Growth, Distribution and Dynamic Inefficiency in Turkey

An Analysis of the Naïve Neoclassical Theory of Capital

M. Aykut Attar

Hacettepe University

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Abstract. This paper presents a critical analysis of the naïve neoclassical theory of capital by applying it to Turkish economic history. The paper first develops a unified framework of theoretical predictions on growth, distribution, and dynamic inefficiency. This framework clarifies why the naïve neoclassical theory remains largely misleading in understanding the historical, macro dynamics of a growing, capitalist economy. Using this framework and long-run macroeconomic data for the 1923-2005 period, the paper establishes a new set of empirical findings that contribute to the related literature on Turkey. The paper then discusses the limitations of the naïve neoclassical theory by building on these empirical results and some lessons from Turkish economic history. This discussion summarizes some empirical findings on the distributional causes and consequences of growth in Turkey, by focusing mainly on the role of heterodox theories of growth and distribution.

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Contact Information.
Dept. of Economics, FEAS Building No: 27
Hacettepe University Beytepe Campus
06800 Çankaya / Ankara – TURKEY
Tel: + 90 312 2978650 / 135
maattar@hacettepe.edu.tr

1. Introduction

The *naïve* neoclassical theory of capital, proposed by Solow (1956) simply as a critique of the Harrod-Domar instability result, has been highly influential. It has served as the workhorse model of economic growth until the mid-1980s. However, with exogenous productivity, the theory has almost completely ignored historical, political, and institutional causes of long-run economic growth. As a theory of distribution, it has determined relative prices and relative incomes through (i) unit-elastic factor substitution, (ii) marginal productivity, and (iii) perfect competition. Hence, the theory has not been useful for historical, political, and institutional analyses of income and wealth inequalities. Coupled with the Heckscher-Ohlin model of international trade, it has also been used to formulate not-very-useful development recipes for poor economies, i.e., liberalize the trade regime, specialize in labor-intensive or land-intensive goods, increase savings, and decrease fertility. Recently, Piketty (2014) has exploited a simple Harrod-Domar-Solow framework to develop his arguments in his best-selling work on capital accumulation and inequality.

More than six decades after its birth, the *naïve* neoclassical theory remains to be one of the cornerstones of mainstream economics. It is still taught in undergraduate and graduate classes, and it is still pervasive among mainstream economists working on macroeconomic issues. According to Google Scholar, Solow's (1956) original paper has been cited 32,673 times as of October 23, 2020. About half of these citations have been recorded in the last decade, and 2,660 of them have been recorded in 2020!

The primary purpose of this paper is to study the empirical limitations of this *naïve* but *highly influential* theory of capital. To this end, the paper first formulates a unified analysis of the theory to clarify the issues that can be empirically investigated by building upon it, i.e., growth, distribution, and dynamic inefficiency (Section 3). The paper then applies this particular formulation to the long-run growth and development experience of the Turkish economy from 1923 to 2005 (Sections 4 and 5). Finally, the paper presents a discussion of the theory's limitations (Section 6). This discussion focuses both on the heterodox approaches (that remain largely incommensurable with neoclassical theories) and on the efforts of mainstream

economists (that partially address these limitations without violating the hard-core principles of neoclassical theories).

Clarifying the empirical boundaries of the theory within a unified framework contributes to the literature from a methodological perspective. Once the theoretical constructs are formally described, some of the limitations of the naïve theory become entirely transparent. For instance, the wage-rental ratio, i.e., the only meaningful measure of income inequality originating from the theory, is proportional to physical capital per effective worker. Hence, it can reflect only the role of relative scarcity of capital (and labor). Similarly, the naïve theory is not really informative about wealth inequality dynamics since the only meaningful indicator originating from the theory is the Piketty differential ($r - g$) that is defined as the difference between the real rate of return on capital and the growth rate of aggregate GDP.

By acknowledging these limitations at the outset, this paper presents a new set of findings to determine the boundaries of what we can learn from the naïve neoclassical theory. Growth accounting results show that labor-augmenting technical change has a sizable contribution to long-run growth. For income inequality, the evolution of the wage-rental ratio exhibits a decreasing trend from 1923 to the mid-1960s and an increasing trend from the mid-1960s to 2005 with a slowdown after the 1980s. For wealth inequality, the Piketty differential is generally positive from 1923 to 2005, indicating that the capital accumulation regime in Turkey tended to increase wealth inequality in the long run. Finally, for dynamic inefficiency, the paper computes two ratios, i.e., the Investment-to-GDP ratio motivated by the traditional definition of Phelps (1961) and the Investment-to-Profit ratio motivated by the approach proposed by Abel et al. (1989). The evolution of these ratios show that the Turkish economy is not dynamically inefficient, i.e., it has not accumulated too much capital. Section 2 presents a detailed discussion of how these empirical results contribute to the literature on the Turkish economy.

One thing should be emphasized: The naïve neoclassical theory of capital, disciplined with actual economic data, returns an *internally consistent* picture about distribution. However, this picture is centered entirely on the notion of *relative scarcity* and originates from a framework in which who owns the capital stock does not matter for aggregate outcomes. Hence, for both income and wealth distributions, the theory is not useful in identifying historical, political, and institutional factors that would affect the evolution of the wage-rental ratio and the Piketty differential. With

perfectly competitive firms each using a *Cobb-Douglas production function* to derive conditional factor demands based on *marginal productivities*, there is no way by which the naïve theory can be useful for discovering the role of historical, political, and institutional factors.[1] As Section 6 discusses at some length, the Classical-Marxian and post-Keynesian theories of growth and distribution explicitly model the class structure and typically dismiss (unit-elastic) factor substitution and/or perfect competition. Hence, they identify mechanisms that make growth *wage- or profit-driven* and *demand- or supply-led*. Section 6 also discusses (i) the distributional consequences of growth with an emphasis on structural imbalances in the post-1980 era of external liberalization, and (ii) what we know *empirically* about the neoclassical and Marxian variants of labor exploitation in Turkey.

The organization of the paper is as follows: Section 2 discusses the contributions of the paper to the related literature on the Turkish economy. Section 3 constructs the model and derives the formulations to be used. Section 4 introduces the dataset. Section 5 presents the empirical results. Section 6 discusses the limitations of the naïve neoclassical theory of capital. Section 7 concludes with some final remarks.

2. Contributions to the Related Literature on Turkey

There exist illuminating studies on the Turkish economy that focus on growth and distribution in one way or another. These studies, however, generally focus on the sources of economic growth, and this paper studies relatively more neglected distribution and dynamic inefficiency issues as well, not just the sources. Thus, this paper offers a complete analysis of the naïve neoclassical theory of capital in all of the three domains of inquiry.

Altuğ et al. (2008) present the most comprehensive growth accounting results for Turkey for the longest span of time, i.e., from 1923 to 2005. There exist several other studies conducted for

[1] There is a large literature on the use of aggregate production functions and an aggregative concept of physical capital in macroeconomic models. The origins of this literature date back to Sraffa (1960) and the famous Cambridge Capital Controversies. Harcourt (1972) presents an early review, and Colacchio and Soci (2003) analyze the limitations imposed by aggregate production functions in growth theory and business cycles research. A recent survey can be found in Fratini (2019).

different periods (Saygılı et al., 2005; İsmihan and Metin-Özcan, 2009; Çiçek and Elgin, 2011; Yeldan et al., 2012; Atiyas and Bakış, 2014). As underlined by Atesagaoglu et al. (2017: 11), the main message of this literature is that the role of total factor productivity (TFP) is indispensable as a source of long-run economic growth.

The present results are consistent with this message. More importantly, this paper complements the literature in a novel way: Growth accounting results presented by Altuğ et al. (2008) diminish the role of TFP to nil once they introduce their own construction of human capital. This paper uses an alternative construction of human capital as well (the one from the Penn World Tables) and demonstrates that both human capital (as a measured variable) and TFP growth (as a residual) account for the observed long-run growth in real GDP per worker.[2]

Existing evidence show that Turkey is among the OECD countries that record highest income Gini coefficients (40% as of 2015). Other distributional indicators such as the Palma ratio and S80-to-S20 quintile share also indicate that income inequality is notably high in Turkey (OECD, 2019).[3] Studies on income inequality in Turkey are predominantly empirical, and a vast majority of these studies utilize the micro datasets such as the Household Budget Survey, the Household Labor Force Survey, and, more recently, the Survey of Income and Living Conditions (SILC).[4] Tamkoç and Torul (2018) briefly but comprehensively survey this literature and present a new set of results on wage, income, and consumption inequalities for the 2002-2016 period.[5] They confirm that this period featured a decrease in wage, income, and consumption inequalities.

[2] That both human capital and TFP were indispensable in explaining growth in the postwar era is also consistent with Attar's (2019) results originating from a rigorously calibrated dynamic general equilibrium model with endogenous TFP and human capital accumulation.

[3] The historical trends summarized in DPT (2007) show that the Gini coefficient was around 55% in 1960s, remained largely stable around 50% from early 1970s to mid-1980s, and permanently moved to the 40% band only after 2000s.

[4] Çavuşoğlu and Hamurdan (1966), Bulutay et al. (1971), and Derviş and Robinson (1980) are cited among the pioneer works. Recent studies that use micro-level data include those of Başlevent and Dayıoğlu (2005), Duygan and Güner (2006), Candaş et al. (2010), Tansel and Bodur (2012), Bakış and Polat (2015), Filiztekin (2015), and Ekşi and Kırdar (2015).

[5] These authors use the standardized methodology introduced in the *Review of Economic Dynamics*' 2010 special issue on *Cross-Sectional Facts for Macroeconomists* for the first time in the analysis of Turkish micro-level data.

Contrary to the case of income inequality, little is known about the extent of wealth inequality in Turkey (Başlevent, 2018; Tamkoç and Torul, 2018). An early calculation by Davies et al. (2011) shows that the Gini coefficient for household wealth in 2000 was around 72%, and the same methodology applied to the 2017 data indicate that the wealth Gini is around 82% (Shorrocks et al., 2017). Torul and Öztunalı (2018) demonstrate that these large Gini figures can easily be accounted for within a simple Aiyagari (1994) model calibrated to Turkey. But Başlevent (2018) emphasizes that the Gini figures from Davies et al. (2011) and Shorrocks et al. (2017) depend on incomplete and non-reliable data. He goes further to estimate the household-level wealth Gini as being equal to 54% by using the 2014 SILC data.

Regarding income and wealth distributions, the main contribution of this paper is to compute the wage-rental ratio and the Piketty differential for the Turkish economy for the 1923-2005 period. The existing literature on the Turkish economy has not exploited a theoretical framework to identify these two historical sequences from the long-run data.

There does not exist a literature on whether the Turkish economy is dynamically inefficient or not. But two multi-country investigations that use various data sources and different definitions of over-accumulation and inefficiency provide some evidence on Turkey. Knolle (2014) uses the weighted average cost of capital, weighted through debt and equity shares, and compares this with the growth rate for the 2000-2014 period. Her results indicate that Turkey is dynamically inefficient, but one should note that this average rental rate measure is available for only 99 firms indexed in Istanbul Stock Exchange Index in the year 2000. The other study that provides evidence on Turkey, Luo et al. (2018), builds upon a criterion that follows from several modifications on the criterion used by Abel et al. (1989). These are related with the share of land value in the total value of assets, taxes on labor income, and mixed income sources. Using data for the 2009-2015 period, Luo et al. (2018) conclude that the Turkish economy was not dynamically inefficient in that particular episode.

Contrary to both Knolle (2014) and Luo et al. (2018), the present paper develops a novel macro view to the dynamic inefficiency issue by directly motivating the use of the Investment-to-GDP and the Investment-to-Profit ratios as inspired by Phelps (1961) and Abel et al. (1989), respectively, and it provides a long-run assessment starting from the year 1923.

3. The Naïve Neoclassical Theory of Capital

Time in the model, denoted by t, is discrete with an infinite horizon: $t \in H \equiv \{0,1,\dots\}$. There exists an all-purpose good called GDP, and this good is produced by *ex ante* identical and perfectly competitive firms. The production function is simply of the type suggested by Cobb and Douglas (1928) and admits two rival inputs, i.e., physical capital K_t and raw labor L_t, and two intangible variables augmenting L_t, i.e., productivity A_t and human capital per worker h_t. Formally, we have

$$Y_t = K_t^{\alpha}(A_t h_t L_t)^{1-\alpha} \tag{1}$$

with $\alpha \in (0,1)$, where Y_t is the flow of output. The productivity term A_t here may be called the Solow residual under the assumption that Y_t, K_t, h_t, and L_t are observed.

Suppose that L_t grows in time as a result of demographic changes, and let g_{Lt} denote the exogenously given percentage growth rate of L_t. Also suppose that A_t and h_t exhibit perpetual growth at exogenous percentage rates g_{At} and g_{ht}, respectively, as well. Technology adoption, R&D investments, and learning by doing at the firm level are typical causes of growth in A_t. The expansion of h_t in time is usually associated with schooling, on-the-job-training, and, again, learning by doing.

3.1. Growth

If variables Y_t, K_t, h_t, and L_t are indeed observed and readily available as a sample, then the production function in (1) and a value of α directly allow the computation of the Solow residual A_t as in

$$A_t = \left(\frac{Y_t}{K_t^{\alpha}}\right)^{\frac{1}{1-\alpha}}\left(\frac{1}{h_t L_t}\right). \tag{2}$$

The production function in (1) also defines real GDP per worker y_t as in

$$y_t \equiv \frac{Y_t}{L_t} = \frac{K_t^{\alpha}(A_t h_t L_t)^{1-\alpha}}{L_t} = K_t^{\alpha}(A_t h_t)^{1-\alpha} L_t^{-\alpha}. \tag{3}$$

Notice that the gross growth rates of the variables, e.g., y_{t+1}/y_t, satisfy the additive relationship

$$\ln\left(\frac{y_{t+1}}{y_t}\right) = \alpha \ln\left(\frac{K_{t+1}/L_{t+1}}{K_t/L_t}\right) + (1-\alpha)\left[\ln\left(\frac{A_{t+1}}{A_t}\right) + \ln\left(\frac{h_{t+1}}{h_t}\right)\right], \tag{4}$$

and this growth accounting formula decomposes economic growth in y_t simply into *factor endowment growth* ($k_t \equiv K_t/L_t$) and *factor productivity growth* ($A_t h_t$), the first and second terms on the right-hand side, respectively.

Rearranging (3) implies real GDP per worker also as in

$$y_t = A_t h_t \left(\frac{K_t}{A_t h_t L_t}\right)^{\alpha}. \tag{5}$$

The model has a stationary form where variables are expressed in *per effective worker* terms. Capital stock per effective worker, denoted by $\hat{k}_t$, is defined as in

$$\hat{k}_t \equiv \frac{K_t}{A_t h_t L_t}, \tag{6}$$

and this implies real GDP per effective worker $\hat{y}_t \equiv Y_t/(A_t h_t L_t)$ as in

$$\hat{y}_t = \hat{k}_t^{\alpha}. \tag{7}$$

Now suppose that, in period t, an exogenously given fraction $s_t \in (0,1)$ of GDP is directed to gross investment, and a fixed fraction $\delta \in (0,1)$ of existing physical capital stock depreciates at any period. Then, we have

$$K_{t+1} - K_t = s_t Y_t - \delta K_t \tag{8}$$

as the law of motion of K_t. To be more specific about the equilibrium dynamics of this economy, note that the sequences $\{A_t, h_t, L_t\}_{t\in H}$ and the initial capital stock $K_0 > 0$ are exogenously given. To define the steady-state, rewrite the difference equation in (8) as a law of motion of $\hat{k}_t$ after some arrangements:

$$\hat{k}_{t+1} = \frac{s_t \hat{k}_t^{\alpha} + (1-\delta)\hat{k}_t}{(1+g_{At})(1+g_{ht})(1+g_{Lt})}. \tag{9}$$

Let s_t, g_{Lt}, g_{At}, and g_{ht} converge to fixed numbers s^*, g_L^*, g_A^*, and g_h^*. Then, the nontrivial steady-state value of $\hat{k}_t$ satisfies

$$\hat{k}^* = \left[\frac{s^*}{(1+g_A^*)(1+g_h^*)(1+g_L^*)-(1-\delta)}\right]^{\frac{1}{1-\alpha}}. \tag{10}$$

With g_y^* denoting the (percentage) balanced growth rate of real GDP per worker, we also have

$$1 + g_y^* = (1 + g_A^*)(1 + g_h^*), \tag{11}$$

indicating that long-run growth is driven by productivity and human capital.

3.2. Distribution

To define the profit function of a firm that is a price taker in both the product and factor markets, first normalize the price of Y_t to unity. Denote, now, the real rental rate of physical capital by $r_t > 0$ and the real wage for a unit of raw labor by $w_t > 0$. Both of these (relative) prices are to be determined in equilibrium.

The profit function of a firm is simply

$$\Pi_t = K_t^{\alpha}(A_t h_t L_t)^{1-\alpha} - w_t L_t - r_t K_t. \tag{12}$$

It is convenient (and instructive) to work with the stationary form of the profit function which we can write as in

$$\hat{\pi}_t \equiv \frac{\Pi_t}{A_t h_t L_t} = \frac{K_t^{\alpha}(A_t h_t L_t)^{1-\alpha}}{A_t h_t L_t} - \frac{w_t L_t}{A_t h_t L_t} - \frac{r_t K_t}{A_t h_t L_t} = \hat{k}_t^{\alpha} - \frac{w_t}{A_t h_t} - r_t \hat{k}_t. \tag{13}$$

The profit maximizing firm, then, solves

$$\max_{\hat{k}_t \geq 0} \hat{\pi}_t \tag{14}$$

and finds the unique interior solution satisfying the inverse demand function

$$r_t = \frac{\alpha}{\hat{k}_t^{1-\alpha}} = \frac{\alpha(A_t h_t L_t)^{1-\alpha}}{K_t^{1-\alpha}} = \frac{\alpha Y_t}{K_t}. \tag{15}$$

Note that (K_t, A_t, h_t, L_t) determines r_t as a result of firms' optimal decisions where, as it is typical, the real rental rate inversely changes with the capital-output ratio. The zero-profit condition, $\Pi_t = 0$, then determines w_t as in

$$w_t = \frac{K_t^{\alpha}(A_t h_t L_t)^{1-\alpha}}{L_t} - \frac{r_t K_t}{L_t} = \frac{(1-\alpha)K_t^{\alpha}(A_t h_t L_t)^{1-\alpha}}{L_t} = \frac{(1-\alpha)Y_t}{L_t}. \tag{16}$$

The constant factor income shares through (15) and (16) imply that the total payment to labor services is proportional to the total payment to capital services. Formally, we have $w_t L_t / r_t K_t = (1-\alpha)/\alpha$. Thus, a useful measure of income inequality in this economy is the wage-rental ratio (Stolper and Samuelson, 1941). But the real wage w_t is itself proportional to real GDP per

worker y_t and, hence, grows exponentially. For this reason, a stationary measure of inequality is defined as in

$$\text{Ineq}_t \equiv \frac{w_t/(A_t h_t)}{r_t} = \left(\frac{1-\alpha}{\alpha}\right)\left(\frac{K_t}{A_t h_t L_t}\right) = \left(\frac{1-\alpha}{\alpha}\right)\hat{k}_t. \tag{17}$$

Clearly, Ineq_t changes one-to-one with the existing stock of physical capital per effective worker, reflecting the sole role of relative scarcities of labor or capital. Put differently, if $\hat{k}_t$ is larger, then this implies a relatively higher level of labor scarcity and increases Ineq_t, thereby resulting in a new state of income distribution that is relatively more favorable to the wage earners.

While the wage-rental ratio serves as a simple measure of income inequality within the limitations of the present framework, it is not informative for the dynamics of wealth inequality. Clearly, the theory described above with an exogenous s_t cannot possibly help us identify the evolution of wealth inequality unless we explicitly introduce a wealth distribution and let people accumulate wealth via endogenous saving rates. On the other hand, an analysis that is based on the difference between the net real rate of return on capital and the growth rate of aggregate GDP would still inform us loosely on whether wealth inequality has tended to be increasing or decreasing in a particular episode (Piketty, 2014). The idea is simple: If the net return on capital, defined as in $r_t^{\text{net}} \equiv r_t - \delta$, is larger than the growth rate of aggregate GDP, denoted by g_{Yt}, then K_t grows faster than Y_t.[6] Since r_t is proportional to the capital-output ratio as seen in (15), r_t^{net} tends to be larger in the next period. Under the regulatory assumption that there is at least

[6] Two remarks are in order: First, note that Piketty (2014) does not really concern himself with the crucial role played by the difference between net and gross returns. See Krusell and Smith's (2015) critique of Piketty (2014) on this. Second, we can make sense of Piketty's (2014) understanding of wealth inequality in terms of how wealth in a simple model would accumulate. Let there be a unit continuum of identical capitalist households and another unit continuum of identical worker households. Suppose that the following period budget constraint describes the evolution of wealth from t to $t+1$ for the generic capitalist household that consumes a total of X_t units: $\text{Wealth}_{t+1} + X_t = (1 + r_t - \delta)\text{Wealth}_t$. Since physical capital is the only asset in this economy (and since there exists a unit measure of identical capitalists), we have $\text{Wealth}_t = K_t$. Some simple algebra then implies $r_t K_t - X_t = s_t Y_t$, and this equation determines the endogenous saving rate as a function of the consumption flow X_t. Under the common assumption that X_t is proportional to Wealth_t, the percentage growth rate of Wealth_t is equal to $r_t^{\text{net}} - (X/\text{Wealth})$.

one person in the economy without any asset holdings, then a higher level of r_t^{net} causes the wealth inequality to be higher, *ceteris paribus*.

Note that this notion has been popularized by Piketty (2014) as *the central contradiction of capitalism* in his famous best-seller. With no obligations to share his assertion that $r_t^{\text{net}} > g_{Yt}$ is a contradiction of capitalist accumulation, define the Piketty differential PD_t as in

$$\text{PD}_t \equiv r_t^{\text{net}} - g_{Yt} = \frac{\alpha Y_t}{K_t} - \delta - g_{Yt}. \tag{18}$$

3.3. Dynamic Inefficiency

Let $\hat{c}_t \equiv C_t/(A_t h_t L_t)$ denote (real) consumption per effective worker with C_t denoting aggregate consumption in the economy. Since C_t is simply equal to $C_t = (1 - s_t)Y_t$, we have

$$K_{t+1} - K_t = Y_t - C_t - \delta K_t \tag{19}$$

and this implies

$$\hat{k}_{t+1} = \frac{\hat{k}_t^{\alpha} - \hat{c}_t + (1-\delta)\hat{k}_t}{(1+g_{At})(1+g_{ht})(1+g_{Lt})}. \tag{20}$$

In the unique (non-trivial) steady-state with $\hat{k}_{t+1} = \hat{k}_t = \hat{k}^* > 0$, the steady-state consumption per effective worker satisfies

$$\hat{c}^* = \left(\hat{k}^*\right)^{\alpha} - [(1 + g_A^*)(1 + g_h^*)(1 + g_L^*) - (1 - \delta)]\hat{k}^*. \tag{21}$$

Following Phelps (1961), the well-known Golden-Rule level of $\hat{k}_t$, denoted by $\hat{k}^{\text{GR}}$, can easily be found as the unique solution to $\max_{\hat{k}^* \geq 0} \hat{c}^*$, and it reads

$$\hat{k}^{\text{GR}} = \left[\frac{\alpha}{(1+g_A^*)(1+g_h^*)(1+g_L^*) - (1-\delta)}\right]^{\frac{1}{1-\alpha}}. \tag{22}$$

There exists, then, a particular level of physical capital per effective worker, $\hat{k}^{\text{GR}}$, that maximizes consumption per effective worker in the long run.

Within the present formulation, the particular Golden-Rule level of physical capital per effective worker is achieved only if we have $s_t \to s^* = \alpha$ as directly implied by (10) and (22). Thus,

convergence to the Golden-Rule requires the economy to invest at a rate exactly equal to the capital share.

A steady-state is said to be dynamically inefficient if $\hat{k}^{\mathrm{GR}} < \hat{k}^{*}$ or, equivalently, if $\alpha < s^{*}$.[7] The term inefficient here originates from the following Paretian logic: If the investment-to-GDP ratio s_t is larger than α and decreases towards α for some reason, then this would increase every generation's consumption (including, say, that of generation-t) without decreasing the consumption levels that would be enjoyed by any generation of individuals.

While a direct comparison of the capital share with the investment-to-GDP ratio is simple and sensible, it is not very straightforward to ensure the validity of such an assessment for actual economies characterized by stochastic asset returns and growth rates. Motivated by this concern, Abel et al. (1989) develop a cash flow criterion by demonstrating that an economy that invests the total flow of returns on the stock of capital is not dynamically inefficient. Put differently, if the investment-to-profit ratio is less than unity, then the economy does not accumulate an excessive volume of physical capital.

In the present deterministic model with perfect competition and a CRS production function, the ratio $s_t Y_t / r_t K_t$ takes an extremely simple solution that is proportional to the investment-to-GDP ratio s_t since the capital income share is fixed at α.

4. Data

The quantitative analysis in this paper uses two sets of data. First, the paper utilizes a particular historical dataset of the Turkish economy that covers the 1923-2005 period. This has been

[7] Since dynamic inefficiency and over-accumulation are mainly about a welfare-based conflict across generations, a rigorous analysis of dynamic inefficiency would require the construction of an overlapping generations (OLG) model where the welfare levels of different generations are linked through capital accumulation. However, a simple OLG model with two-period lives, logarithmic preferences, and a Cobb-Douglas production function is still commensurable with the naïve neoclassical theory studied here. In such an OLG economy, the condition of dynamic inefficiency reduces into $\alpha < (3+\rho)^{-1}$ where $\rho > 0$ is the subjective discount rate. I wish to thank an anonymous referee for pointing out this OLG connection.

organized and used by Altuğ et al. (2008).[8] Second, the paper uses the human capital estimates for the 1950-2005 period from the PENN World Tables 9.0 data of Feenstra et al. (2015). This section briefly describes the main features of the data used and pictures the evolution of certain macroeconomic variables from 1923 to 2005.

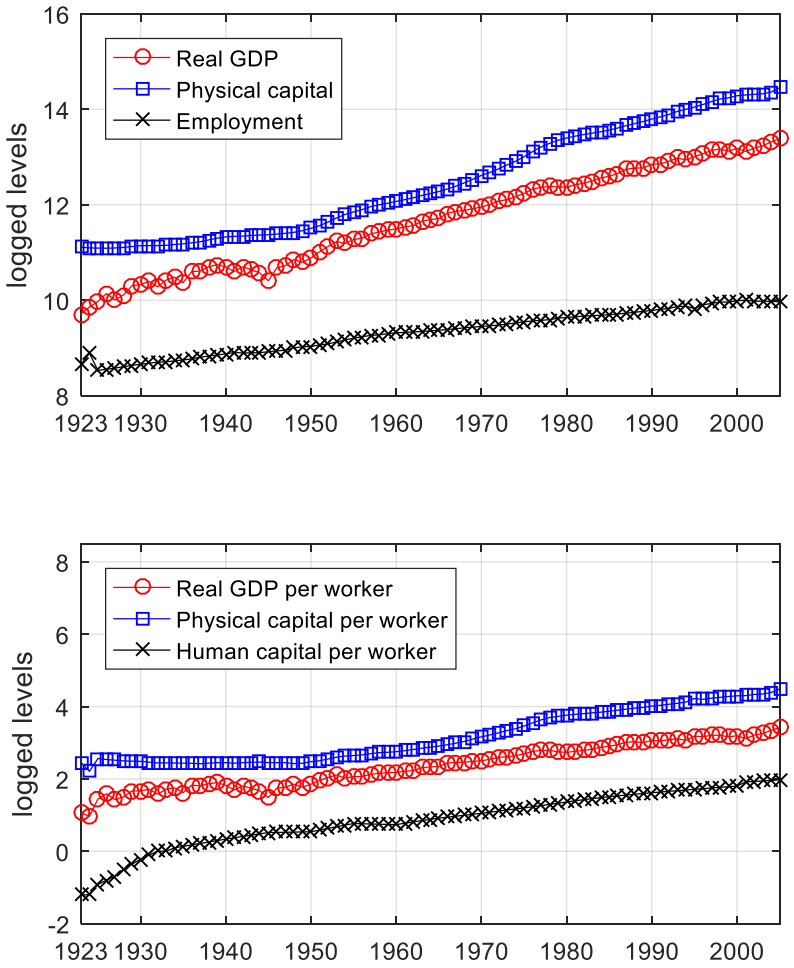

Figure 1: GDP, Employment, Physical Capital and Human Capital (1923-2005)

Source: Altuğ et al. (2008)

Four variables are obtained from the dataset provided by Altuğ et al. (2008). These are real GDP, physical capital, employment, and human capital. Altuğ et al. (2008: 426) construct human

[8] The dataset is located at http://myweb.sabanciuniv.edu/alpayf/files/2010/04/erehdata.xls

capital "*by multiplying the number of persons that are alive and finished a particular school with the years of education required for that degree*" after rigorously constructing the average years of schooling data for those aged 15-64.

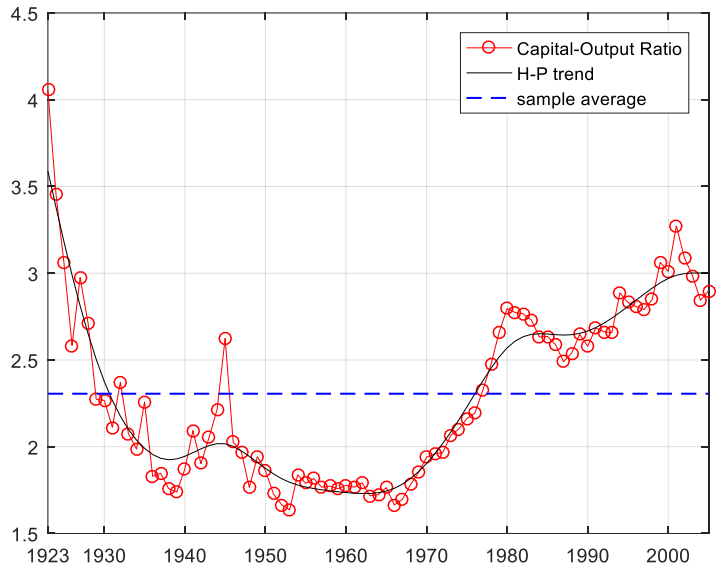

Figure 2: The Capital-Output Ratio (1923-2005)

Source: Altuğ et al. (2008)

Figure 1 pictures the evolution of aggregate and per worker variables, all expressed in logarithms. Physical capital and real GDP per worker variables are defined by dividing the aggregate figures by employment. An almost linear time trend, i.e., exponential growth, is clearly visible in the evolution of real GDP per worker, and physical capital per worker exhibits faster-than-exponential growth from early 1950s to late 1970s. The bottom panel of Figure 1 also shows that human capital per worker exhibits fast growth from 1923 to early 1930s.

Figure 2 shows the evolution of capital-output ratio, simply defined as the ratio of aggregate stock of physical capital to the flow of aggregate GDP. The capital-output ratio is the foremost explanatory factor in understanding how income and wealth distributions would evolve (see, e.g., Piketty, 2014).

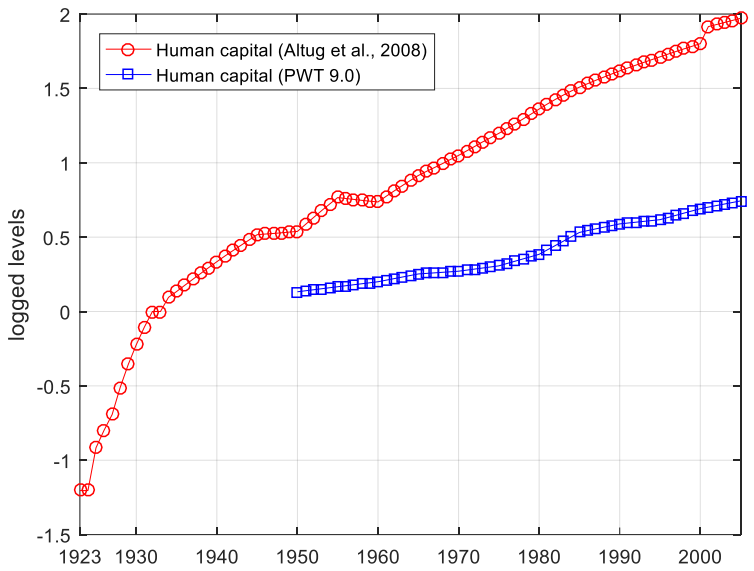

Figure 3: Two Alternative Measures of Human Capital

Sources: Altuğ et al. (2008), Feenstra et al. (2015)

Figure 3 concludes this section by picturing the human capital variables used in the analysis. As also shown in Figure 1, the human capital construction of Altuğ et al. (2008) exhibits tremendous growth from 1923 to the early 1930s and keeps growing for the rest of the sample at a nearly constant growth rate. The alternative human capital construction from the PWT 9.0 also exhibits growth but at a visibly lower rate, and it records a faster expansion from the mid-1970s to the mid-1980s.

5. Results

5.1 Patterns and Sources of Economic Growth

Assigning values to the production function parameters is not a straightforward issue, and it seems reasonable to use the $\alpha = 1/3$ benchmark.[9] Figure 4 shows three constructions of the

[9] The production function parameter α is equal to the capital income share under CRS and perfect competition. Theoretically, then, assigning a fixed value is problematic from at least two perspectives: From the Cambridge controversy perspective, i.e., the use of an aggregate production function, and from the viewpoint of some mainstream theories of automation, i.e., the task-based framework (Acemoglu and Autor, 2011) and factor-

Solow residual (or the TFP term) following directly from (2). All of the three TFP figures are expressed in logarithms, i.e., in the form of $\ln(A_t)$. The red circles show the "raw" TFP term under $h_t = 1$. To be exact, the production function in (1) returns the TFP sequence marked with the red circles given the data sequences $\{Y_t, K_t, L_t\}$ if human capital is assumed away. The blue squares, on the other hand, show the alternative sequence when h_t term constructed by Altuğ et al. (2008) is taken into account in the calculation of A_t through (2). Finally, the black crosses show the TFP sequence when human capital is represented by the measure from the PWT 9.0 for the post-1950 period. Contrary to the human capital construction of Altuğ et al. (2008) and reflecting the discrepancy pictured in Figure 3 above, a much more modest growth in human capital leaves some residual growth to the TFP term.

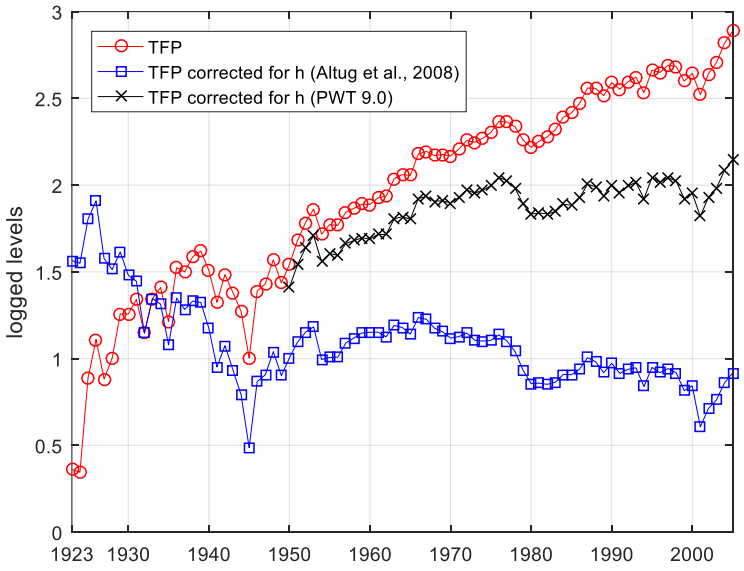

Figure 4: TFP Measures

Source: Own calculations

Tables 1, 2, and 3 report the average growth rates and present the growth accounting results obtained through (4). In Table 1, corresponding to the "raw" TFP figures that presume $h_t = 1$

eliminating technical change (Peretto and Seater, 2013). Empirically, there are several studies that invalidate the constancy of the capital income shares in GDP (e.g., Bengtsson and Waldenström, 2018). For the results presented below, the sensitivity analysis using two alternative values, i.e., marginally larger $\alpha = 0.35$ and possibly more realistic $\alpha = 0.5$, shows that they are robust. The full set of results are available upon request.

for all t, economic growth (in y_t) is decomposed into the contributions of factor endowment growth (in k_t) and factor productivity growth (in A_t). Tables 2 and 3 then report the results that correct for human capital accumulation using the data from Altuğ et al. (2008) and from Feenstra et al. (2015), respectively. Thus, economic growth is decomposed into the contributions of k_t, A_t, and h_t. Clearly, since k_t and h_t are the observed variables, A_t is the residual category and computed accordingly.

Table 1: Growth Accounting (without corrections for human capital)

	Avg. Growth Rates (% per annum)			Contributions (%)	
Period	*y*	*k*	*A*	*k*	*A*
1923 - 1929	11.22	1.81	16.68	3.30	96.70
1930 - 1949	1.63	-0.03	2.98	-21.24	121.24
1950 - 1979	3.05	4.40	2.44	46.44	53.56
1980 - 2005	2.90	2.97	2.92	32.90	67.10

Source: Own calculations

Table 2: Growth Accounting (human capital from Altuğ et al., 2008)

	Avg. Growth Rates (% per annum)				Contributions (%)		
Period	*y*	*k*	*A*	*h*	*k*	*A*	*h*
1923 - 1929	11.22	1.81	0.32	15.41	8.16	2.00	89.84
1930 - 1949	1.63	-0.03	-0.67	3.94	-31.64	-27.97	159.61
1950 - 1979	3.05	4.40	-0.33	2.79	46.03	-7.23	61.20
1980 - 2005	2.90	2.97	0.51	2.49	30.81	11.80	57.39

Source: Own calculations

Table 3: Growth Accounting (human capital from PWT 9.0)

	Avg. Growth Rates (% per annum)				Contributions (%)		
Period	*y*	*k*	*A*	*h*	*k*	*A*	*h*
1950 - 1979	3.05	4.40	1.59	0.84	46.30	35.02	18.68
1980 - 2005	2.90	2.97	1.45	1.45	32.81	33.60	33.59

Source: Own calculations

The main messages originating from these tables are the following: First, physical capital *per worker* is not a major source of economic growth for the period before 1950. From 1923 to 1929, k_t grows at an average 1.8% per annum, and it exhibits a net decrease against employment growth from 1930 to 1949. However, its contribution to growth from 1950 to 2005 is not negligible as the lowest calculated share is still larger than 30%.

The second message is concerned with the role of factor productivity growth, i.e., the growth of $A_t h_t$. Regardless of whether human capital is ignored or not and regardless of the human capital construction used when it is not ignored, a large share of economic growth is explained by the growth of this intangible factor that augments raw labor. In fact, the contribution of productivity growth is particularly large after the 1980s with the lowest calculated share being around 67%.

Finally, the two human capital constructions used in the analysis deliver widely differing relative shares of A_t and h_t as expected after Figures 3 and 4. The human capital measure from Altuğ et al. (2008) diminishes the role of the TFP term completely; A_t does not exhibit growth from 1930 to 1949 and from 1950 to 1979, and its average growth rate remains at a very modest 0.51% from 1980 to 2005.

5.2 Income and Wealth Inequality

Figure 5 pictures the evolution of Ineq_t computed through (17) for the benchmark parameter value $\alpha = 1/3$. The figure indicates that income inequality in favor of wage earners has a U-shaped pattern from 1923 to 2005. The young republic in 1923 finds herself in an "initial" equilibrium where physical capital is *relatively* more abundant; this is an equilibrium historically explained by *relatively* low levels of L_t due to World War I and the National War of Independence and of $A_t h_t$ due to underdevelopment. From 1923 to the mid-1960s, the overall trend of income inequality is to worsen the relative position of the working class where physical capital per effective worker decreases and becomes relatively scarcer. This prolonged decay of relative wages features a steady increase in the flow of effective employment $A_t h_t L_t$ explained by increases in human capital through increased educational attainment and by increases in employment through population recovery and expansion. More specifically, $A_t h_t L_t$ average in the 1960s is nearly 12 times larger than its 1923 level.

There is a fast recovery of the wage-rental ratio between the mid-1960s and the year 1980, and the contraction during the 1980s is followed by an improvement in the 1990s until the 2001 crisis hits the economy.

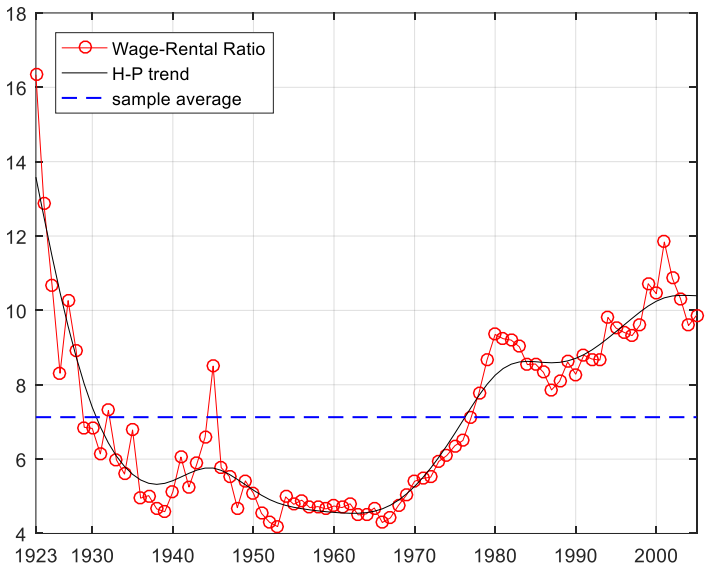

Figure 5: The Wage-Rental Ratio (1923-2005)

Source: Own calculations

The wage-rental ratio dynamics after the mid-1960s largely overlap with the movements of income shares of quintiles and Gini coefficients collected by Duygan and Güner (2006). In the 1968-1987 period, the Gini coefficient decreases from 0.56 to 0.44, and it exhibits a much more limited decrease of 2 percentage points from 1987 to 2003.[10]

Computing the Piketty differential PD_t requires the input of the depreciation rate δ. Here, the benchmark value is set at 4.7%.[11] This is the rate of depreciation calibrated by Çiçek and Elgin (2011) for the Turkish economy in a way that jointly calibrates the initial capital-output ratio.

[10] Acar and Doğruel (2012) report that the (income) Gini improvement in Turkey from 1987 to 2005 was around 1 percentage point.

[11] The construction of the Piketty differential is robust under alternative values assigned to the rate of depreciation. Specifically, the two alternative values that have been experimented with are 4.2% and 5.0%. The full set of results are available upon request.

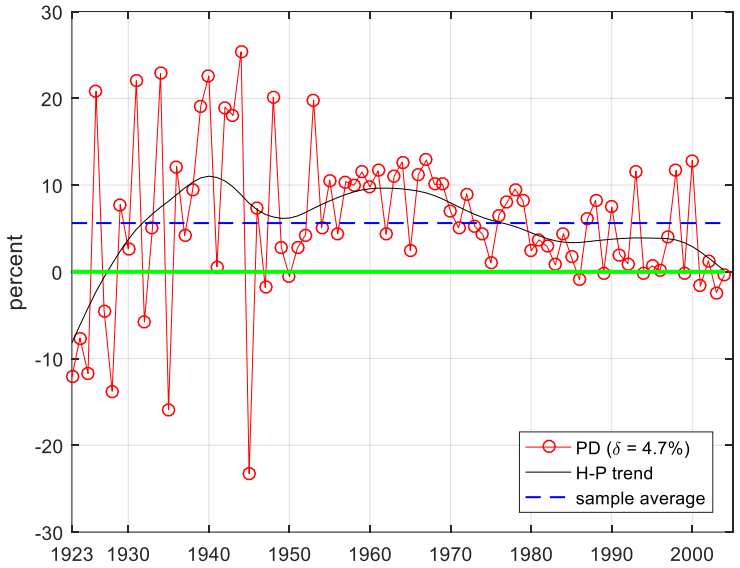

Figure 6: The Piketty Differential (1923-2005)

Source: Own calculations

Figure 6 pictures the evolution of the Piketty differential under the benchmark value of δ. Compared to Ineq_t, PD_t is highly volatile, and volatility is especially sizable before the mid-1950s. With a sample average larger than 5% for the 1923-2004 period, it is safe to assert that Turkey's is a regime of accumulation that benefitted the wealth owners and thereby increased wealth inequality throughout the 20th century. In line with this, PD_t is negative only for 17 years out of 82 years in the sample. For the period after the 1960s, PD_t decreases in a non-monotonic way, and, not surprisingly, the trend of this movement closely follows the trend of Ineq_t in the reversed direction: The episodes over which income inequality changes in favor of the wage earners are in the meantime episodes over which the Piketty differential decreases to imply less unequal distribution of wealth across the society.[12]

[12] As underlined by Tamkoç and Torul (2018: 16) for more recent episodes, the co-existence of growing wealth inequality at the top percentiles of the wealth distribution *and* decreasing wage, income, and consumption inequalities is an issue that necessitates further research.

5.3 Capital Accumulation and Dynamic Inefficiency

Figure 7 pictures the two measures of dynamic inefficiency introduced above. The top panel shows the investment-to-GDP ratio (s_t), and the corresponding figure for the investment-to-profit ratio (s_t/α) is at the bottom. Both figures clearly demonstrate that the Turkish economy is not dynamically inefficient; that is, there is no over-accumulation of capital. The investment-to-GDP ratio is well below the capital share especially before the 1970s, and it largely remains above the sample average after 1970. The same is true for the investment-to-profit ratio.[13]

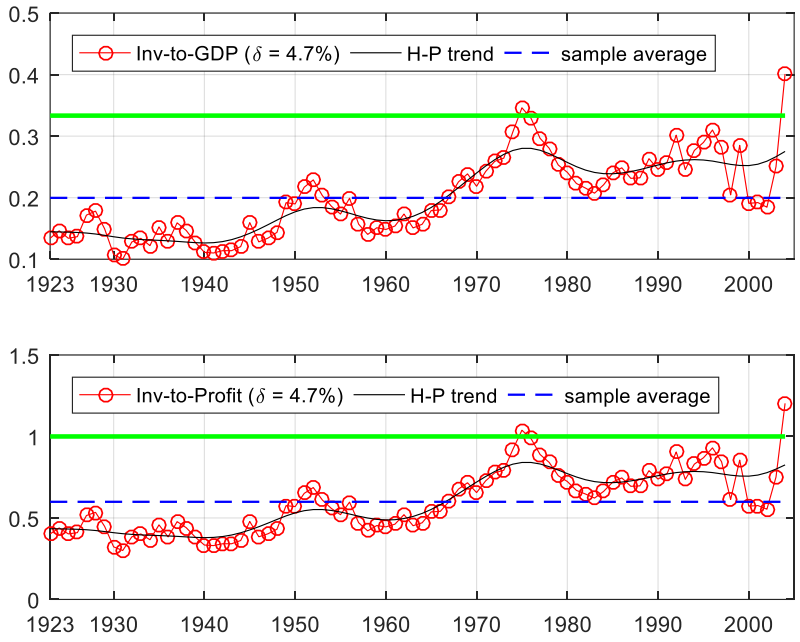

Figure 7: Two Measures of Dynamic Inefficiency

Source: Own calculations

Both measures considered here indicate that the Turkish economy exceeded the boundary of inefficiency only in 1975 and in 2004. The former date represents the end of an investment boom started in the early 1960s. The top panel of the figure shows that there existed earlier episodes with such an inverse U- or V-shaped dynamic, e.g., in the 1920s, the 1930s, and much more

[13] Once again, the measures of dynamic inefficiency are not sensitive to the assumed value of the rate of depreciation, and the full set of results are available upon request.

visibly in the 1950s. The year 2004, on the other hand, is some midpoint of the recovery of the 2001 crisis. This recovery occurs along with a remarkable boom in real economic activity from 2002 to 2008.

6. Discussion

This section discusses the limitations of the naïve neoclassical theory of capital. In this discussion, the guiding principle is to assess these limitations by referring to the lessons from the economic history of Turkey. The discussion focuses both on heterodox theories (i.e., the Classical-Marxian and post-Keynesian theories) and on the works of mainstream economists.

6.1 The Distributional Determinants of Accumulation and Growth

In the naïve neoclassical theory, the growth rate of aggregate capital (net of depreciation) depends positively on the saving rate s_t and negatively on the capital-output ratio K_t/Y_t. The former is assumed to be exogenous and generally fixed, and the latter is proportional to the real rental (or profit) rate r_t in equilibrium. As a result, there is no way by which one can meaningfully think of the distributional determinants of accumulation and growth. Heterodox growth and distribution theories offer a wide range of possibilities in this respect by explicitly accounting for class structure under alternative model closures and alternative investment functions (see the surveys by Setterfield, 2014; Dutt, 2017; Hein, 2017).

In the Classical-Marxian model, the real wage (w), the rate of capacity utilization (u), the capital-output ratio (v), and the propensity to save (out of profits) (s_π) are exogenous. Since only capitalists save and the rate of profit (r) inversely changes with the real wage, the growth rate (g) of K_t changes negatively with w and positively with s_π. Hence, accumulation is *profit-driven* and *supply-led*.

The post-Keynesian approaches differ with respect to the equilibrating variables and how the investment function is specified. In the simplest post-Keynesian setup where u is endogenous and w is exogenous, accumulation is *wage-driven* (higher w implying higher g) and *demand-led* (higher s_π implying lower g). The Kaldor-Robinson variant endogenizes w by keeping u exogenous, and investment is positively changing with r. In the Kalecki-Steindl variant, on the

other hand, u is endogenized, and investment is explained both by u and r. In all of these post-Keynesian models, accumulation can be described as *demand-led* since g still changes negatively with s_π.[14] The question, then, becomes whether *demand* is wage-led or profit-led.

There are five empirical studies that investigate whether the *demand regime* in Turkey (and other countries) is profit-led or wage-led. Four of these studies demonstrate that the demand regime is wage-led in Turkey (Onaran and Stockhammer, 2005; Onaran and Galanis, 2014; Oyvat et al., 2020; Kurt 2020). The study that finds the regime to be profit-led, Yılmaz (2015), does so because net exports is profit-led and dominates the wage-led domestic demand.

The evidence on the drivers of the demand regime in Turkey clarifies why the naïve neoclassical theory is not useful in understanding the distributional determinants of accumulation and growth. The only sound way to address these issues within a micro-founded framework is to develop a "Keynesian" model with heterogeneous agents and apply it to the Turkish economy using micro-level data.

6.2 The Proximate Causes of Long-Run Growth

The naïve neoclassical theory of capital does not provide a satisfactory explanation of the proximate causes of long-run growth; productivity and human capital are typically modeled as exogenous variables. The poor understanding of these proximate causes in the naïve theory has motivated various endogenous growth theories after the mid-1980s (Romer, 1986; Lucas, 1988; Romer, 1990; Grossman and Helpman, 1991; Aghion and Howitt, 1992).

After the establishment of the republic in 1923, Turkey has experienced significant transformations with respect to both human capital accumulation and productivity growth. The former has been centrally related with the dynamics of the demographic transition, especially after the mid-1950s during which fertility sharply declined. The pace at which the country achieved industrialization, especially during the 1920s and between the early 1960s and the late

[14] There is also a version of the Kalecki-Steindl variant, developed by Bhaduri and Marglin (1990), where investment is explained by the rate of capacity utilization and the profit share. This version of the post-Keynesian theory generates different demand and growth regimes under differing strengths of various effects where both demand and growth regimes could be either profit- or wage-driven (Hein, 2017).

1970s, has also been non-monotonically changing in time. There are papers using various micro-founded models of endogenous technology to investigate a diverse set of questions related with the growth dynamics of the Turkish economy (Adamoupoulos and Akyol, 2009; Attar, 2013, 2019; İmrohoroğlu et al., 2014; Voyvoda and Yeldan, 2015; Yılmaz and Saracoğlu, 2016). While the naïve theory presumes that long-run growth is exogenous, these papers shed light on the mechanisms explaining long-run growth of human capital and productivity in Turkey by using various quantitative techniques.

6.3 The Distributional Consequences of Growth

The historical evolution of the wage-rental ratio pictured in Figure 5 does not tell us much about the historical, political, and institutional determinants of income distribution; it reflects only the relative scarcity of capital. The same is true for the Piketty differential in Figure 6; it offers only a narrow understanding of wealth inequality dynamics as it mainly depends on the capital-output ratio.

To understand the distributional consequences of growth in the long run, it is essential to look at the historical transformation of the economy. In Turkey, as in many other developing countries, this transformation has featured, among other things, a transition from a single-party regime to a multi-party electoral system, changing development strategies (from etatism and import-substitution to export-orientation), and differing degrees of integration with the world economy (Boratav, 2003; Pamuk, 2018).

In Pamuk's (2018: 20-21) periodization, there are three distinct periods in the post-1913 era: From 1914 to 1950, etatism under a single-party regime; from 1950 to 1980, import-substitution under a multi-party democracy; and, from 1980 to 2015, export-orientation and Washington Consensus principles. Given the data limitations, Pamuk (2018) argues that a useful indicator of income inequality in the urban economy, for all of these three periods, is the ratio of urban GDP per capita to urban wages. The evolution of this indicator suggests that the relative position of wage earners in the distribution deteriorated in the 1914–1950 and 1980–2015 periods and improved in the 1950–1980. Hence, the movement of the wage-rental ratio from 1923 to 2015 pictured in Figure 5 is only partially consistent with Pamuk's (2018) findings.

There is general agreement in the literature that the status of wage earners worsened in the post-1980 era characterized by the Washington Consensus (e.g., Boratav, 2003). A macro-level distribution analysis by Boratav and Yeldan (2006) shows that the share of interest income within GDP grew from less than 1% in 1980 to nearly 15% in 1998. Within the naïve neoclassical theory, accounting for such an increase would necessitate an extremely large variation in physical capital per worker if the production technology is to remain fixed. There also exist econometric evidence showing that a stronger integration of the Turkish economy with global capitalism through increasing trade and capital flows after 1980 caused the aggregate wage share to decrease (e.g., Oyvat, 2011). This is not only because of strong international competition but also because of increased macroeconomic and financial instability. The sharp collapse of the wage-rental ratio after the 2001 crisis is largely consistent with the distributional consequences of the crisis mediated through the labor market effects. Şenses (2003) for instance underlines that around 2.3 million workers lost their jobs from February 2001 to August 2002. However, the naïve neoclassical theory of capital does not allow us to see the effects of globalization and the role of structural imbalances such as persistent current account deficits and continuing boom-bust cycles. Taylor's (2006) findings indicate that Turkey, in the post-1980 period of current account and capital account liberalizations, is a country in *cyclical stagnation*, exemplifying the most adverse (distributional) effects of liberalization among other developing countries.[15] There are now highly informative, heterogeneous-agent models that explicitly deal with income and wealth distributions in Turkey, e.g., Yakut and Voyvoda (2017) and Torul and Öztunalı (2018). However, it is generally not straightforward to extend these heterogeneous-agent models with structural imbalances emphasized by heterodox economists. Hence, studies that apply the open-economy versions of Classical-Marxian and post-Keynesian models to Turkish micro-level data would be highly illuminating for the distributional consequences of growth.

[15] A structuralist model of external liberalization has been developed by Taylor (2000). He also applies decomposition techniques to identify the effects of liberalization on effective demand, sectoral productivity levels, and real earnings. For the jobless growth experience of Turkey and how the government can tackle this problem, one can refer to the structuralist, open-economy, computable general equilibrium model constructed by Telli et al. (2006).

6.4 The Class Conflict

The naïve neoclassical theory is severely misleading to understand real-world labor markets usually characterized by non-Walrasian outcomes and wage-productivity gaps. Under competitive product and factor markets, real wages are always equal to the marginal productivity of labor. Since the same is true for physical capital, there is no class conflict, in its narrow sense, within the naïve neoclassical theory.

As demonstrated by Elgin and Kuzubaş (2012) for Turkey and by Elgin and Kuzubaş (2013) for the OECD countries, the ratio of marginal productivity of labor to the real wage (MPL-to-W) remains larger than unity for prolonged periods. The MPL-to-W ratio, called the Pigouivan (or neoclassical) exploitation rate after Pigou (1924), is centrally related with the monopsony power in labor markets (Boal and Ransom, 1997; Manning, 2003). Elgin and Kuzubaş (2012, 2013) show that higher MPL-to-W ratios are associated with a lower bargaining power of workers, both in Turkey and in the OECD panel. Moreover, lower bargaining power is found to be related with higher unemployment rates and lower numbers of strikes in Turkey. Elgin and Kuzubaş's (2012) calibration results show that the decadal average bargaining power of workers in Turkish manufacturing industries steadily declined from 1950s to 2000s, and the pre-1980 average of 54% is sizably larger than the post-1980 average of 33%.

A deeper understanding of the Pigouivan (or neoclassical) exploitation of workers necessitates the development of micro-founded models as in Elgin and Kuzubaş (2012) and, ideally, the application of such models to the Turkish economy. An interesting paper by Ünveren and Sunal (2015) that develops and estimates a micro-founded model for Turkey shows that imperfect competition in product markets is also a causal factor that limits secular growth in real wages.

For the issue of class conflict, there exist theoretical and empirical literatures in the Classical-Marxian tradition developed since the mid-1970s (see the surveys by Mohun and Veneziani, 2017; Basu, 2017). Theoretically, papers mainly focus on the resolution of the (Marxian) transformation problem. Empirically, the main task is to measure Marxian value categories using actual economic data such as national income accounts and input-output tables. For Turkey, there is only one comprehensive work conducted by Karahanoğulları (2009). He uses the metholodogy developed by Shaikh and Tonak (1994) to develop Marxian national accounts from 1988 to 2006. The rate of surplus value (the rate of exploitation) computed by Karahanoğulları

(2009) exhibits a fluctuation around 2.5 from 1988 to 1998 and a secular increasing trend from 1999 to 2006.

7. Conclusion

Transcending Solow's (1956) original intention, the naïve neoclassical theory of capital delivers sharp predictions for the sources of long-run growth, for the evolution of income and wealth inequalities, and for the over-accumulation of capital. These predictions originate from a set of quite restrictive assumptions: There is a single good produced with a technology that exhibits constant returns to scale. Productivity is an exogenous variable. Firms are identical and easily find their conditional factor demands using partial derivatives. Markets are perfectly competitive. There are no information frictions or other sorts of institutional and cultural barriers. The main driver of aggregate outcomes is physical capital per worker, but the theory completely assumes away class structure and, more generally, any type of heterogeneity across individuals.

Both heterodox and mainstream economists have developed theories alternative to the naïve theory. Heterodox economists, building on Marx, Sraffa, Keynes, Kaldor, Robinson, Kalecki, Pasinetti and others, have developed alternative models of growth and distribution by explicitly accounting for class structure, differential saving rates, imperfect competition in product and factor markets, changes in effective demand, animal spirits in investment, and non-substitutability of production factors. Mainstream economists have also developed new growth and distribution models with endogenous technological progress and heterogeneous agents. The naïve neoclassical theory of capital is a benchmark for both of these alternatives, but it is a highly influential benchmark, not only in classrooms but also in research seminars.

This paper develops a unified framework to demonstrate the limitations of the naïve neoclassical theory by applying it to the economic history of Turkey. The paper contributes to the related literatures in two distinct ways. First, the formulation of the theory presented in this paper clarifies exactly why it remains largely misleading in understanding the historical, macro dynamics of a growing, capitalist economy. Not only do the sources of growth remain exogenous and obscured, but theoretical predictions on income and wealth inequality build only on relative scarcity. Hence, the theory is not adequate to understand the evolution of the Turkish economy

since 1923, with its changing development strategies, differing degrees of integration with global capitalism, persistent social cleavages, and institutional frameworks that remain prone to economic and political instability.

The second contribution of the paper is empirical. The paper presents a new set of findings concerning growth, distribution, and dynamic inefficiency in Turkey. The existing literature that uses the naïve neoclassical theory of capital in one way or another is typically centered on the task of growth accounting. The growth accounting exercises presented in this paper extends our understanding of the role of productivity, but the paper also studies the wage-rental ratio, the Piketty differential, and the model-based indicators of dynamic inefficiency. Most significantly, this is the first paper that computes the Piketty differential and dynamic inefficiency indicators for the Turkish economy for a satisfactorily long period of time. Readers should view these results as the ones that would close a chapter in the naïve neoclassical analysis of Turkish macroeconomic history; *closing this chapter for good*! In the years ahead, the literature will expand with new results that follow from the analyses of the state-of-the-art models applied to the Turkish economy, both in the neoclassical and in the heterodox traditions.

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