as mentioned above, analyzed the US economy and found it to be moderately wage-led along with positive effects of rentier income and wealth on consumption but negative effects of rentier income on investment. During the last decade, empirical studies have covered emerging economies, as well. Among these studies, Molero-Simarro (2015) and Jetin and Ortiz (2020), Jetin and Kurt (2016), and Kohli (2018) conducted empirical analyses on China, Thailand, and India, respectively. An empirical literature on Turkiye has also flourished in this period. Onaran and Galanis (2014) analyzed the majority of G20 countries, including Turkiye. In their study, instead of analyzing economies in isolation, they performed an empirical analysis that integrated global interactions among economies. This study concluded that the global demand regime is wage-led. The Turkish economy was found to be wage-led in isolation; furthermore, the global effects rendered it even more wage-led. While Bölükoğlu (2019) confirmed the prevalence of a wage-led demand regime in Turkiye, Yılmaz's (2015) findings pointed out a profit-led economy. In the literature, the majority of the post-Keynesian empirical studies examined demand regimes, however, Kurt (2020, 2021), based on the theoretical model of Hein and Tarassow (2010), analyzed

demand and productivity regimes together in Turkiye and the US, respectively. The author found that the demand regime in the former is wage-led, nevertheless taking into account that the productivity regime renders the economy unstable. Both the demand regime and the endogenous productivity-augmented *overall* regime are found to be unstable in the US.

The second group of studies adopt a systems approach and employ VAR models. In these studies, some hypotheses on demand, capital accumulation, and capacity utilization were simultaneously tested. Stockhammer and Onaran (2004) conducted an empirical study on France, the UK, and the US. Onaran and Stockhammer (2005) studied South Korea and Turkiye and found that the demand and accumulation regimes are wage-led in these countries. Barbosa-Filho and Taylor (2006) estimated a Goodwinian model on the US and found it to have a profit-led demand regime. Nishi (2012), as mentioned above, examined the Japanese economy through a structural VAR model and found the distribution-capital accumulation pattern to be profit-led and the debt-capital accumulation pattern to be debt-burdened. Kim, Setterfield, and Mei (2015) integrated household borrowing, wealth, debt burden, and consumer sentiment into the Keynesian consumption function for the analysis of the US economy, though they did not attempt to determine the character of the demand regime. Using VEC (Vector Error-Correction) and DOLS (Dynamic Ordinary Least Squares) methods, they found evidence for the impact of household borrowing and debt burden on consumption in the US. Carvalho and Rezai (2016) developed a model by integrating the effect of size distribution of income among workers on their savings and thus on the character of the demand regime. The authors' findings suggest that the increase in income inequality during the post-1980 period rendered the US economy more profit-led.

The two methods applied discussed above come with their own advantages and drawbacks. The first group of studies are based on exogenous distribution of income, and this inevitably raises questions about endogeneity and the dynamic relationship between distribution and growth. Use of instrumental variables is one potential remedy to this problem. Blecker, Cauver, and Kim (2022), for

instance, employed a number of strikes in order to endogenize unit labor costs, however such measures are not systematically available for all economies, as in the case of Turkiye. Use of lagged distributional variables, which is independent from current output, might alleviate this problem, as in our econometric analysis[15]. In VAR models, where past values of all variables are allowed to influence the present value of all other variables, these problems might partially be solved. However, its drawback is the difficulty of identification of effects of individual variables (Stockhammer and Ederer, 2008).

The third category of empirical research is based on panel data. Hartwig (2014) examined the demand and productivity regime in OECD countries and found the former to be "(slightly) wage-led" and the latter wage-led. The empirical analysis by Kiefer and Rada (2015) falls into both the second and third categories. The authors analyzed a panel of 13 OECD countries by estimating a Goodwinian model using the VAR method and found that the demand is weakly profit-led in these countries. We address the findings of the study by Stockhammer and Wildauer (2016) on OECD countries, in comparison with our findings on Turkiye in the fifth section.

4. Data and Econometric Methodology

In this section, we present data issues and econometric methodology employed in the estimations of the model equations.

We collected and compiled data from different sources in order to estimate the model for Turkiye. The sources and definitions of the data are presented in the Appendix. Since the wage share series for Turkiye start in 1988, the sample is delimited. Stockhammer and Wildauer (2016) employed stock price and real property indices as proxies for financial wealth and housing wealth of households, respectively. The stock price index is available for the sample period; however, the real property price is only available for the post-2010 period. The real long term

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[15] We employed both current and lagged distribution variables in the econometric analyses.

interest rate is only available for the post-2005 period. Consequently, we could not employ these two variables in our analysis since inclusion of any of them in the regressions would have reduced the number of observations to an insufficient level.[16] In order to check for the robustness of estimations of the consumption and investment equations, we employed four different measures of personal income inequality. Of those, three of them are Gini indices ($EHII$, $GINI_1$, and $GINI_2$) and the other is the income share of the richest 10% in total income ($TOP10$). In these regressions the series $EHII$, and $GINI_1$ and $GINI_2$ delimit the end of the sample to years 2015 and 2019, respectively. Due to unavailability of the Gini indices after the year 2019 and for consistency and comparability of the parameters of alternative estimations, we had to restrict our analysis to the 1988-2019 period.[17]

At the initial step of the econometric analysis, we applied ADF (Augmented Dickey–Fuller), KPSS (Kwiatkowski–Phillips–Schmidt–Shin), and PP (Phillips-Perron) unit root tests to the time series (in logarithm form) in order to determine their stationarity properties[18]. All three tests indicate that the series WS, Y, C, M, DH, DB, EHII, Y_f, $GINI_1$, TOP10 are integrated of order 1, i.e. I(1), whereas the series SP turned out to be I(0). The series and $GINI_2$ are I(1) according to the ADF and PP tests, but I(0) according to the KPSS test. The series EX is I(0) according to the ADF test and I(1) according to the two other tests[19]. We opted for treating these latter three series as I(1) in our estimations. At the next step we tested for cointegration among the series in each equation using Pesaran, Shin, and Smith's (2001) "Bounds test." This method is especially relevant for regression equations which consist of both I(0) and I(1) or variables whose order of integration is not certain but either I(0) or I(1). Since we could not find any (strong) signs of cointegration, we estimated all equations in the logarithmic difference form of the series.[20]

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[16] It should also be noted that interest rates usually turned out to be insignificant in the investment equations in the empirical literature. See Hein and Vogel, 2008; Stockhammer et al., 2009; Molero-Simarro, 2015, among others.

[17] This has indirectly led to exclusion of effects of the COVID crisis on the Turkish economy. Summary statistics of the variables are presented in the Appendix.

[18] The unit root tests are available on request. We did not test for structural breaks due to the limited sample size.

[19] This series is I(1) at 5% according to the KPSS test at and marginally I(1) at 10% according to the PP test.

[20] Critical values calculated by Narayan (2005) are used for the evaluation of the F-test and the asymptotic ones

After conducting the estimations, we made a diagnosis check for the regressions using standard tests for autocorrelation (LM test), heteroskedasticity (White and ARCH tests), adequacy of specification (RESET test) and parameter stability (CUSUM test). The null hypotheses of the LM test for autocorrelation is that there is no autocorrelation up to a selected order, of White's heteroskedasticity test is that there is no heteroskedasticity, of the ARCH test is that there is no autoregressive conditional heteroskedasticity, of the CUSUM test is that parameters are stable, and of the RESET test is that specification is adequate. When error terms or specifications failed to pass these diagnosis checks, we re-estimated the equations by including lags of some variables into regressions.

5. Econometric Estimations and Synthesis of Findings

This section presents the results of our estimations of the model equations. We evaluate our findings in comparison to those of Stockhammer and Wildauer (2016) for the OECD countries.

5.1. Consumption

We estimated four specifications of the consumption function employing the four measures of personal income inequality[21]. Our findings are presented in Table 1.

The econometric findings point out that the income elasticity of consumption lies within the interval of 0.93-0.98 for the Turkish economy. These coefficients are considerably higher than the ones estimated by Stockhammer and Wildauer (2016) for the OECD countries, which lie between 0.71 and 0.81. The direct effect of the wage share on consumption, however, turned out to be smaller in size for Turkiye. While the related coefficient is between 0.06 and 0.11 in Turkiye, it is around 0.15 in the average OECD country. Household debt does not seem to

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by Pesaran et al. (2001) for that of the t-test. The cointegration tests are available on request.

[21] In other words, specifications 1 to 4 separately employ the variables *EHII*, *GINI*$_1$, *GINI*$_2$, and *TOP10*, respectively. The same applies to the investment equation in the next subsection.

Table 1: Estimation Results for the Consumption Function

Dependent variable: ∆lnC	Specifications							
	1		2		3		4	
Regressors	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	0.00	0.64	0.00	0.00	0.00	0.14	0.01*	1.82
∆lnY	0.94***	17.23	0.95***	21.97	0.93***	22.14	0.98***	14.77
∆lnY(-1)							-0.11	-1.64
∆lnWS	0.06*	2.03	0.09***	4.22	0.11***	3.75	0.08*	1.88
∆lnWS(-1)	0.05	1.64	0.03	0.98	0.03	0.88	0.02	0.53
∆lnDH	0.00**	-2.17	0.00	0.03	0.00	0.38	0.00	-0.42
∆lnSP	0.02***	5.31	0.02***	3.87	0.02***	3.85	0.02***	3.62
∆lnSP(-1)	0.01**	2.89	0.01	0.14	0.01	1.21		
∆lnEHII	-0.27*	-1.76						
∆lnEHII(-1)	0.49***	4.89						
∆lnGINI1			0.14	0.14				
∆lnGINI1(-1)			-0.23	-0.23				
∆lnGINI2					-1.20	-0.68		
∆lnGINI2(-1)					0.60	0.39		
∆lnTOP10							0.02	0.15
∆lnTOP10(-1)							0.00	-0.01
Diagnostics								
R2	0.96		0.93		0.93		0.92	
Adjusted R2	0.94		0.91		0.91		0.88	
F Test	0.00		0.00		0.00		0.00	
LM test for autocorrelation	0.72		0.48		0.63		0.79	
White's test for heteroskedasticity	0.76		0.76		0.67		0.52	
Test for ARCH of order 1	0.99		0.62		0.58		0.98	
RESET test for specification	0.28		0.11		0.09		0.07	
CUSUM test for parameter stability	0.74		0.46		0.31		0.28	
Number of observations	26		30		30		32	

Notes: ***, ** and * represent 1%, 5% and 10% significance levels, respectively. The numbers for the tests are p-values.
Source: Author's work

be a determinant of consumption according to the four specifications, whereas it is significant in Stockhammer and Wildauer's study. However, stock price index, as a proxy for household wealth, turned out to have a positive but small impact on consumption in the Turkish economy, whereas it is insignificant for the average

OECD country. Of the four measures of personal income distribution, only EHII is significant and has a positive impact on consumption in Turkiye, when both the contemporaneous and lagged effects are evaluated together. This finding suggests that the conspicuous consumption effect might prevail in Turkiye, however, it is not robust across different measures of personal income distribution. In the average OECD country, personal income inequality has no significant effect on consumption.

5.2. Investment

As in the estimation of the consumption function, we estimated four specifications of the investment function. The findings are presented in Table 2.

The results of the estimations reveal that the constant in the investment function is significant and negative but small in absolute value, which is indicative of investors' negative animal spirits. The income elasticity of investment lies within the interval of 2.61-3.16 in Turkiye and it is significantly higher than that of the average OECD country in Stockhammer and Wildauer's (2016) study. The wage share turned out to have no effect on investment even though there is a weak sign of the significance of the contemporaneous (positive) effect in two of the specifications. However, the hypothesis that the sum of the contemporaneous and the lagged effects of the wage share on investment is not different than zero is not rejected at at least 5% significance level across the four specifications. Stockhammer and Wildauer emphasized that it was not assured the wage share had a negative effect on investment since they found positive effects in some of the specifications that they estimated. In the Turkish economy, household debt has a modest but positive effect on investment with an elasticity between 0.08 and 0.14, which contrasts with Stockhammer and Wildauer's findings on the average OECD country. In line with the arguments of the latter authors, it might be the case that household borrowing leads to higher levels of housing investment in Turkiye. The important share of housing in total consumer loans, mentioned above, and the fact that the share of construction constitutes more than 50% of the gross fixed capital formation over the 2009-19 period (TURKSTAT, 2022)

Table 2: Estimation Results for the Investment Function

Dependent variable: ΔlnI	Specifications							
	1		2		3		4	
Regressors	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	-0.05***	-5.36	-0.08***	-8.77	-0.08***	-7.40	-0.08***	-5.88
ΔlnY	2.61***	15.50	3.05***	16.72	3.07***	14.95	3.16***	13.64
ΔlnWS	0.03	0.29	0.24	1.64	0.25*	1.78	0.25*	1.94
ΔlnWS(-1)	0.04	0.44	-0.00	-0.04	-0.01	-0.23	-0.05	-0.75
ΔlnDH	0.08***	3.59	0.08***	4.79	0.08***	5.13	0.08***	4.37
ΔlnDH(-1)			0.05**	2.21	0.05**	2.17	0.06*	1.82
ΔlnDB	-0.18	-1.63	-0.21*	-2.06	-0.18*	-1.79	-0.20*	-1.96
ΔlnDB(-1)	-0.14***	-3.22	-0.20***	-4.85	-0.17***	-3.70	-0.19***	-2.91
ΔlnSP	-0.01	-0.39	-0.01	-0.73	-0.02	-0.88	-0.01	-0.32
ΔlnSP(-1)	0.02	1.35	0.01	0.51	0.00	0.28	0.01	0.61
ΔlnEHII	-0.67	-1.26						
ΔlnEHII(-1)	-0.59	-1.27						
ΔlnGINI1			-1.30	-0.47				
ΔlnGINI1(-1)			-2.81	-1.06				
ΔlnGINI2					-2.28	-0.48		
ΔlnGINI2(-1)					-2.37	-0.51		
ΔlnTOP10							0.69	1.34
ΔlnTOP10(-1)							-0.59	-0.97
Diagnostics								
R2	0.96		0.96		0.95		0.95	
Adjusted R2	0.93		0.93		0.92		0.92	
F Test	0.00		0.00		0.00		0.00	
LM test for autocorrelation	0.77		0.40		0.54		0.74	
White's test for heteroskedasticity	0.82		0.49		0.54		0.43	
Test for ARCH of order 1	0.53		0.58		0.50		0.38	
RESET test for specification	0.30		0.50		0.61		0.77	
CUSUM test for parameter stability	0.62		0.79		0.56		0.72	
H0: ΔlnWS + ΔlnWS(-1) = 0	0.52		0.10		0.08		0.11	
Number of observations	26		30		30		30	

Notes: ***, ** and * represent 1%, 5% and 10% significance levels, respectively. The numbers for the tests are p-values.
Source: Author's work.

supports this claim.[22] However, findings indicate that business borrowing has a negative effect on total investment. This finding supports the hypothesis of Stockhammer and Wildauer, but they find no significant effect in their estimations. The stock price index turned out to be insignificant in the regression. Personal income inequality has no impact on investment in the Turkish economy. This is partially in line with Stockhammer and Wildauer's findings, since they also found negative effects in some specifications.

5.3. Exports and Imports

The estimation results for the exports and imports equations are presented in Table 3.

Table 3: Estimation Results for the Exports and Imports Functions

Dependent variable:	ΔlnX		ΔlnM	
Regressors	Coeff.	t-ratio	Coeff.	t-ratio
Constant	0.01	0.28	*0.04**	-2.15
ΔlnYf	1.55**	2.21		
ΔlnY			2.44***	12.60
ΔlnY(-1)			-1.20***	-4.33
ΔlnWS	-0.29*	-1.81		
ΔlnWS(-1)			0.09*	1.72
ΔlnEX	-0.06	-1.34	0.23***	4.79
ΔlnEX(-1)			-0.31***	-7.27
ΔlnM(-1)			0.41***	4.30
R2	0.31		0.92	
Adjusted R2	0.23		0.90	
F Test	0.00		0.00	
LM test for autocorrelation	0.68		0.52	
White's test for heteroskedasticity	0.25		0.36	
Test for ARCH of order 1	0.73		0.37	
RESET test for specification	0.58		0.67	
CUSUM test for parameter stability	0.82		0.20	
Number of observations	31		30	

Notes: ***, **, and * represent 1%, 5% and 10% significance levels, respectively. The numbers for the tests are p-values. Source: Author's work.

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[22] However, this share has dropped to 45% in 2020 and 34 in 2021. Although the construction sector is not completely geared towards housing, this ratio is indicative.

The econometric findings for the exports equation indicate that a 1% increase in the foreign demand boosts Turkish exports by 1.55%. This effect is much stronger for the average OECD country, with an elasticity of around 2 in Stockhammer and Wildauer's study. The negative effect of the wage share (or real unit labor costs) is confirmed by the estimations. An increase in the wage share by 1% leads to around a 0.3% decline in the exports, the relevant elasticity for the average OECD country being 0.25. The exchange rate does not seem to have an effect on the Turkish exports, whereas it is a significant determinant for the average OECD country.

The estimation of the imports function reveals that the income elasticity of imports in Turkiye is 2.10[23] and it is significantly higher than that in the average OECD country in Stockhammer and Wildauer's study. The positive impact of the wage share on imports is confirmed for Turkiye, however, it was not significant for the average OECD country. The exchange rate variable turns out to be significant, but the findings are contradictory. While the contemporaneous effect has the expected positive sign, the lagged effect is negative and stronger in absolute value, thus the total effect is negative. This point requires further investigation, and this opposite sign might be due to the rising import dependence of the Turkish economy, as pointed out by Orhangazi and Yeldan (2021).

5.4. Demand Regime

In this subsection we synthesize our econometric findings and calculate the effect of an increase in the wage share on the components of aggregate demand at a given level of output, the domestic and total private excess demands and the multiplier for the overall economy. The results are presented in Table 4.

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[23] This value is obtained by summing up the contemporaneous and lagged effects of the aggregate demand on imports and dividing this sum by 1 minus the coefficient for the lagged endogenous imports variable. The effect of the wage share is calculated likewise in the next subsection for the synthesis of the findings.

Table 4: Marginal Effect of a 1% Increase in the Wage Share

	Specification			
	1	2	3	4
$(\partial(C/Y))/\partial WS$	0.06	0.10	0.11	0.09
$(\partial(I/Y))/\partial WS$	0.00	0.00	0.00	0.00
$(\partial(X/Y))/\partial WS$	-0.11			
$(\partial(M/Y))/\partial WS$	0.06			
Domestic excess demand	0.06	0.10	0.11	0.09
Private excess demand (f1)	-0.11	-0.07	-0.06	-0.08
f2	0.71	0.82	0.81	0.87
f1/(1−f2)	-0.38	-0.41	-0.31	-0.61

Notes: The marginal effects are calculated following Stockhammer and Wildauer (2016, p. 1625).
Source: Author's work based on the estimations of the parameters in tables 1-3.

The calculations using different constellations of parameters obtained from the different specifications point out that the Turkish economy is domestically wage-led, i.e., when only consumption and investment is considered, as the sign of the domestic excess demand suggests. However, the overall economy turns profit-led when the effects on the net exports are taken into account. The calculation of the multiplier points out that a 1% increase in the wage share leads to a 0.31 up to 0.61% decline in the aggregate output of the Turkish economy. Our findings are in line with those of Yılmaz (2015), however, Onaran and Galanis (2014) had found the Turkish economy to be wage-led both domestically and overall. Domestic vs. overall economy distinction is not pertinent in other studies on Turkiye (Onaran and Stockhammer, 2005; Bölükoğlu, 2019; Kurt, 2020) and the overall demand regime is found to be wage-led in those.

5.5. Growth contributions

In this last part of the section, we calculate the growth contributions of the exogenous variables of the model for each demand component over the sample period 1988-2019. Our findings are reported in Table 5.

The impacts of the variables which turned out to be insignificant in the regressions above have no effect on the variations in demand components. While the growth rate of investment exceeds that of the GDP, that of the consumption falls

Table 5: Growth Contributions

		Change over 1988–2019 period (%)	Specification			
			1	2	3	4
		ΔY	278.55	278.55	278.55	278.55
Consumption	(1)	ΔC	242.42	242.42	242.42	242.42
	(2)	$\Delta C - \beta Y \Delta Y$	-19.64	-20.77	-16.77	-30.23
	(3)	$\beta WS \Delta WS$	-0.41	-0.67	-0.79	-0.61
	(4)	$\beta SP \Delta SP$	7.35	4.57	4.29	7.71
	(5)	$\beta DH \Delta DH$	0.00	0.00	0.00	0.00
	(6)	$\beta Q \Delta Q$	-0.22	0.00	0.00	0.00
Investment	(7)	ΔI	464.42	464.42	464.42	464.42
	(8)	$\Delta I - \beta Y \Delta Y$	-263.08	-384.52	-390.42	-414.62
	(9)	$\beta WS \Delta WS$	0.00	0.00	0.00	0.00
	(10)	$\beta SP \Delta SP$	0.00	0.00	0.00	0.00
	(11)	$\beta DH \Delta DH$	380.27	684.21	665.20	669.37
	(12)	$\beta DB \Delta DB$	-51.30	-151.54	-134.10	-142.98
	(13)	$\beta Q \Delta Q$	0.00	0.00	0.00	0.00
Exports	(14)	ΔX	791.30			
	(15)	$\beta Yf \Delta Yf$	234.49			
	(16)	$\beta WS \Delta WS$	2.12			
Imports	(17)	ΔM	766.45			
	(18)	$\beta Y \Delta Y$	586.22			
	(19)	$\beta WS \Delta WS$	-1.12			
Y-Short run	(20)	$\beta WS \Delta WS$	2.83	2.57	2.46	2.63
	(21)	$\beta SP \Delta SP + \beta DH \Delta DH + \beta DB \Delta DB$	336.31	537.23	535.39	534.10
	(22)	$\beta Q \Delta Q$	-0.22	0.00	0.00	0.00
Y-Long run	(23)	$\beta WS \Delta WS$	9.69	14.04	13.21	19.54
	(24)	$\beta SP \Delta SP + \beta DH \Delta DH + \beta DB \Delta DB$	1150.41	2931.40	2879.99	3965.33
	(25)	$\beta Q \Delta Q$	-0.75	0.00	0.00	0.00

Notes: The calculations are based on those by Stockhammer and Wildauer (2016, p. 1627). (There seems to be a typo in the last two lines of the footnote to Table 6 in their study, i.e., the locations of the symbols 'f1' and 'f2' must be switched.) βx is the elasticity of the relevant demand component to variable x and Δx is the percentage growth rate of the variable x. Rows (1), (7), (14), and (17) are the point-to-point percentage growth rates of each demand component over the sample period 1988-2019. Rows (2) and (8) calculate the growth rates of consumption and investment not explained by changes in income, respectively. Rows (3), (9), (16), and (19) calculate the effects of the wage share on each demand component. Rows (4) and (10) calculate the effects of the stock price index on consumption and investment, respectively. Rows (5) and (11) calculate the effects of the household debt on consumption and investment, respectively. Row (12) calculates the effect of the business debt on investment. Rows (6) and (13) calculate the effects of personal income inequality measures on consumption and investment, respectively. Row (15) calculates the effects of the foreign demand on exports and row (18) calculates that of the domestic demand on imports. Rows (20) to (22) report the short-run effects on demand and rows (23) to (25) report the long-run ones, taking into account the multiplier effect of 1/(1-f2).
Source: Author's work based on the estimations of the parameters in tables 1-3.

behind the latter over the sample period. The following point is in line with the former: over the 1988-2019 period, the share of private consumption in the Turkish GDP has decreased from 65 to 58% while that of private investment has increased

from 17 to 25%. In Stockhammer and Wildauer's (2016) study, the weighted consumption and investment growth rates are higher than that of the GDP of the 18 OECD countries over the period 1997-2007.[24] The income growth, according to our empirical investigation, overexplains the rates of growth of consumption and investment but not that of imports of Turkiye. In the average OECD country, there remains an unexplained part of the consumption growth by income, while investment is overexplained by the latter. The decline in the wage share in the Turkish economy had a negative effect on consumption growth, however, compared to the impact of the stock price index, which proxies the household financial wealth effect, it remains very weak in absolute value. The wage share does not have any impact on investment due to the insignificant coefficient estimated above and it explains a very small part of the variations in exports and imports. In the first specification of the consumption function, personal income inequality has a weak effect, while it has no effect in the other specifications. We observe very high effects of household debt and business debt on investment in opposite directions, the former being considerably higher than the latter in absolute value. Foreign demand explains an important fraction of the export growth but there remains an unexplained part. The calculated overall short-run effects on aggregate demand show that the changes in functional and personal income distributions have negligible effects compared to sum of the effects of stock prices and household and business debt stocks. This result is in line with the findings of Stockhammer and Wildauer (2016) for the OECD countries. The findings for the short run also apply to the long run. The long-run effects are calculated by multiplying the short-run effects by the multiplier which lies between 3.42 and 7.42 throughout the four specifications. The multiplier for the Turkish economy is significantly higher than that of the average OECD country, which is 1.77.

6. Conclusion

In this article we investigated the role of wealth, personal income distribution, and household and firm debt on aggregate demand and its components in Turkiye and

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[24] Stockhammer and Wildauer (2016) combine these 18 OECD countries into four groups and focus on the decade prior to the 2007-09 economic and financial crisis.

characterized the prevailing demand regime. We applied the post-Keynesian model developed by Stockhammer and Wildauer (2016) over the 1988-2019 period.

Our findings suggest that the demand regime in Turkiye is domestically wage-led and overall weakly profit-led. Another finding of the study is that household debt has a positive effect on investment but no effect on consumption in Turkiye. We suppose that this positive effect is due to rising household indebtedness for the purpose of housing investment expenditures, as discussed by Orhangazi and Yeldan (2021, p. 476-480). The business debt, however, has a negative effect on investment according to our estimations. We also found that the proxy variable for wealth had some positive effect on consumption but no significant effect on investment. Of the four measures of personal income inequality, only one of them weakly supported the conspicuous consumption hypothesis. Personal income distribution measures turned out to have no impact on investment. Overall, personal income distribution *per se* does not seem to be a determinant of aggregate demand in the Turkish economy.

The findings underscore the importance of wealth and household and business debt ratios in determination of the aggregate demand. Although not negligible, the role of functional distribution in determination of aggregate demand is secondary, while that of personal income distribution is almost nil. However, according to our findings, debt accumulation largely accounts for keeping the aggregate demand buoyant. The crucial point to be questioned in the Turkish economy is the economic structure that leads to increasing debt-ratios and their sustainability. Further research should shed light on the dynamics of debt accumulation and crises.

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Appendix

Data definitions and sources

All the data were retrieved from AMECO (Annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs), BIS (Bank for International Settlements), BIST (*Borsa İstanbul*), SWIID (Standardized World Income Inequality Database), UTIP (University of Texas Inequality Project), WB (World Bank), and WID (World Inequality Database) in June-July 2022.

WS: Adjusted wage share: total economy: as percentage of GDP at current factor cost. Source: AMECO.

Y: GDP (constant 2015 US$). Source: WB.

C: Households and NPISHs final consumption expenditures (constant 2015 US$). Source: WB.

I: Gross fixed capital formation (constant 2015 US$). Source: WB.

X: Exports of goods and services (constant 2015 US$). Source: WB.

M: Imports of goods and services (constant 2015 US$). Source: WB.

Yf: Foreign demand. World GDP (constant 2015 US$) minus *Y*. Source: WB.

DH: Credit to households and NPISHs from all sectors at market value (percentage of GDP), adjusted for breaks. Source: BIS.

DB: Credit to private non-financial sector from all sectors at market value (percentage of GDP), adjusted for breaks. Source: BIS.

SP: Share price index, Consumer Price Index deflated. Sources: AMECO and BIST.

EHII: Estimated Household Income Inequality Index. Source: UTIP.

GINI1: Estimate of Gini index of inequality in equivalized (square root scale) household disposable (post-tax, post-transfer) income. Source: SWIID.

GINI2: Estimate of Gini index of inequality in equivalized (square root scale) household market (pre-tax, pre-transfer) income. Source: SWIID.

TOP10: The share of the pretax income of the richest 10% of the adult population in total pretax income. Source: WID.

Summary statistics

Table A1: Summary statistics of the variables

	Mean	Standard Deviation	Minimum	Maximum
WS (%)	59.25	11.77	47.12	92.60
Y	538161123724.94	230374439555.39	263489521766.27	997437115405.82
C	333969069131.38	130193485897.50	168223352514.01	582037029022.40
I	131502312024.07	79072485900.34	43741411678.02	282633532189.49
X	117755418117.36	71876039088.26	29817327909.60	266451160373.05
M	131530108495.04	76820695359.37	26796221417.54	261558695965.55
Yf	54796625773902.30	15432627002103.70	33347489426172.30	83673310807367.50
DH	7.63	7.27	0.10	19.05
DB	39.90	24.57	15.55	86.83
SP	7.22	2.83	2.00	16.71
EHII (0 to 100)	48.13	1.86	44.70	50.76
GINI1 (0 to 100)	41.29	1.08	39.60	42.70
GINI2 (0 to 100)	45.41	0.61	44.40	46.30
TOP10 (0 to 100)	54.24	2.73	48.98	59.56

Source: Author's calculations based on data retrieved from sources cited above.