Sectoral implications of policy induced household credit expansions☆

Esra Nur Ugurlu

University of Leeds, Leeds, LS2 9JT, United Kingdom

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ABSTRACT

This paper analyses the sectoral implications of household credit expansions in a two-sector open economy model. In the model, policy-induced expansion in banks' willingness and ability to lend to households results in new lending, boosting aggregate demand and average wages in the nontradable sector. Under fixed relative wages and mark-up pricing in the tradable sector, wage pressures translate into inflationary pressures. The inflation-targeting central bank increases the policy rate to contain inflationary pressures. This intervention causes a real exchange rate appreciation, followed by a reduction in international competitiveness and a contraction of the tradable sector output. This way, the model illustrates that consumer credit expansions can trigger *premature deindustrialisation*, shifting the sectoral structure away from the high-productivity tradable sector towards the lower-productivity nontradable sector. Key macroeconomic developments from the Turkish economy between 2002 and 2013 are presented to motivate the model.

1. Introduction

Over the past two decades, developing countries have experienced a marked increase in household credit,[1] both in terms of its share in total credit and GDP (Müller 2018). The rapid expansion of household lending was driven primarily by an increased ability and willingness to lend to households on the part of financial intermediaries (Mian et al., 2020). Policy changes that enabled and encouraged banks to extend their lending operations to households lifted borrowing constraints that households were subjected to in previous periods.

From a political economy perspective, the growth of household lending in the developing world can be linked to adherence to the Washington Consensus model of economic management from the late 1970s onward. Washington Consensus, propagated by key Bretton Woods institutions like the IMF and the World Bank, transformed policymaking under the imperatives of fiscal discipline, inflation-targeting, flexible exchange rate systems, privatisation of state-owned enterprises, and rolling back of the welfare state (Fine et al., 2003). Whilst this new hegemonic agenda constrained the possibilities of boosting domestic demand through expansionary fiscal and monetary policies, it also provided new opportunities to stimulate domestic demand through

credit-financed consumption. Furthermore, the improved availability of consumer credit provided governments means of mediating distributional tensions that were aggravated by the Washington Consensus model of economic management. By delinking domestic demand generation from wage growth, household lending provided a way of stimulating demand without challenging the distributive interests of the capitalist class. The working class, on the other hand, was partly compensated for reductions in their purchasing power through increased borrowing opportunities, while income was being redistributed from the working to the rentier class through interest payments on household debt (Hein 2012).

In terms of immediate macroeconomic effects, household lending booms resulted in short-term expansions in real GDP (Mian et al., 2020). However, as a growing body of empirical research indicates, household lending expansions contributed to GDP growth by fuelling unsustainable demand booms instead of improving productive capacity and were followed by contractions in output in the medium to long run. Furthermore, empirical studies link the growth of household lending with the appreciation of the real exchange rate (RER), a surge in imports, a slowdown in exports, and distortions in the sectoral allocation of resources, which resulted in the growth of low-productivity nontradable

industries at the expense of the higher productivity tradable industries (Mian et al., 2020; Müller and Verner 2021).

While the link between household lending booms and sectoral dynamics has garnered some attention in the above-cited empirical literature, much of the theoretical literature investigates household debt in relation to its sustainability (Palley 1994) and distributive implications (Hein 2012). Very little has been said about the ways in which policy-induced expansions in household lending affect sectoral dynamics and structural transformation. This paper attempts to address this gap by developing a two-sector open economy model capturing the key structural and institutional features of developing countries, such as dual labour and goods market structures, inflation-targeting central banking regimes, and credit-constrained consumers. In line with the empirical and institutional evidence on the drivers of household lending booms, the model explains household lending by changes in banks' willingness and ability to lend to consumers. The model then illustrates that household credit expansions of this type can generate premature deindustrialisation, whereby low-productivity (growth) sectors, often associated with the production of nontradable goods,[2] such as construction and services, dominate the sectoral structure before the economy goes through a sufficient experience of industrialisation (Palma 2005; Rodrik 2016). The performance of the Turkish economy between 2002 and 2013 is used to motivate the model.

In what ways does the expansion of aggregate demand mediated by household lending pose challenges for developing countries? To address this question, we first need to identify the key growth challenge faced by developing countries. To do so, this paper draws from the long tradition of dual-economy models dating back to Lewis (1954) that distinguish between 'mature' and 'dual' economies, whereby in the latter (i) a modern/high-productivity-tradable sector exists alongside a traditional/low-productivity/nontradable sector and (ii) labour constraints have little or no influence on the expansion of the modern sector. The paper then builds on the view that while the primary obstacle to growth faced by mature economies concerns the insufficiency of aggregate demand, the key growth challenge faced by dual economies is to undertake structural transformation[3] (Aboobaker and Ugurlu 2023; Skott 2020). This is to say that in order to stabilise the actual growth rate at a higher warranted rate, developing countries need to implement policies that would shift the composition of output and employment away from low-productivity sectors, such as construction, toward high-productivity sectors, such as manufacturing. This suggests that in mature economies, household lending expansions can be effective in stimulating economic growth by fuelling domestic demand, notwithstanding their adverse implications for income distribution and financial stability. In contrast, in dual economies, large expansions in domestic aggregate demand triggered by household credit can have detrimental

consequences[4] if it causes macroeconomic imbalances, such as exchange rate overvaluation or trade imbalances, or deteriorates the sectoral structure by expanding the low productivity nontradable industries at the expense of higher productivity tradable ones.

The mechanism by which household credit expansions undermine structural transformation can be summarised as follows. In the model, incomes in the nontradable sector are demand determined. Policy changes increase banks' ability and willingness to lend to households. The resulting expansion in household lending boosts consumption demand and, related to this, the average incomes (wages) in the nontradable sector. Under the assumptions of fixed relative wages across the two sectors and fixed mark-up pricing, wage pressures translate into inflationary pressures. The central bank, acting under the sole target of controlling inflation, raises the interest rate to contain domestic price increases. However, this intervention causes the real exchange rate to appreciate, followed by a loss of international competitiveness in the tradable sector. This way, the model illustrates that household credit expansions can shift the sectoral composition of output away from the tradable and towards the nontradable sector.

Regarding the related theoretical literature, this paper relates closely to the post-Keynesian literature on household debt and the literature on the resource curse. However, as will be discussed in the next section, the lack of attention given to sectoral dynamics and issues of structural transformation in the post-Keynesian literature and the absence of household lending, banking sector dynamics, and un(der)employment in the resource curse literature motivate the modelling exercise in this paper.

Turkey is a great exemplar of a developing country that experienced remarkable growth in household credit in recent decades with adverse implications on macroeconomic balances and the sectoral structure. Following a major economic crisis in 2001, Turkey adopted an IMF-led disinflation program called "Transition to a Strong Economy" (TSEP). In compliance with this program, the economic management committed to fiscal discipline and restructuring of the banking sector. Being bound by primary fiscal surplus targets and a lack of an industrial strategy to stimulate investment, the TSEP left limited scope to boost domestic demand. In subsequent years, the rise in household credit functioned towards filling this vacuum. The strategic importance assigned to the construction sector by the ruling AKP[5] governments amplified the importance of household credit even further. In effect, the TSEP has sown the seeds of a household credit-led growth model.[6]

The TSEP also enabled and encouraged the banking sector to increase household lending through various policy changes. Throughout the 1990s, commercial banks invested heavily in high-yielding government debt instruments[7] and subsequently provided too little and expensive credit to the private sector (Bakir and Öniş 2010). Therefore, TSEP was formulated based on the understanding that reducing the government deficit, lowering interest rates on government debt

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[2] Note that certain service sectors, such as IT and finance, can exhibit high productivity (see Appendix F) and are sometimes tradable (Rodrik 2016). The shift in the sectoral structure away from the high-productivity tradable toward the lower-productivity nontradable sector discussed throughout the paper concerns mainly the shift from the manufacturing to the construction sector. This point is particularly relevant in discussions concerning Turkey.

[3] Empirically, both the level and growth rate of productivity are often higher in industries producing tradable goods, such as industrial goods, than nontradable goods, such as construction and services (Benigno et al. 2015). Empirical studies also confirm the idea that structural change and economic growth involve the allocation of resources from low to high-productivity sectors (e.g., Diao et al. 2019.) Fig. A.1 in Appendix F shows that in Turkey, the level of labour productivity was higher in the manufacturing sector than in the construction sector between 2004 and 2015.

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[4] This is not to say that any expansion in aggregate demand necessarily hinders structural transformation. In fact, increases in certain components of domestic demand, such as private investment and government expenditures in certain strategic areas like infrastructure, are often key to achieving structural transformation.

[5] AKP is the Turkish acronym for Justice and Development Party.

[6] The conceptualisation of Turkey's growth strategy/model as being credit/debt-led is shared by some other scholars. For instance, Akçay et al. (2021), in a study examining the demand regimes of eight emerging capitalist economies, define Turkey's growth regime between 2000 and 2019 as a "debt-led private demand regime." According to Akçay et al. the defining characteristics of this demand regime are (i) "negative or close to zero financial balances of the private household sector", (ii) positive financial balances of the external sector (i.e., current account deficits), and (iii) the role of private consumption in driving growth.

[7] In this period, the average real interest rate on government securities averaged about 30 percent.

Fig. 1. Inflation rate in Turkey since 1990 **Source:** IMF, WEO (April 2020) **Note:** The inflation rate is calculated as the annual percentage change in average consumer prices.

instruments, and restricting the purchase of Treasury securities by commercial banks would crowd in investment by encouraging commercial banks to lend to the corporate sector. However, in the context of cheap borrowing opportunities in the international markets, large corporations decreased their reliance on the domestic banking sector. The end of an era of profiting off high interest rates on Treasury securities accompanied by lower demand for domestic bank credit from large corporations encouraged commercial banks to find new profit generation sources (Karaçimen 2014). It was in this context that household credit provision became a vital business strategy for the Turkish banking sector.

Although household lending supported high growth rates through stimulating consumption, particularly between 2003 and 2007, this period was much less successful as judged by other key indicators, such as stagnating investment rates, an overvalued currency, deteriorating current account deficits, and shifts in the sectoral structure favouring low-productivity sectors, in particular the construction sector. While some illuminating accounts highlighted the shortcomings of Turkey's post-2001 macroeconomic performance (e.g., Orhangazi and Yeldan, 2021 and Akçay and Güngen, 2022), there have not been any attempts to formally illustrate the potential mechanisms through which household credit expansions contributed to generating these detrimental outcomes, particularly with respect to the sectoral structure.

The contributions of this paper are hence two-fold: 1) to develop a dual-economy model that illustrates the mechanisms through which household credit expansions can impede structural change when borrowing constraints that consumers were previously subjected to are lifted, and an inflation-targeting regime is in place 2) and by way of this, to assess the weaknesses of consumer-credit fuelled growth strategies various developing countries, such as Turkey, adopted during the 2000s. Much as the relevance of the formal model is illustrated by the Turkish economy, the mechanisms described here can be relevant beyond the Turkish case given that several other developing economies have adopted household credit-driven growth models (Akçay et al., 2021).

The rest of this paper is organised as follows. The second section discusses the relevant literature. The third section illustrates the policy-driven nature of household credit expansion in Turkey and presents a descriptive analysis of key macroeconomic trends to motivate the formal model. The fourth section presents the model. The final section concludes.

2. Related literature

This paper relates to two strands of literature: the post-Keynesian literature on household debt and the literature on the (financial) resource curse. The following paragraphs will elaborate on how the formal model presented here builds on and differs from these bodies of literature.

In much of the post-Keynesian literature, the expansion in household borrowing is attributed to a greater demand for consumer borrowing stemming from the deterioration in income distribution observed in industrialised economies since the early 1980s (e.g., Barba and Pivetti 2009).[8] On the contrary, this paper highlights the changes in banks' ability and willingness to lend as key drivers of household credit expansions. If borrowers do not wish to go to the limits of credit available to them, the total amount of credit will be constrained by credit demand (Dutt 2006).[9] When this is the case, the institutional changes that alter the supply of credit will be ineffective in stimulating the amount of borrowing; thus, changes in credit conditions can be explained mainly by the demand-side factors (*ibid.*). On the contrary, if borrowers are already in debt up to their credit limits, the total amount of credit will depend primarily on the banks' willingness and ability to lend. Empirical evidence indicates that household lending booms observed in recent decades were driven mainly by the increased ability and willingness of financial intermediaries to lend to households (Verner 2019). For instance, in the case of Turkey, as discussed in section three, policy-induced transformations in government financing and the banking sector in the early 2000s have led to the diversification of banking activities towards household lending. This transformation has greatly lifted borrowing constraints households were previously subjected to (Başçı 2006). Similar policy changes that boosted household credit were in place in other developing countries, such as *crédito de nómina* loans across Latin America and requirements on commercial banks to meet certain targets in mortgage loans in a wide array of countries like Brazil and Malaysia (Dos Santos 2013). Therefore, the formal model presented in this paper highlights banks' willingness and ability to lend to consumers to explain household credit expansions.

Historically dual economy models depicting two or more sectors have played a central role in the analysis of macro-development issues, such as factor misallocations, sectoral productivity differences,

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[8] See Brochier (2016) for a more detailed review of the post-Keynesian literature on household debt. See Dutt (2006) for a discussion of whether demand- or supply-side explanations are more relevant in explaining the growth of household indebtedness. See Stockhammer and Wildauer (2018) for an empirical examination of different theories on the determinants of household debt.

[9] The focus on the supply drivers of credit expansion does not suggest that the demand-side factors did not play any role in contributing to consumer credit expansion in Turkey. As described in section 3.1, certain macroeconomic and legal developments led to an increase in households' demand for bank credit. Nonetheless, given that credit constraints are typically binding for households in developing countries, including Turkey, the model presented in this paper abstains from formalising the demand-side drivers of consumer credit expansion.
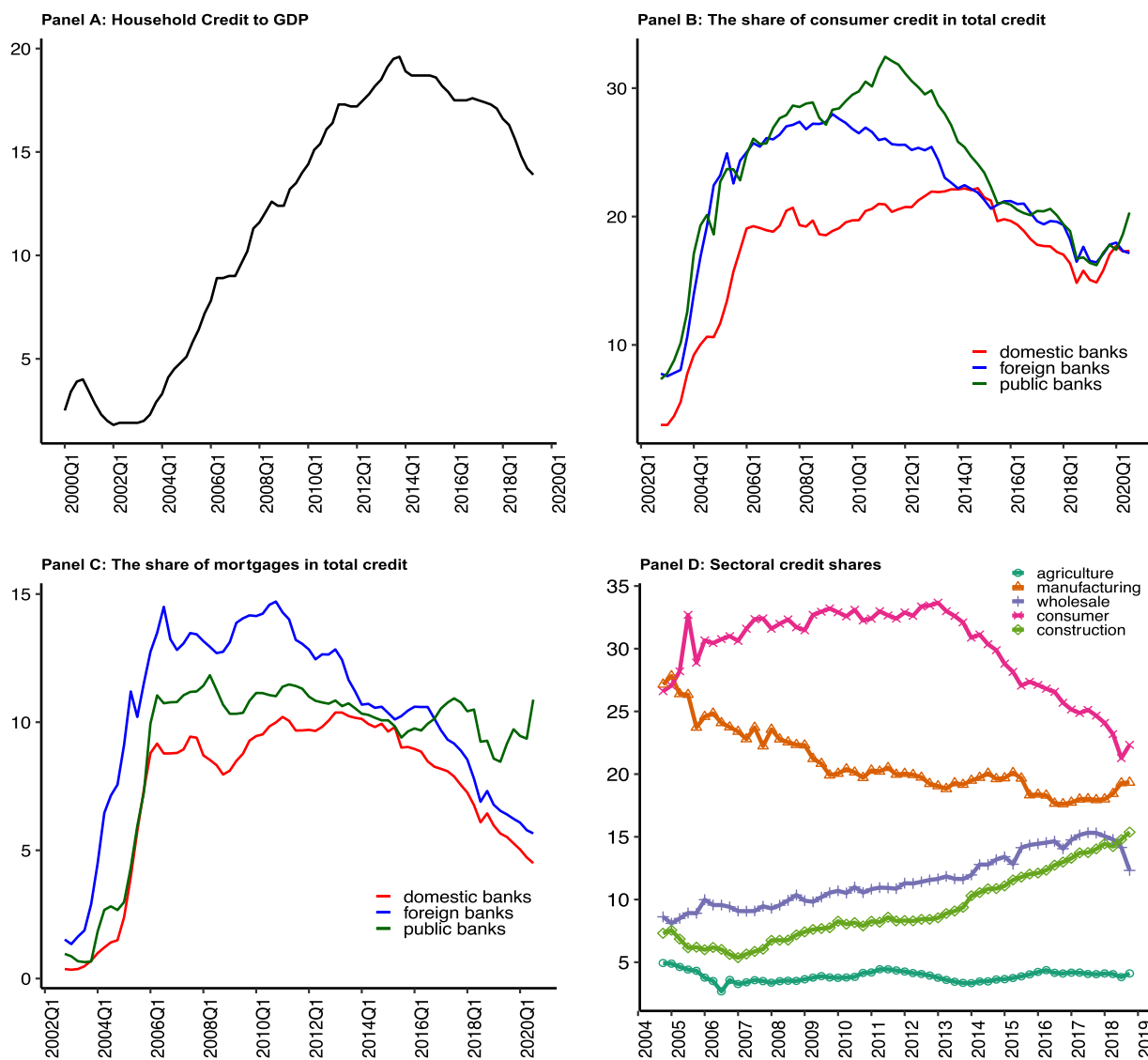
Fig. 2. Developments in bank credit in Turkey **Source:** Bank for International Settlements, Bank Regulation and Supervision Agency (BRSA) & author's calculations. **Note:** All ratios are in percentages.

agricultural constraints on economic growth, and the role of the informal sector (Temple 2005). In contrast, given the focus on advanced economies, for which sectoral differences and structural transformation imperatives are less salient, the post-Keynesian literature on household debt uses single-sector models. However, the prevalence of dual labour and goods market structures in low- and middle-income countries calls for a multisectoral approach to formalising the sectoral effects of household lending.

This paper also relates to the (financial) resource curse and the Dutch Disease literature. This literature, surveyed by Van der Ploeg (2011), investigates how a natural resource discovery could have detrimental effects on economic performance. In a classical Dutch Disease model, a natural resource discovery boosts incomes and hence consumption demand both for tradable and nontradable goods. While the price of tradable goods remains constant due to being internationally determined, the resource boom increases the prices of nontradable goods. The resulting appreciation of the real exchange rate shifts productive resources from the tradable to the nontradable sector (e.g., Corden and Neary 1982). A more recent Dutch Disease model by Martins and Skott (2021) this paper more closely relates to investigates the inflationary effects of commodity price booms. In this model, a boom in commodity prices creates wage pressures and inflationary tendencies, to which the

inflation-targeting central bank responds by raising the interest rate, generating a real exchange rate appreciation. The subsequent fall in the tradable sector profitability causes deindustrialisation.

While the classical Dutch Disease literature was concerned only with real variables (Botta 2018), two recent studies incorporate financial variables in the form of investigating the role of capital flows as a potential source of a resource curse. A model presented by Benigno and Fornaro (2014) illustrates that episodes of abundant access to foreign capital and the accompanying credit expansions result in the allocation of productive resources toward the nontradable sector. In their model, the expansion of the nontradable sector constitutes a problem insofar as this expansion takes place at the expense of the tradable sector, owing to a full employment assumption. In other words, the movement of an already fully utilised labour into a low-productivity sector lowers the growth potential. Botta (2018) similarly builds a financial resource curse model in which a short-lasting boom in portfolio inflows gives rise to a long-lasting deterioration of the productive structure as the initial contraction of the manufacturing sector following the resource boom results in a reduction in the growth rate of domestic labour productivity, curbing the development of the manufacturing sector further by restraining domestic demand expansion.

The model presented in this paper is related to these models insofar

as the expansion of a financial resource negatively affects the sectoral structure. A further similarity with Martins and Skott's paper concerns inflationary tendencies linked to relative wage structure. However, different from these studies, our model centres around household credit expansions – an aspect that has not been explored in these studies. As a result, household debt dynamics, the banking sector behaviour, and stock-flow consistency feature prominently in this paper. Secondly, this model deviates from the full employment assumption in Benigno and Fornaro, given this assumption does not apply to a dual economy context where high levels of un(der)employment are prevalent. As Skott (2020) notes, the official unemployment rate may not be indicative of labour constraints on economic growth in developing countries due to the pervasiveness of underemployed labour. Even when the official unemployment rate is low, the labour supply does not hold back the expansion of the modern sector owing to the prevalence of large reserves of underemployed labour. Finally, whereas most resource curse models are of long-run nature, this paper investigates the macroeconomic implications of household lending booms in a short-run setting, given that the effects of household lending on domestic demand, price movements, and current account balance are more of short-run nature. These departures motivate the modelling exercise in this paper further.

3. Household credit expansion in Turkey

3.1. Increase in Turkish banks' ability and willingness to lend to consumers

During the 1990s, the Turkish economy was marked by chronic inflation rates and unsustainable fiscal deficits. The decade-long macroeconomic and political instability culminated in a major economic crisis in 2001. The economic management cadres announced an IMF-led stabilisation program, the aforementioned TSEP, to combat the crisis. This program has laid the foundations for Turkey's post-2001 growth performance.

The deterioration of the public sector's fiscal balances amidst the high-interest rate environment was one of the main drivers of high inflation rates in the 1990s (Voyvoda and Yeldan 2005). Therefore, disinflation and fiscal discipline were highlighted as the most important objectives of the TSEP. Regarding these two objectives, the program was largely successful. The government budget gave a primary surplus of 6 per cent of GDP between 2002 and 2008, and the inflation rate was brought down to single digits in 2004, from an average of 77 per cent during the 1990s, and it fluctuated around 8 per cent between 2004 and 2016 (Fig. 1).

Given its primary objective of achieving fiscal and inflationary discipline, the TSEP aimed at suppressing the wage compensation of public sector employees and restructuring income transfer policies. While these measures aimed to repress domestic demand, the program did not adequately support an export-led growth strategy either, as there was no roadmap to develop the international competitiveness of key export industries. Neither has the program presented an industrial strategy to boost investment expenditures. The word 'investment' was used mostly in relation to 'financial investment' by foreigners (Bağımsız Sosyal Bilimciler 2001). The lack of a long-run growth strategy and industrialisation targets was this program's major weakness.

Despite its non-negligible shortcomings, the TSEP expressed a legitimate concern that commercial banks were providing too little credit to the private sector as they were focused on investing in high-yielding government debt instruments. In fact, up until 2001, commercial banks were earning most of their revenue from financing the public deficit (Karaçimen 2014). Therefore, the working assumption of the TSEP was that contracting public expenditures and limiting commercial banks' purchase of Treasury securities would crowd in investment by directing bank lending toward private investors.

Meanwhile, during the 2000s, big corporations decreased their reliance on the domestic banking sector due to gaining better access to foreign funding, benefiting from the low international interest rates and excess global liquidity. The end of an era of profiting off high-interest rates on treasury securities accompanied by improved macroeconomic stability encouraged commercial banks to find new sources for profit generation (Karaçimen 2014). As the corporate sector's reliance on domestic bank loans also decreased, commercial banks turned towards consumer lending. Banks resorted to various marketing strategies to encourage consumer credit, especially within the segments of society that were not used to finance their expenditures through borrowing from financial institutions (*ibid.*). As a result, the share of household credit as a percentage of GDP started increasing rapidly from 2001 onward (panel A, Fig. 2). Parallel to this, the share of consumer credit and mortgages increased until 2013, whereas the share of credit allocated to the manufacturing sector declined secularly (panel D, Fig. 2).

Another key driver of the expansion of household credit was the entry of foreign banks into the Turkish banking sector such as HSBC and Citibank. The percentage of foreign banks amongst total banks increased sharply between 2001 and 2007.[10] Foreign bank ownership is typically associated with the reallocation of banks' loan portfolios towards consumer loans due to the technological advantages and the know-how on consumer lending foreign-owned banks possess. For instance, credit scoring methods require data on the performance of up to 30,000 loans to provide a high degree of statistical confidence (Lapavitsas and Dos Santos 2008). In recent decades, this requirement favoured large global banks that already specialised in consumer lending in their home countries and therefore possessed data from their pool of previously extended loans. In the case of Turkey, although foreign banks account only for 12% of the domestic loan provision (Başkaya et al. 2017: 15), the increase in foreign ownership of banking has orientated the Turkish banking sector as a whole towards consumer lending (Ergüneş 2009).

Domestic banks, particularly the two state-owned banks, followed suit and expanded into the mortgage and other consumer credit markets. They adopted aggressive marketing strategies to encourage credit card use, such as offering instalment payment plans, loyalty points, and flier miles (Karaçimen 2015: 121–122). Banks were also competing to acquire the rights to direct deposit employee salaries (Karaçimen 2014: 15). Upon reaching an agreement with the employers, banks would offer employees credit cards and personal loans at favourable interest rates. Similar to the *crédito consignado* loans in Brazil, these arrangements between employers, banks, and workers have contributed to consumer credit growth. In line with these arguments, Fig. 2 (panels B and C) shows that foreign and state-owned banks have allocated a higher share of their loan portfolio to consumer credit and mortgages than privately owned domestic banks.

Although banking regulations have been prudent thanks to the measures undertaken following the 2001 crisis,[11] the Banking Regulation and Supervision Agency lacked a macroeconomic perspective as it focused exclusively on the health of individual banks (Kara, 2016) without controlling the composition of credit and the growth of consumer loans. As Fig. 2 illustrates, the upward trend in consumer loans started reversing after 2013 following the Fed's 'taper tantrum' signal, which indicated a change in global liquidity conditions and led to a major slowdown in capital inflows to emerging markets. In terms of policy measures, the growth of consumer loans was not addressed until March 2020, when the Central Bank introduced a set of changes to reserve requirements to limit the rise in consumer loans and channel

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[10] According to the Banking Regulation and Supervision Agency (BRSA), as of December 2019, there are 53 banks operating in the Turkish banking sector, 34 deposit banks, 13 development and investment banks, and six participation banks. Among these 53 banks, 21 are foreign-owned, where foreign ownership is defined as more than 51 per cent of ownership belonging to foreigners.

[11] For instance, banks are banned from having currency mismatches, foreign currency loans to consumers are prohibited, and to firms, it is highly restricted (Kara 2016).

loan supply towards more productive and production-orientated sectors (Financial Stability Report 2020).

The growth of household lending was closely linked with the strategic importance assigned to the construction sector. AKP governments explicitly promoted the construction sector due to its potential to stimulate economic activity, create jobs, and win loyalty at the ballot box through increased home ownership (Yeşilbağ 2020). One of the ways by which the government promoted the construction sector's growth was to engage in massive construction projects. All the mega projects are in nontradable activities, particularly construction, revealing the sectoral preferences of the government in growth generation (Günçavdı and Ülengin 2017).

It is worth noting that certain demand side factors also played a role in the growth of consumer lending. For instance, decreasing inflation rates and interest rates on consumer loans encouraged consumers to realise consumption demand that they had deferred during the 2001 crisis (Başçı 2006). The dismantling of organised labour through new labour laws introduced in 2003, which increased flexible and low-paying jobs, contributed to households' demand for bank credit further (Karaçimen 2014).

To summarise, restructuring macroeconomic policies under an IMF-supported disinflation program limited the government's ability to stimulate domestic demand. The growth of household credit, enabled and encouraged by the TSEP, worked towards filling this vacuum. Decreasing reliance of the corporate sector on domestic borrowing, the increasing presence of foreign banks and the strategic importance assigned to the construction sector orientated the banking sector towards household lending further. These developments, combined with a growing demand for consumer lending, resulted in a remarkable increase in the household credit to GDP ratio (Fig. 2, panel A).

3.2. Macroeconomic and sectoral effects of consumer-credit expansions in Turkey

One of the natural consequences of the expansion of consumer credit was high growth in final consumption expenditures, excluding the crisis years (Fig. 3, panel A). However, the stimulation of private consumption, together with the appreciation of the real exchange rate (Fig. 4), contributed to the deterioration in the current account deficit since 2001. While current account deficits have been a feature of the Turkish economy even before the 2000s, particularly since the liberalisation of trade and financial flows in the 1980s, these deficits were usually small (Orhangazi and Yeldan 2021) and started deteriorating significantly only after the implementation of the TSEP (Fig. 3, panel B).[12]

Despite the high growth performance during the 2000s, particularly between 2003 and 2007, a period referred to as the "Tulip Era[13]", the consumer credit-fuelled growth strategy has led to a build-up of imbalances and fragilities, such as balance sheet fragilities for firms and households, an overvalued real exchange rate, persistent current account deficits, and sectoral changes favouring the nontradable sectors. Most importantly, this growth strategy lacked a sound industrial policy as short-term gains enabled by an overvalued real exchange rate undermined the industrial base of the economy in the long run (*ibid.*). This short-sighted macroeconomic perspective started running into a crisis following the tapering signal by the Fed in 2013. As Fig. 5 shows, GDP growth started exhibiting a declining trend in 2013.

With regard to sectoral developments, a prolonged period of overvalued real exchange rate promoted the use of imported intermediate goods across many sectors while resulting in the loss of export

competitiveness (*ibid.*) In the manufacturing sector, the import content of exports increased from 27.25% in 2002 to 30.6% in 2012 (Tok and Sevinç 2019). The end result was a case of premature de-industrialisation indicated by the secular increase in the ratio of construction to manufacturing output (Fig. 6, panel A). The ratio of construction sector value added in GDP doubled from 4.6% in 2003 to 8.2% in 2015, whereas the share of manufacturing and services value-added stagnated at around 18% and 60% respectively. In other words, the production structure of the Turkish economy moved away from tradable toward the nontradable sector (Can et al. 2016).

The nontradable to tradable sector employment also increased considerably (Fig. 6, panel B).[14] The construction sector employment grew by about 17% per annum between 2003 and 2010 (Dincer et al., 2022). There was a shift of employment from high and increasing productivity sectors towards sectors with low and falling labour productivity at an economy-wide level. Labour exiting the agricultural sector entered nontradable sectors with stagnant or falling productivity to work as construction workers, security guards, cleaning staff or gardeners instead of going into the manufacturing sector (*ibid.*).

While the relative output and employment ratios moved in favour of the nontradable sector, in terms of absolute growth rates, both manufacturing and construction & real estate sectors enjoyed positive growth since 2002 except for the crises years (Fig. 7). However, the growth rates in the manufacturing sector lagged significantly behind those in the construction & real estate sector, with average rates of 7.3% and 14.7% between 2002 and 2013, respectively.

With respect to sectoral capacity utilisation rates, according to the estimates based on business tendency surveys, there was an upward trend in the early 2000s (Fig. 8) as the economy was recovering from a major earthquake, which struck the country's main industrial region in 1999, and the 2001 crisis (Kurt, 2020). However, excluding the period of the Global Financial Crisis, the average utilisation rate dropped from an average of %78.6 between 2002 and 08 to 76.5% between 2010 and 18. It is worth highlighting that alternative estimates of the manufacturing sector output-capital ratio that are based on firm-level data yield inconsistent trends. For instance, Yilmaz and Kiliç (2021, p. 389) present two sets of estimates based on alternative methods of estimating capital stock levels. While their first method indicates a downward trend in the manufacturing sector capital-output ratio, the second method yields an upward trend between 2005 and 2015. Inconsistencies in alternative data series make it difficult to make decisive conclusions about how the output-capital ratio (which can be used as a proxy for capacity utilisation) in the manufacturing sector developed in this period.

Despite the economy-wide relatively high growth rates (Figs. 5 and 7), the economy suffered from poor productivity growth performance due to adverse developments in sectoral output and employment ratios. According to calculations by Dincer et al. (2022), between 2003 and 2010, annual labour productivity in the manufacturing and services sectors shrank by 0.8% and 4.8%, respectively. The economy-wide labour productivity fell by 3.49% in this period (*ibid.*). The shift of employment towards low-productivity services and construction sector jobs was the main factor behind these numbers (*ibid.*). It is worth

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[12] The current account deficit to GDP ratio did not exceed one per cent throughout the 1990s; it averaged 4.61 per cent between 2002-2013 and reached as high as 9 per cent in 2012.

[13] Boratav (2018) refers to the 2003-2007 period, during which the first AKP government was in power, as the "Tulip Era" (Kurt 2020).

[14] Although this paper primarily focuses on consumer credit, developments in the sectoral composition of firm credit can also shed light on the expansion of the nontradable sector. The micro-econometric evidence on Turkey, presented by Günay and Kılınç (2015), shows that the nontradable sector firms were more financially constrained than the tradable sector ones between 1970 and 2004. This result is not surprising considering that bank credit is a major source of external finance for nontradable sector firms, whereas many tradable sector firms have access to international capital markets, given that they can pledge export receivable as collateral (Tornell and Westermann 2002). Therefore, the nontradable sector is more sensitive to changes in banks' lending standards than the tradable sector. In light of this evidence, it is possible to interpret the rise of the nontradable sector output, particularly of the construction sector, in relation to the rise in credit availability to this sector, as indicated in Fig. 3.

Panel A: Growth Rate of Consumption Expenditures
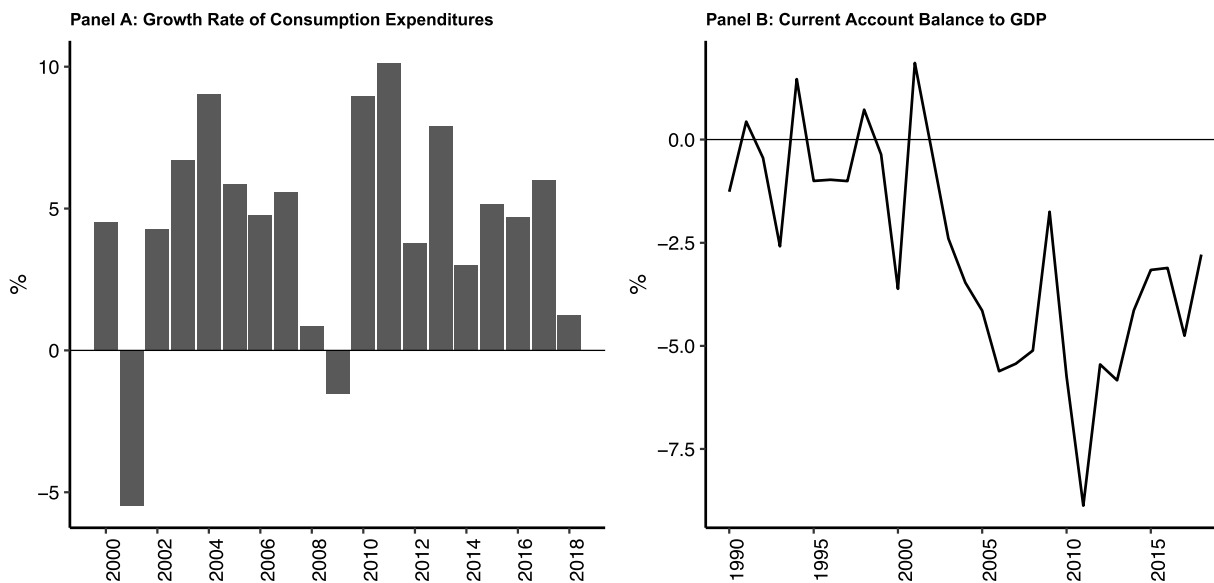
Panel B: Current Account Balance to GDP

Fig. 3. Consumption expenditures and current account balance **Source:** Central Bank of the Republic of Turkey.
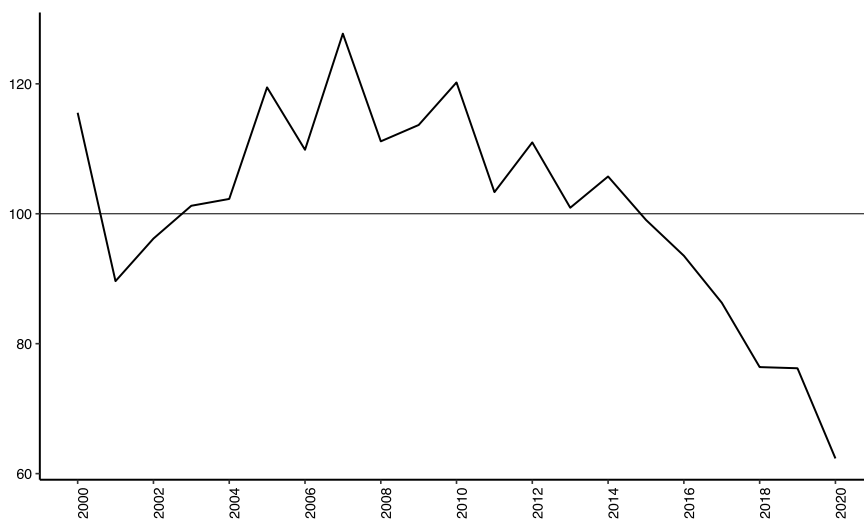
Fig. 4. Real effective exchange rate **Source:** Central Bank of the Republic of Turkey. **Note:** The RER reflects the weighted geometric average of the prices in Turkey relative to the prices of its principal trade partners in international markets.

highlighting that these sectoral shifts in employment and output, and associated productivity problems, coincide closely with credit policies favouring household and construction sectors.

4. The model

4.1. Production

The economy under consideration consists of two sectors: a tradable (T-sector) and a nontradable sector (N-sector). Given that the model is a short-run model, capital stock is assumed to be fixed. Therefore, we can use the T-sector output-capital ratio (denoted by σ) to track the sectoral implications of consumer credit expansions. Contractions in this ratio, corresponding to an increase in the N-sector output and a deterioration of the T- to N- sector output ratio, will be used as an indicator of premature deindustrialisation. Accounting relations on the model are summarised in Table 1.

The tradable sector produces output Y_T using modern production techniques, and labour exhibits high productivity. The output of this

sector can be exported or used for domestic consumption. The production is characterised by a Leontief production function. The capital coefficient is taken to be constant. $\sigma \leq \overline{\sigma}$ indicates that the economy is operating below full capacity.

$$Y_T = \min\{\overline{\sigma}K, AL_T\} = \sigma K = AL_T \ \sigma \leq \overline{\sigma} \tag{1}$$

The nontradable sector produces output Y_N using labour as the only input. This assumption reflects the stylised observation that capital intensity is lower in the production of nontradable goods. Eq. (2) gives the production function for the nontradable sector, where e denotes the 'employment rate' in the nontradable sector and unemployment, $1 - e$ can take the form of hidden unemployment.

$$Y_N = BeL_N \tag{2}$$

Labour is assumed to be mobile across sectors. Workers prefer to be employed in the T-sector, and those who cannot find jobs in the T-sector move into the N-sector.

$$L = L_T + L_N \tag{3}$$

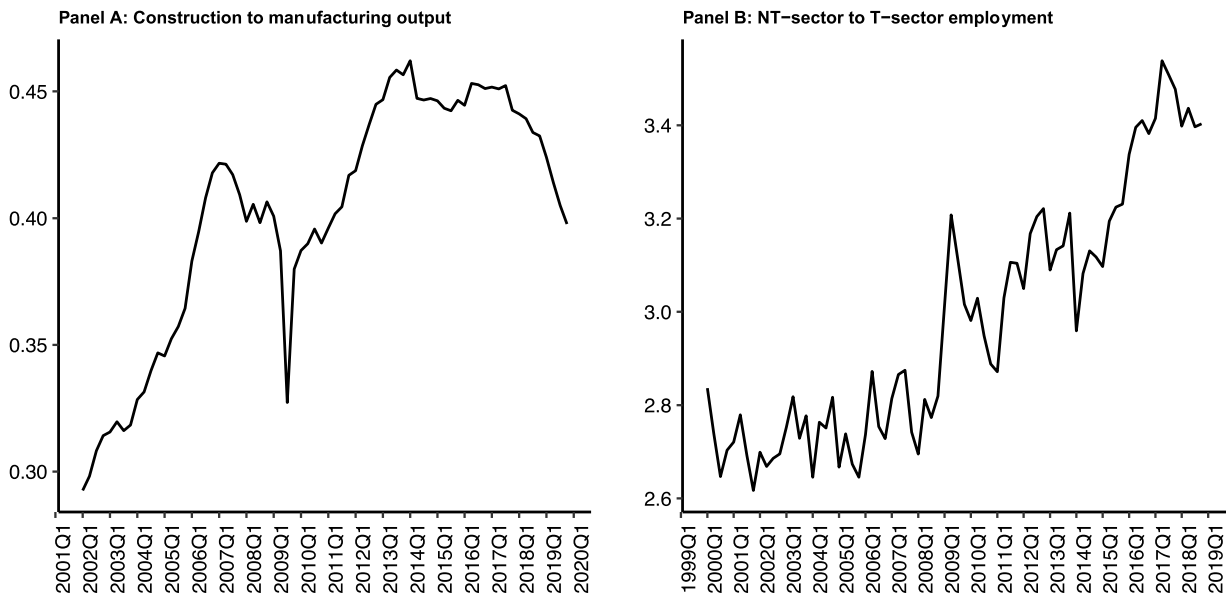**Fig. 5.** GDP growth **Source:** IMF, World Economic Indicators (April 2020).

Fig. 6. Sectoral relative output and employment ratios **Source:** Turkish Statistical Institute (TUIK).

Using Eq. (3), Eq. (2) can be re-written as:

$$Y_N = BeL_N = Be(L - L_T) = BeL\left(1 - \frac{\sigma K}{AL}\right) = BeL(1 - \sigma\lambda) \quad (4)$$

where λ is given by:

$$\lambda = \frac{K}{AL} \quad (5)$$

4.2. Demand

Aggregate consumption (pC) is divided into three components: i) demand for domestically produced nontradable goods ($p_N C_N$), ii) demand for tradable goods ($p_T C_T$), and iii) demand for foreign-produced tradable goods ($np^* C_{IM}$). All nontradable income is spent on consumption.[15] Similarly, wage earners in the T-sector consume all their earnings

plus their borrowing net of interest payments ($\dot{D}^W - iD^W$) on their total stock of debt. In line with the standard structuralist and Kaleckian literature, I assume that capitalists save a fraction of s of total profits, πY_T. Capitalists spend a proportion of their profit income plus their net interest earnings on consumption.

$$pC = p_N C_N + p_T C_T + np^* C_{IM}$$
$$= p_N Y_N + (1 - \pi)p_T Y_T + \dot{D}^W - iD^W + (1-s)\left(\pi p_T Y_T - iD^C + iM^C\right) \quad (6)$$

where p, p^*, p_N, and p_T denote the general price level, foreign prices, prices of N-sector goods, and prices of T-sector goods, respectively.

Each of the three goods receives a fixed share of total domestic spending on consumption, corresponding to a Cobb-Douglas utility function.[16] Eqs. (7)-(9) show that a proportion α of total consumption demand goes to nontradable goods, while the rest $1 - \alpha$ goes to the

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[15] Appendix E shows that the qualitative results of the model do not change if we relax this assumption.

[16] This assumption is made for algebraic convenience. Furthermore, the assumption of fixed consumption shares is a reasonable approximation for the short and medium run (Skott and Gómez-Ramírez 2018).
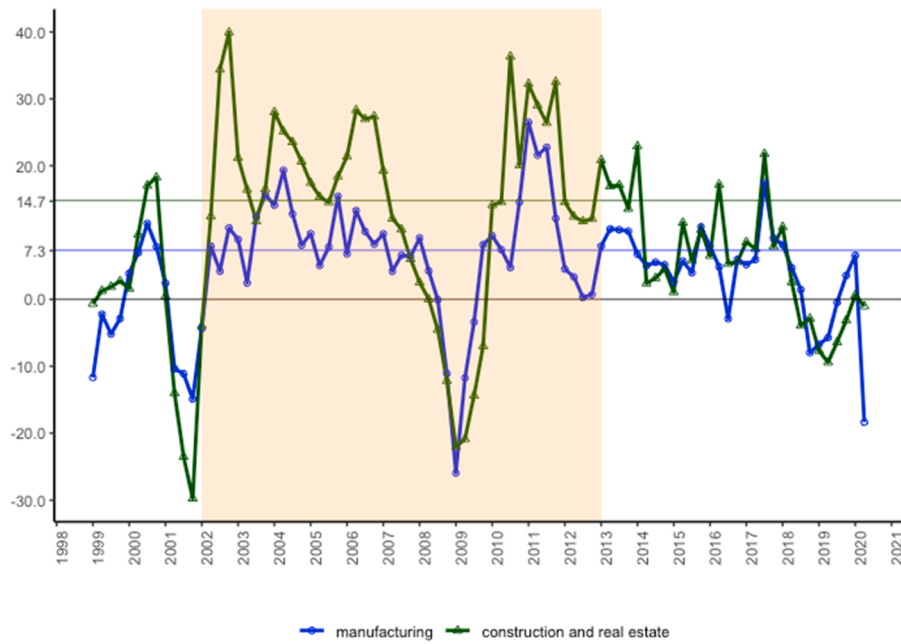
Fig. 7. Growth rates of the manufacturing and construction & real estate sectors.

Fig. 8. Capacity utilisation rate in the manufacturing sector. **Source:** OECD MEI.

tradable goods. The demand for tradable goods is divided between domestically and foreign-produced goods, with shares $1 - \psi$ and ψ respectively.

$$p_N C_N = \alpha p C \tag{7}$$

$$p_T C_T = (1 - \psi)(1 - \alpha)p C \tag{8}$$

$$n p^* C_{IM} = \psi(1 - \alpha)p C \tag{9}$$

The nominal exchange rate, n, is defined as the number of units of domestic currency required to buy one unit of foreign currency. Hence, an increase in n corresponds to a depreciation of the domestic currency. Following the standard interest parity arguments, the nominal exchange rate can be represented as a function of the domestic interest rate (i),

foreign interest rate (i^*), expectations of the future exchange rate (E^n), and risk considerations that are independent of exchange rate expectations (τ) (Eq. (10)) (Martins and Skott 2021). The expected exchange rate and the risk premium change in response to any domestic or international macroeconomic shock. Foreign prices are exogenously given.

$$n = n(i, \ i^*, \ E^n, \tau) \tag{10}$$

The real exchange rate (η) is defined as the relative price of foreign and domestically produced goods in domestic currency:

$$\eta = \frac{n p^*}{p_T} = \frac{n(i, \ i^*, \ E^n, \tau) p^*}{p_T} = \eta \left(i, \ i^*, \ E^n, \tau, \frac{p^*}{p_T} \right)$$

By subsuming τ, i^*, E^n, and $\frac{p^*}{p_T}$ into a shift variable ρ, the real exchange

rate is given by Eq. (11).

$$\eta = \eta(i, \rho); \eta_i < 0, \eta_\rho > 0 \tag{11}$$

Investment requires both domestic tradable goods and imported goods, with strict complementarity.[17] Real investment is given by:

$$I = \min\left\{\frac{I_T}{\beta}, \frac{I_{IM}}{1-\beta}\right\} \tag{12}$$

Nominal investment is given by:

$$p_K I = [\beta p_T + (1-\beta)np^*]I \tag{13}$$

Investment behaviour is given by Eq. (14). Given the fixed coefficient production function, the output-capital ratio can be used as an indicator of capacity utilisation. Capacity utilisation appears as the only argument in the investment function. The sensitivity of investment to changes in utilisation, given by a_1, depends on the time frame under consideration. Given that the sensitivity is likely to be low in the short run, we can assume that the Keynesian stability condition is satisfied, meaning that the saving rate responds more to changes in capacity utilisation than investment.

$$\frac{I}{K} = a_0 + a_1\sigma \tag{14}$$

Eq. (15) shows that exports depend positively on the real exchange rate. The effect of foreign income on exports is omitted. Net exports are given by Eq. (16) where imported goods used for investment and consumption of imported tradable goods are deducted from exports.

$$p_T X = p_T \phi(\eta), \phi'(\eta) > 0 \tag{15}$$

$$NX = p_T X - np^*(1-\beta)I - \psi(1-\alpha)pC \tag{16}$$

4.3. Wages and prices

Nominal wages in the T-sector, w_T, are predetermined. Assuming a constant mark-up, prices in the T-sector, p_T, are also predetermined. Therefore, profit share is given by:

$$\pi = 1 - \frac{w_T}{Ap_T} \tag{17}$$

The nontradable sector is characterised by income/work sharing, which is a commonly employed assumption in dual economy models.[18] The average income (wage) in the N-sector is therefore given by total income divided by the number of workers not employed in the tradable sector.

$$w_N = p_N \frac{Y_N}{L_N} = p_N Be \tag{18}$$

Aggregate income in the N-sector is demand determined. However, we do not know whether the increase in nominal income ($p_N Y_N$) results

Table 1
Balance sheet matrix **Note:** Assets appear with positive signs and liabilities with negative signs. Given that each financial asset has a counterpart as a financial liability, all rows sum to zero except for the fixed capital row.

	Workers	Capitalists	Banks	External	Sum
Fixed Capital		$p_K K$			$p_K K$
Loans	$-D^W$	$-D^C$	$D^W + D^C$		0
Deposits		M^C	$-M^C - M^F$	M^F	0
Net Worth	$-D^W$	$p_K K - D^C + M^C$	$D^W + D^C - M^C - M^C$	M^F	$p_K K$

from an increase in prices (p_N) or output (Y_N). A higher demand for N-goods can i) increase p_N, ii) reduce the rate of unemployment and raise Y_N, iii) or some combination of two might take place. Regardless of the specific channel by which a higher demand for N-goods translates into a higher $p_N Y_N$, an increase in N-sector incomes would result in wage inflation in the T-sector if workers in this sector respond to higher average incomes in the N-sector by demanding an increase in their wages.

Following Martins and Skott (2021), the specification for wage inflation in the T-sector incorporates relative wage norms whereby an increase in the N-sector income triggers upward pressures on T-sector wages. This is represented by Eq. (19). (Hat over a variable is used to denote growth rates ($\widehat{X} = (dX/dt)/X$).

$$\widehat{w_T} = f\left(\frac{w^O}{w_T} - 1\right), f(0) = 0, f' > 0 \tag{19}$$

where w^O is the target (objective) wage rate of T-sector workers, which is proportional to the average income in the N-sector (Eq. (20)). The target level of wage can be interpreted in relation to the norms of fairness.[19] Eq. (20) shows that the target wage rate in the T-sector is higher than average incomes in the N-sector ($\mu > 1$). Firms can be expected to pay a wage premium under the standard rationales of efficiency wage theory (*ibid.*). The non-negative wage premium is also a common assumption in dual sector models in the tradition of Lewis (1954).[20]

$$w^O = \mu w_N \tag{20}$$

4.4. Banking behaviour and debt dynamics

A skeletal banking system is assumed. All foreign (net) capital inflows take the form of changes in foreign held deposits in domestic banks ($\dot{M}^F$). All foreign deposits are held in domestic currency. Domestic firms are owned by capitalists, who also receive interest income on their bank deposits. Eq. (21) shows that total loans, divided into loans given to workers (D^W) and capitalists (D^C), and deposits, by foreigners (M^F) and capitalists (M^C), are equal, which means that banks have no reserves.

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[17] In the model, while domestically produced and imported goods are substitutes in consumption, they are complements in investment. This assumption is a stylised representation where the home country is importing sophisticated investment goods, such as machinery and equipment, that are essential but cannot be produced domestically.

[18] Income sharing assumption features prominently in Lewis's seminal 1954 paper, where labour in the informal/subsistence sector is paid the average product or some function of the average product. The employment of workers with negligible marginal productivity in the subsistence sector indicates the existence of income sharing in the Lewis model. This assumption implies that workers who cannot find jobs in the modern sector (the tradable sector as in this model) work in the subsistence/informal (or nontradable) sector, sharing work with family members. This assumption remains to be a typical characterisation of wage determination in more recent dual economy models. See, for instance, Razmi (2015), Razmi et al. (2012), and Martins and Skott (2021).

[19] Formulating a target wage rate shares affinities with the post-Keynesian conflicting claims theory of inflation (Rowthorn 1977). In this theory, the general price level comprises various cost components whereby each interest group receiving income from these components comes into conflict to increase their relative income shares. Given the assumption of constant labour productivity employed in this paper, we can think of demanding a desired functional distribution versus a desired real wage as being the same. It should also be noted that besides the N-sector wages, the employment rate in the T-sector is likely to influence the target wage rate as it shapes workers' perceptions of their bargaining power (Porcile and Lima 2010). However, this paper abstains from this aspect of wage setting to keep the formal analysis easily tractable.

[20] Lewis (1954) discusses a few different rationales for the existence of wage premium, such as "the payoff to experience in the capitalist sector." In his later work, Lewis drew attention to the role of labour unions and minimum wages in explaining the wage premium (Fields 2004, p. 726).

Table 2

Transaction-flow matrix **Note:** The sources of funds appear with a positive sign and uses with a negative sign. Columns display the budget constraint of each group/sector in the economy, and rows indicate how different components of national income are earned and spent.

	Households	Firms		Banks		External	Sum
		Current	Capital	Current	Capital		
Consumption	$-C_N - C_T$	$C_T + C_N$					0
Investment		pI_T	$-pI_T$				0
Exports		pX				$-pX$	0
Imports	$-C_{IM}$	$-I_{IM}$				$C_{IM} + I_{IM}$	0
Wages	$W_N + W_T$	$-W_T - W_N$					0
Profits		$-\Pi$	Π				0
Interest payments	$-iD^C$	iM^C		$iD^C - iM^C - iM^F$		iM^F	0
Δ in loans	$\dot{D}^W$	$\dot{D}^C$			$-\dot{D}^c - \dot{D}^W$		0
Δ in deposits		$-\dot{M}^c$			$\dot{M}^c + \dot{M}^F$	$-\dot{M}^F$	0
Sum	0	0	0	0	0		0

With interest rates on borrowing and lending are being the same,[21] banks have zero profits.

$$D^W + D^C = M^F + M^C \tag{21}$$

Workers take on debt for consumption purposes whereas capitalists borrow to finance investment spending. Firms'/capitalists' finance constraint is given by Eq. (22). This equation suggests that for capital accumulation (Eq. (13)), to exceed internal funds and interest income net of interest payments on debt, and deposits, it needs to be financed by new borrowing.

$$p_K I = s\left(\pi p_T Y_T - iD^C + iM^C\right) + \dot{D}^c - \dot{M}^c \tag{22}$$

A key assumption of the model is that workers are subject to credit rationing; therefore, consumer credit expansions are explained by changes in banks' willingness and ability to lend to households. There are no constraints on total amount of loans that can be borrowed by firms.[22] Eq. (23) expresses the change in workers' debt ($\dot{D}^w$) as a function of the target level of lending (to workers) as determined by banks (D^T), and actual stock of workers' debt (D^W), where θ is a positive constant. This specification of debt dynamics shares affinities with Dutt (2006) and Ryoo and Kim (2014).

$$\dot{D}^W = \theta\left(D^T - D^W\right) \tag{23}$$

The target level of lending, the key variable of interest in this model, reflects banks' willingness and ability to give consumer loans. As discussed in Section 3, in the case of Turkey, the policy-induced transformations in government financing and the banking sector in the aftermath of the 2001 crisis have led to the diversification of banking activities towards consumer lending. Changes in the target level of lending towards consumers reflect this sort of policy-induced increases

in borrowing opportunities faced by consumers.[23]

Eq. (24) reflects the balance of payments. The first term in brackets represents the current account, i.e., net exports minus interest payments on foreigners' deposits. The second term represents the financial account, i.e., net capital inflows, which take the form of changes in deposits held by foreigners in domestic banks.

$$\left(NX - iM^F\right) + \dot{M}^F = 0 \tag{24}$$

Regarding central banking behaviour, the central bank adopts an inflation-targeting framework, where the interest rate is used as a tool to keep inflation under control.[24] As such, whenever there is upward pressure on the general price level, the central bank increases the interest rate to keep inflation at a targeted rate. This assumption is in line with the central banking practices prevalent in most developing countries.

All flows of current and capital transactions are summarised in a transaction-flow matrix, given in Table 2.

4.5. Equilibrium

To solve the model for the endogenous variables σ and i, we first need to define the equilibrium conditions for the two sectors. Using Eqs. (4), (17), and (18), the equilibrium condition for the N-sector can be expressed as:

$$p_N Y_N = p_N BeL(1 - \sigma\lambda) = p_N C_N = \alpha pC \tag{25}$$

With a fixed mark-up, a successful inflation targeting requires a constant wage inflation. This in turn requires that 1) the actual wage in the T-sector is equal to the target wage, and 2) there is a fixed relationship between the wages in the two sectors. These two conditions can be summarised as:

$$w_T = w^O = \mu w_N \tag{26}$$

Using Eqs. (17), (18), and (26), Eq. (25) can be solved for T-sector output-capital ratio as follows (see appendix A for intermediate steps):

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[21] Credit rationing suggests that banks find lending to households risky, and they expect some households to default. As such, it might be unreasonable to expect the interest rates on lending and borrowing to be the same. We could introduce an interest rate spread; however, qualitative results would not change as long as banks are owned by domestic capitalists and any profits are paid out to them as dividends. This is because whether capitalists earn interest income on their deposits or earn dividend income does not change their consumption behaviour.

[22] Alongside consumers, small and medium-sized enterprises, particularly those operating in the nontradable sector, typically face credit constraints (Günay and Kılınç 2015). This paper does not formalise the credit constraints firms face.

[23] As stated in section 3, consumer lending expansion in Turkey had demand driven aspects too. Equation 23 abstracts from these aspects. This equation therefore represents an 'extreme case' of credit constraints whereby new lending depends solely on changes in the banks' willingness and ability to lend as borrowers are assumed to be in debt up to their credit limits.

[24] The behaviour of the monetary authority is not explicitly modelled here. Inflation targeting endogenises the interest rate. Therefore, to see the central bank's behaviour formally, we need to look at comparative statics. Appendix C shows that the partial derivative of the equilibrium interest rate with respect to new household borrowing is positive.

$$\sigma = \frac{1}{\left[\frac{B}{A} + \frac{\alpha}{1-\alpha}(1-s\pi)\frac{B\mu}{A(1-\pi)}\right]}\left\{\frac{B}{A\lambda} - \frac{\alpha}{(1-\alpha)}\frac{B\mu}{A(1-\pi)}\frac{\dot{D}^W}{p_T K}\right.$$
$$\left. + \frac{\alpha}{(1-\alpha)}\frac{B\lambda}{A(1-\pi)}\frac{[sD^W + (1-s)M^F]i}{p_T K}\right\} \tag{27a}$$

Eq. (27a) expresses the value of σ that is consistent with the assumption of constant inflation as a function of $\dot{D}^W$, i and a set of exogenous and predetermined variables. Looking at the partial derivatives, we can establish that this equation expresses σ as an increasing function of i and as a decreasing function of $\dot{D}^W$, Eq. (27a) can be written in implicit form as:

$$G\left(\sigma, i, \dot{D}^W\right) = 0 \quad G_1 > 0, \quad G_2 < 0, \quad G_3 > 0 \tag{27b}$$

So far, we have looked at the equilibrium condition for the N-sector. We also need to take the equilibrium condition for the T-sector, which is given by:

$$p_T Y_T = p_T C_T + p_T I_T + p_T X_T = (1-\psi)(1-\alpha)pC + p_T \beta I + p_T \phi(\eta) \tag{28}$$

Solving this equation for output-capital ratio yields (see appendix B for intermediate steps):

$$\sigma = \frac{1}{1 - (1-\psi)(1-s\pi) - \beta a_1}\left\{(1-\psi)\left(\frac{\dot{D}^W}{p_T K} - \frac{[sD^W + (1-s)M^F]i}{p_T K}\right)\right.$$
$$\left. + \beta a_0 + \frac{\phi(\eta)}{K}\right\} \tag{29a}$$

Eq. (29a) expresses σ as a decreasing function of i and an increasing function of $\dot{D}^W$. This equation can also be rewritten in implicit form as:

$$H\left(\sigma, i, \dot{D}^W\right) = 0 \quad H_1 > 0, \quad H_2 > 0, \quad H_3 < 0 \tag{29b}$$

We now have two equations (Eqs. (27b) and (29b)) that we can use to determine σ and i.

4.6. Comparative statics

The effects of household credit expansion on tradable sector output

Having specified the equilibrium conditions, we can now solve the model and analyse how an increase in D^T affects the sectoral dynamics through its influence on $\dot{D}^W$. To do so, we can look at the partial derivative of the equilibrium value of tradable sector output-capital ratio (given by σ^*) with respect to $\dot{D}^W$. This derivative is negative provided that i) the real exchange rate is interest elastic, and ii) Marshall-Lerner condition holds[25] (see appendix C for a formal proof of this result).[26]

$$\frac{d\sigma^*}{d\dot{D}^W} < 0 \tag{30}$$

The effects of household credit expansion on nontradable sector output

From Eq. (4), we have: $p_N Y_N = p_N BeL(1 - \sigma\lambda)$. Given the constancy of $p_N e$, B, L and λ, we can see that $p_N Y_N$ would unambiguously increase

as an increase in $\dot{D}^W$ causes σ to decline, as can be seen from Eq. (25).

The short-run equilibrium of the model is graphically represented in Fig. 9. NN locus represents the equilibrium in the N-sector (Eq. (27a)). This locus slopes upward in the (σ, i) space. Higher interest payments on workers' and capitalists' debt reduce the demand for N-sector output. Given that N-sector incomes are demand determined and a lower N-sector nominal income ($p_N Y_N$) corresponds to a higher σ, we obtain a positive relationship between σ and i along the N-sector equilibrium. TT locus represents the equilibrium in the T-sector (Eq. (29a)). This schedule slopes downward because a higher interest rate lowers consumption demand and net exports, corresponding to a lower σ.

When there is an exogenous increase in banks' willingness to lend to consumers, the NN locus shifts leftward: for a given level of i, we have a higher level of nominal output in the nontradable sector (corresponding a lower σ). We also observe a rightward shift in the TT locus: for a given level of i, we have a higher output-capital ratio in the T-sector. The two shifts result in a higher i and lower σ. The intuition behind this outcome is as follows.

When there is new borrowing by households, the total consumption demand increases, a portion α of which feeds into the N-sector. Higher demand for N-goods translates into an increase in $p_N Y_N$, representing an increase in the average incomes in this sector. Given that the target wage rate in the T-sector exceeds average incomes in the N-sector (i.e., $\mu > 1$) an increase in N-sector average incomes puts upward pressure on T-sector wages. With mark-up pricing, wage pressures in the T-sector translate into inflationary pressures. Under an inflation targeting framework, the central bank would raise the interest rate to contain the rise in domestic prices. This intervention causes an appreciation of the nominal, and hence the real exchange rate (η falls, Eq. (11)). This results in a loss of competitiveness and contraction of output in the T-sector.[27]

Taken together, the two comparative statics we looked at so far indicate that an increase in banks' appetite for consumer lending expands the N-sector output while resulting in the contraction of the T-sector output-capital ratio. In other words, consumer credit expansion moves the relative output ratio towards the N-sector. This result is consistent with the data presented in Fig. 6.[28]

The effects of household credit expansion on net exports
Net exports were given by:

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[25] There is empirical evidence in favour of the Marshall-Lerner condition even in countries with a relatively high share of intermediate goods imports (Martins and Skott 2021). For instance, econometric evidence presented by Karamollaoğlu and Yalçın (2020) indicates that a real depreciation of the Turkish Lira has a positive impact on export shares even though this impact is muted to some extent for firms operating in sectors that use imported inputs intensively.

[26] Taking the partial derivative of σ^* with respect to D^T is algebraically too involved. Therefore, Appendix C uses the Implicit Function Theorem to find the partial derivative of σ with respect to $\dot{D}^W$. Note that any increase in D^T directly translates into an increase in $\dot{D}^W$.

[27] So far, the model assumed an inflation-targeting central bank. Given that central banking practices pursued in Turkey have diverted from these principles since 2018, it is worth considering how the model's results would have changed if we relaxed this assumption. Relaxing the inflation targeting assumption would mean that any increase in the average incomes in the N-sector would have generated upward pressure on T-sector wages and prices, generating inflation. If the central bank keeps the interest rate constant, an increase in T-sector prices would have translated into an appreciation of the real exchange rate (given $\eta = \frac{np^*}{p_T}$ and assuming exogenously given foreign prices). However, if the central bank pursued a different strategy that necessitated lowering policy rates, either to target lower inflation (a strategy that would fit with President Erdoğan's unorthodox thesis that "higher interest rates cause high inflation") or to pursue a 'competitive exchange rate policy', new household lending, together with a reduction in the policy interest rate, would have resulted in depreciation of the RER, stimulation of exports, and higher inflation. While a formal representation of these dynamics is beyond the scope of this paper, this preliminary discussion suggests that after relaxing the inflation-targeting assumption, this model can be used to illustrate the performance of the Turkish economy after 2018.

[28] Comparative statics show that easing consumer lending standards benefits the nontradable sector at the expense of the tradable sector, holding everything else constant. This conclusion does not exclude the possibility of a positive tradable sector output growth in real life given that the tradable sector's performance is likely to be influenced by various other domestic and international factors, such as industrial policy, consumer confidence, and international economic climate.
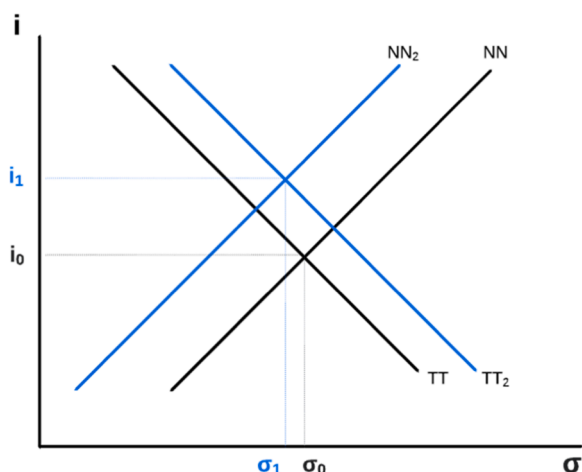
Fig. 9. The effect of household credit expansion on σ and i.

$$NX = p_T X - np^*(1-\beta)I - \psi(1-\alpha)pC$$

$$= p_T\phi(\eta) - np^*(1-\beta)K(a_0 + a_1\sigma) - \psi(1-\alpha)pC$$

Without restrictions on some of the parameters, the net effect on net exports appears to be ambiguous. The effect of an increase in $\dot{D}^W$ is likely to be negative for small values of β, if the sensitivity of accumulation to changes in output a_1 and the share of consumption going to imported tradable goods is high. The intuition behind these conclusions is as follows. When there is an increase in $\dot{D}^W$, consumption demand increases. If only a small share of domestically produced tradable goods are used for investment (and if a large share of investment relies on imported tradable goods), then the effect of an increase in $\dot{D}^W$ on net exports is likely to be negative. Furthermore, if the sensitivity of investment to changes in income is high, more capital goods will be imported when there is an increase in aggregate demand and income following a relaxation of lending standards. Likewise, if the share of consumption going to imported tradable goods is high, looser lending standards are likely to have a more negative effect on net exports.

Before concluding the formal analysis, this is a good place to note that this model is stock-flow consistent in the sense that the balance sheet condition for the banking sector is maintained over time for any value of $\dot{D}^W$ by the financial flows that the model determines (i.e., $\dot{M}^F + \dot{M}^C = \dot{D}^W + \dot{D}^C$) (See appendix D for a formal proof.)

5. Conclusion

This paper presented a dual-economy model to analyse how policy-induced expansions in household credit can generate premature deindustrialisation when borrowing constraints on consumers are lifted and an inflation-targeting regime is in place. While the literature on household debt has proliferated in recent years, there have not been any attempts to evaluate the implications of credit-financed consumption in dual economies using a formal model. The lack of attention given to sectoral dynamics in the post-Keynesian literature on household debt, the absence of household lending and banking sector behaviour in the resource curse literature, coupled with the need to evaluate the weaknesses of consumer credit-led growth strategies that many developing countries like Turkey adopted in recent years, motivated the modelling exercise in this paper. The main contribution of this paper hence lies in the development of a formal model that depicts a specific mechanism by which household credit expansions can generate undesirable macroeconomic and sectoral outcomes in developing countries.

The model developed in this paper presents several directions for future research. Firstly, the model analysed the sectoral implications of

credit expansions in a short-run setting. The short-run focus is motivated by the effect that the effects of consumer lending on domestic demand, price movements, and current account balance are more of short-run nature. However, future research should complement the analysis presented in this paper by introducing a long-run perspective.[29] Secondly, the financial side of the model is kept relatively simple. The model does not distinguish between different types of capital inflows as financial inflows take the form of changes in deposits held by foreigners in domestic banks. Examining how domestic credit expansion interacts with different types of capital inflows can be a helpful direction for future research. Furthermore, foreign currency-denominated assets and liabilities in the banking sector's balance sheet are assumed away. Therefore, the model does not allow for examining balance sheet mismatches in the banking sector that could arise from movements in the real exchange rate. Future modelling exercises could take these asymmetries into consideration.

Given the relatively narrow focus of the paper, the formal model is not equipped to account for some of the descriptive statistics presented in Section 3, such as the declining GDP growth trend in 2013 (Fig. 5), positive growth rates in the manufacturing sector (Fig. 6), or the sectoral labour productivity trends presented in Fig. A1. Accounting for these developments is beyond the scope of this paper and would require expanding the formal analysis in various directions, such as introducing industrial policies, a more extensive treatment of financial flows, and endogenising labour productivity.

The paper used the key macroeconomic developments in the Turkish economy between 2002 and 2018 to motivate the model. Changes in the fiscal policy and the banking sector regulations after the 2001 crisis, coupled with favourable international financial conditions, orientated the Turkish banking sector towards household lending. By highlighting the role of the 'target level of debt', this paper illustrated that the growth of credit-financed consumption expenditures was not a pure market result but more of a policy choice. Although the credit-led growth strategy contributed to high growth rates in the short-run by stimulating domestic demand, this process was accompanied by the build-up of several imbalances, such as the appreciation of the RER, expansion of the current account deficit, and deterioration of the sectoral structure. The formal model presented in this paper illustrated a mechanism by which policy-induced expansions in household lending generate these outcomes.

Using the Turkish economy as a case study to contextualise a formal model that centres around the assumption of an inflation-targeting central bank might seem paradoxical to the followers of the Turkish economy given President Erdoğan's strong ideological opposition to high interest rates and the political influence he exerts over the Central Bank (Demiralp and Demiralp, 2019). In recent years, Erdoğan labelled high interest rates as the "mother and father of all evil" and equated the CBRT's attempts to raise the rates as "selling out the homeland" and "acceding to the wishes of Western powers". Between 2016 and 2021, Erdoğan fired four Central Bank governors due to disagreements over interest rate policy. This paper has documented that the policy regime between 2002 and 13 differed significantly from the policy practices characterising the Turkish economy in more recent years. A widely shared view amongst Turkey scholars is that policy reforms in the aftermath of the 2001 crisis have embarked Turkey on a high growth path and that the economic turmoil experienced since 2018 could be resolved by restoring institutions and policy choices characterising the

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[29] While a long-run extension is beyond the scope of this paper, some preliminary directions can be given. A long-run extension could necessitate changes to the investment function. Making labour productivity a function of the rate of accumulation (à la Verdoorn effect), introducing increasing returns to scale, relaxing the assumption of constant consumption shares, and incorporating imported intermediate inputs can be other useful directions to follow for a long-run extension of the model.

2003–07 period (see Akçay and Güngen 2022 for a critical discussion of this view). In contrast, this paper has shown that some key policy choices defining this period, such as stimulating credit-financed consumption expenditures, nontradable sector investments and overvalued currency, have undermined the economy's productive structure. Therefore, instead of restoring a growth strategy that has proven to be incompatible with structural transformation, the future policy ought to be structured around a different set of premises if Turkey is to realise a

more sustainable development path. Curbing aggressive lending to households, avoiding strong overvaluation of the domestic currency, and devising credit, trade, and industrial policies targeted at higher productivity sectors can be useful steps in this direction.

Data availability

Data will be made available on request.

Appendix A. Nontradable sector equilibrium

$$p_N Y_N = p_N BeL(1 - \sigma\lambda) = p_N C_N = \alpha pC \tag{A.1}$$

Solving Eq. (25) (A.1) for tradable sector output-capital ratio yields:

$$p_N Y_N = \alpha\left[p_N Y_N + (1 - \pi)p_T Y_T + \dot{D}^W - iD^W + (1 - s)\left(\pi p_T Y_T - iD^C + iM^C\right)\right] \tag{A.2}$$

Re-arranging the terms and using Eq. (21):

$$(1 - \alpha)p_N Y_N = \alpha\left[(1 - s\pi)p_T Y_T + \dot{D}^W - siD^W - (1 - s)iM^F\right] \tag{A.3}$$

Using Eq. (4):

$$p_N BeL(1 - \sigma\lambda) = \frac{\alpha}{1 - \alpha}\left[(1 - s\pi)p_T Y_T + \dot{D}^W - siD^W - (1 - s)iM^F\right] \tag{A.4}$$

Dividing both sides by $p_N e K$:

$$\frac{BL(1 - \sigma\lambda)}{K} = \frac{\alpha}{1 - \alpha}\left[(1 - s\pi)\frac{p_T}{p_N e}\sigma + \frac{p_T}{p_N e}\frac{\dot{D}^W}{p_T K} - \frac{p_T}{p_N e}\frac{[sD^W + (1 - s)M^F]i}{p_T K}\right] \tag{A.5}$$

Using Eqs. (17) and (18), $\frac{p_T}{p_N e}$ can be rewritten as: $\frac{p_T}{p_N e} = \frac{B}{A(1-\pi)}\frac{w_T}{w_N}$. Inserting this expression into equation A.5 gives:

$$\frac{BL(1 - \sigma\lambda)}{K} = \frac{\alpha}{1 - \alpha}\left[(1 - s\pi)\frac{B}{A(1 - \pi)}\frac{w_T}{w_N}\sigma + \frac{B}{A(1 - \pi)}\frac{w_T}{w_N}\frac{\dot{D}^W}{p_T K} - \frac{B}{A(1 - \pi)}\frac{w_T}{w_N}\frac{[sD^W + (1 - s)M^F]i}{p_T K}\right] \tag{A.6}$$

As stated in Section 4.5, with a fixed mark-up, a successful inflation targeting requires a constant wage inflation. This in turn requires that 1) the actual wage in the T-sector is equal to the target wage, and 2) there is a fixed relationship between the wages in the two sectors. These two conditions can be summarised as:

$$w_T = w^O = \mu w_N \tag{A.7}$$

Therefore, under the assumption of a successful inflation targeting, $\frac{p_T}{p_N e}$ is fixed and given by $\frac{p_T}{p_N e} = \frac{B}{A(1-\pi)}$. Using $\lambda = \frac{K}{AL}$, we have:

$$\frac{B}{A}\frac{(1 - \sigma\lambda)}{\lambda} = \frac{\alpha}{1 - \alpha}\left[(1 - s\pi)\frac{B\mu}{A(1 - \pi)}\sigma + \frac{B\mu}{A(1 - \pi)}\frac{\dot{D}^W}{p_T K} - \frac{B\mu}{A(1 - \pi)}\frac{[sD^W + (1 - s)M^F]i}{p_T K}\right] \tag{A.8}$$

Re-arranging the terms yields:

$$\sigma = \frac{1}{\frac{B}{A}\lambda + \frac{\alpha}{1 - \alpha}(1 - s\pi)\frac{B\mu}{A(1-\pi)}}\left\{\frac{B}{A\lambda} - \frac{\alpha}{1 - \alpha}\frac{B\mu}{A(1 - \pi)}\frac{\dot{D}^W}{p_T K} + \frac{\alpha}{1 - \alpha}\frac{B\mu}{A(1 - \pi)}\frac{[sD^W + (1 - s)M^F]i}{p_T K}\right\} \tag{A.9}$$

Appendix B. Tradable sector equilibrium

$$p_T Y_T = p_T C_T + p_T I_T + p_T X_T = (1 - \psi)(1 - \alpha)pC + p_T\beta I + p_T\phi(\eta) \tag{B.1}$$

Inserting pC from Eq. (6):

$$p_T Y_T = (1 - \psi)(1 - \alpha)\left[p_N Y_N + (1 - s\pi)p_T Y_T + \dot{D}^W - siD^W - (1 - s)iM^F\right] + p_T\beta I + p_T\phi \tag{B.2}$$

Dividing both sides of this equation by $p_T K$:

$$\sigma = (1 - \psi)(1 - \alpha)\left[\frac{p_N}{p_T}\frac{Y_N}{K} + (1 - s\pi)\sigma + \frac{\dot{D}^W}{p_T K} - \frac{[sD^W + (1 - s)M^F]i}{p_T K}\right] + \beta(a_0 + a_1\sigma) + \frac{\phi}{K} \tag{B.3}$$

From Eq. (7), we have:

$$p_N Y_N = p_N C_N = \alpha pC = \alpha\left[p_N Y_N + (1 - s\pi)p_T Y_T + \dot{D}^W - siD^W - (1 - s)iM^F\right] \tag{B.4}$$

$$p_N Y_N = \frac{\alpha}{1 - \alpha}\left[(1 - s\pi)p_T Y_T + \dot{D}^W - siD^W - (1 - s)iM^F\right] \tag{B.5}$$

Inserting this equation into the expression for σ:

$$\sigma = (1-\psi)(1-\alpha)\left\{\frac{\alpha}{1-\alpha}\left[(1-s\pi)\sigma + \frac{\dot{D}^W}{p_T K} - \frac{[sD^W+(1-s)M^F]i}{p_T K}\right] + (1-s\pi)\sigma + \frac{\dot{D}^W}{p_T K} - \frac{[sD^W+(1-s)M^F]i}{p_T K}\right\} + \beta(a_0+a_1\sigma) + \frac{\phi}{K} \tag{B.6}$$

Re-arranging the terms yields:

$$\sigma = \frac{1}{1-(1-\psi)(1-s\pi)-\beta a_1}\left\{(1-\psi)\left(\frac{\dot{D}^W}{p_T K} - \frac{[sD^W+(1-s)M^F]i}{p_T K}\right) + \beta a_0 + \frac{\phi(\eta)}{K}\right\} \tag{B.7}$$

Appendix C. Comparative statics

To find the partial derivative of the equilibrium value of σ with respect to $\dot{D}^W$, we can start by taking the total derivatives of Eqs. (27b) and (29b). These are given by:

$$G_1 d_\sigma + G_2 d_i + G_3 d_{\dot{D}^W} = 0 \tag{C.1}$$

$$H_1 d_\sigma + H_2 d_i + H_3 d_{\dot{D}^W} = 0 \tag{C.2}$$

These total derivatives can be written in matrix form as follows:

$$\begin{bmatrix} G_1 & G_2 \\ H_1 & H_2 \end{bmatrix}\begin{bmatrix} d_\sigma \\ d_i \end{bmatrix} = \begin{bmatrix} -G_3 \\ -H_3 \end{bmatrix}d_{\dot{D}^W}, \quad \begin{vmatrix} G_1 & G_2 \\ H_1 & H_2 \end{vmatrix} \neq 0 \tag{C.3}$$

Using the Implicit Function Theorem, we have:

$$\begin{bmatrix} G_1 & G_2 \\ H_1 & H_2 \end{bmatrix}\begin{bmatrix} d_\sigma/d_{\dot{D}^W} \\ d_i/d_{\dot{D}^W} \end{bmatrix} = \begin{bmatrix} -G_3 \\ -H_3 \end{bmatrix} \tag{C.4}$$

Using Cramer's rule, $d_\sigma/d_{\dot{D}^W}$ is given by:

$$\frac{d_\sigma}{d_{\dot{D}^W}} = \frac{\begin{vmatrix} -G_3 & G_2 \\ -H_3 & H_2 \end{vmatrix}}{\begin{vmatrix} G_1 & G_2 \\ H_1 & H_2 \end{vmatrix}} = \frac{\frac{1}{-G_3 H_2 + H_3 G_2}}{\frac{1}{G_1 H_2 - H_1 G_2}} \tag{C.5}$$

To establish the sign of $\frac{d_\sigma}{d_{\dot{D}^W}}$, we need to find out whether $-G_3 H_2 + H_3 G_2$ is less then, equal to, or greater than 0. Note that the partial derivatives are given by:

$$G_2 = -\frac{1}{\Theta}\frac{\alpha}{1-\alpha}\frac{B\mu}{A(1-\pi)}\frac{[sD^W+(1-s)M^F]}{p_T K} \tag{C.6}$$

$$G_3 = \frac{1}{\Theta}\frac{\alpha}{1-\alpha}\frac{B\mu}{A(1-\pi)}\frac{1}{p_T K} \tag{C.7}$$

$$H_2 = \frac{1-\psi}{\Lambda}\frac{[sD^W+(1-s)M^F]}{p_T K} - \frac{\phi'(\eta)}{\Lambda K} \tag{C.8}$$

$$H_3 = \frac{-(1-\psi)}{\Lambda p_T K}, \tag{C.9}$$

where $\Lambda = \frac{1}{1-(1-\psi)(1-s\pi)-\beta a_1}$ and $\Theta = \frac{1}{\left[\frac{B}{A}+\frac{\alpha}{1-\alpha}(1-s\pi)\frac{B\mu}{A(1-\pi)}\right]}$

Inserting these expressions into $-G_3 H_2 + H_3 G_2$ gives:

$$-\frac{1}{\Theta}\frac{\alpha}{1-\alpha}\frac{B\mu}{A(1-\pi)}\frac{1}{p_T K}\left[\frac{1-\psi}{\Lambda}\frac{[sD^W+(1-s)M^F]}{p_T K} - \frac{\phi'(\eta)}{\Lambda K}\right] + \frac{1-\psi}{\Lambda p_T K}\frac{1}{\Theta}\frac{\alpha}{1-\alpha}\frac{B\mu}{A(1-\pi)}\frac{[sD^W+(1-s)M^F]}{p_T K} \tag{C.10}$$

As long as $\phi'(\eta) > 0$, we have:

$$\frac{1-\psi}{\Lambda p_T K}\frac{1}{\Theta}\frac{\alpha}{1-\alpha}\frac{B\mu}{A(1-\pi)}\frac{[sD^W+(1-s)M^F]}{p_T K} < \frac{1}{\Theta}\frac{\alpha}{1-\alpha}\frac{B\mu}{A(1-\pi)}\frac{1}{p_T K}\left[\frac{1-\psi}{\Lambda}\frac{[sD^W+(1-s)M^F]}{p_T K} - \frac{\phi'(\eta)}{\Lambda K}\right] \tag{C.11}$$

In other words, as long as the interest elasticity of the real exchange rate is greater than zero, and the exchange rate elasticity of exports is negative (i.e., a real exchange rate appreciation causes a decline in exports) (i.e., $\phi'(\eta) > 0$), we can establish that $-G_3 H_2 + H_3 G_2 < 0$. Therefore, we have:

$$\frac{d\sigma^*}{d\dot{D}^W} < 0 \tag{C.12}$$

We can also mathematically confirm that the inflation targeting central bank responds to the credit expansion by raising the interest rate. To do so, we need to establish the sign of $\frac{di^*}{d\dot{D}^W}$. Using Cremer's rule and equation C.4, $\frac{di^*}{d\dot{D}^W}$ is given by:

$$\frac{d_i}{d_{\dot{D}^W}} = \frac{\begin{vmatrix} G_1 & -G_3 \\ H_1 & -H_3 \end{vmatrix}}{\begin{vmatrix} G_1 & G_2 \\ H_1 & H_2 \end{vmatrix}} = \frac{\frac{1}{-H_3 G_1 + G_3 H_1}}{\frac{1}{G_1 H_2 - H_1 G_2}} \tag{C.13}$$

$$G_1 = H_1 = 1 \tag{C.14}$$

$$H_3 = -\frac{1}{\Lambda}\frac{(1-\psi)}{p_T K} \tag{C.15}$$

$$G_3 = \frac{1}{\Theta}\frac{\alpha}{1-\alpha}\frac{B\mu}{A(1-\pi)}\frac{1}{p_T K} \tag{C.16}$$

Inserting these expressions into equation $-H_3 G_1 + G_3 H_1$ gives:

$$\frac{1}{\Lambda}\frac{(1-\psi)}{p_T K} + \frac{1}{\Theta}\frac{\alpha}{1-\alpha}\frac{B\mu}{A(1-\pi)}\frac{1}{p_T K} \tag{C.17}$$

This expression is unambiguously positive. Therefore, we have:

$$\frac{di^*}{d\dot{D}^W} > 0 \tag{C.18}$$

Appendix D. Stock-flow consistency

The model assumes that total loans, divided into loans given to workers and capitalists, are equal to total deposits, which are held by foreigners and capitalists. For the model to be stock-flow consistent, we need to ensure that this balance sheet condition is maintained over time, i.e.,

$$\dot{M}^F + \dot{M}^C = \dot{D}^C + \dot{D}^W \tag{D.1}$$

We can use the IS equation, capitalists'/firms' finance constraint, and equation defining $\dot{M}^F$, all reproduced below, to check whether equation D.1 holds.

The IS equation:

$$p_N Y_N + p_T Y_T = p_N C_N + p_T C_T + p_T \beta I + p_T X \tag{D.2}$$

Capitalists'/firms' finance constraint:

$$p_K I = s(\pi p_T Y_T - iD^C + iM^C) + \dot{D}^C - \dot{M}^C \tag{D.3}$$

Change in foreign deposits:

$$\dot{M}^F = iM^F - NX \tag{D.4}$$

From equation D.4 and 16, $p_T X$ is given by:

$$p_T X = \dot{M}^F - iM^F - np^* C_{IM} - (1-\beta)np^* I \tag{D.5}$$

From Eq. (6), we have:

$$p_N C_N + p_T C_T = p_N Y_N + (1-\pi)p_T Y_T + \dot{D}^W - iD^W + (1-s)(\pi p_T Y_T - iD^C + iM^C) - np^* C_{IM} \tag{D.6}$$

From Eq. (13) and A.3, $p_T \beta I$ is given by:

$$p_T \beta I = s(\pi p_T Y_T - iD^C + iM^C) + \dot{D}^C - \dot{M}^C - (1-\beta)np^* I \tag{D.7}$$

Inserting equation D.4, D.5 and D.6 into the IS equation, we have:

$$p_N Y_N + p_T Y_T = p_N Y_N + (1-\pi)p_T Y_T + \dot{D}^W - iD^W + (1-s)(\pi p_T Y_T - iD^C + iM^C) - np^* C_{IM} + s(\pi p_T Y_T - iD^C + iM^C) + \dot{D}^C - \dot{M}^C - (1-\beta)np^* I + \dot{M}^F - iM^F \\ - np^* C_{IM} - (1-\beta)np^* I \tag{D.8}$$

Using the assumption that $D^W + D^C = M^F + M^C$ and simplifying equation D.8 yields:

$$\dot{M}^F + \dot{M}^C = \dot{D}^C + \dot{D}^W \tag{D.9}$$

Hence the model is stock-flow consistent.

Appendix E. Introducing savings out of nontradable sector income

The baseline model assumed that all nontradable income is spent on consumption. This appendix shows that relaxing this assumption does not

change the qualitative results of the model.

In terms of the equations used to set out the model (i.e., Eqs. (1)-(24)), all equations remain unchanged except for Eq. (6) depicting the consumption function. Once we introduce savings out of nontradable income, this equation is modified as follows:

$$pC = p_N C_N + p_T C_T + np^* C_{IM} = (1-s)p_N Y_N + (1-\pi)p_T Y_T + \dot{D}^W - iD^W + (1-s)(\pi p_T Y_T - iD^C + iM^C) \tag{E.6}$$

The equilibrium condition for the N-sector (Eq. (25)) and the equation summarising the conditions for constant wage inflation (Eq. (26)) remain the same. However, the introduction of savings out of N-income modifies Eq. (27a) as follows:

$$\sigma = \frac{1}{\left[\frac{B}{A}+\frac{\alpha}{1-(1-s)\alpha}(1-s\pi)\frac{B\mu}{A(1-\pi)}\right]}\left\{\frac{B}{A\lambda}-\frac{\alpha}{(1-(1-s)\alpha)}\frac{B\mu}{A(1-\pi)}\frac{\dot{D}^W}{p_T K}+\frac{\alpha}{(1-(1-s)\alpha)}\frac{B\lambda}{A(1-\pi)}\frac{[sD^W+(1-s)M^F]i}{p_T K}\right\} \tag{E.27a}$$

Modification of Eq. (27a) changes neither implicit form of this equation nor its partial derivatives. Hence, Eq. (27b) remains the same.

$$G(\sigma,\ i,\ \dot{D}^W) = 0 \quad G_1 > 0,\ G_2\langle 0, G_3\rangle 0 \tag{E.27b}$$

As for the T-sector, the equilibrium condition given in Eq. (28) remains the same; however, Eq. (29a) is modified as follows:

$$\sigma = \frac{1-(1-s)\alpha}{(1-\beta a_1)(1-(1-s)\alpha)-(1-\psi)(1-s\pi)(1-\alpha)}\left\{\frac{(1-\psi)(1-\alpha)}{1-(1-s)\alpha}\left(\frac{\dot{D}^W}{p_T K}-\frac{[sD^W+(1-s)M^F]i}{p_T K}\right)+\beta a_0+\frac{\phi(\eta)}{K}\right\} \tag{E.29a}$$

The new terms in Eq. (29a) do not alter Eq. (29b).

$$H(\sigma,\ i,\ \dot{D}^W) = 0 \quad H_1 > 0, H_2 > 0, H_3 < 0 \tag{E.29b}$$

As shown in Appendix C, the sign of $\frac{d\sigma^*}{dD^W}$ depends on the sign of $-G_3 H_2 + H_3 G_2$. Changes in Eqs. (27a) and (29a), modify H_2, H_3, G_2, and G_3 as follows:

$$G_2 = -\frac{1}{\Theta}\frac{\alpha}{1-(1-s)\alpha}\frac{B\mu}{A(1-\pi)}\frac{[sD^W+(1-s)M^F]}{p_T K};\quad G_3 = \frac{1}{\Theta}\frac{\alpha}{1-(1-s)\alpha}\frac{B\mu}{A(1-\pi)}\frac{1}{p_T K},$$

$$H_2 = \frac{1-\psi(1-\alpha)}{\Lambda}\frac{[sD^W+(1-s)M^F]}{p_T K}-\frac{\phi'(\eta)}{\Lambda K};\quad H_3 = \frac{-(1-\psi)(1-\alpha)}{\Lambda p_T K}$$

$-G_3 H_2 + H_3 G_2$ is then given by: $\frac{1}{\Theta}\frac{\alpha}{1-(1-s)\alpha}\frac{B\mu}{A(1-\pi)}\frac{1}{p_T K}\frac{\phi'(\eta)}{\Lambda K}$

As long as $\phi'(\eta) < 0$, we have: $\frac{d\sigma^*}{dD^W} < 0$. Hence, the qualitative results do not change when we introduce savings out of N-sector income.

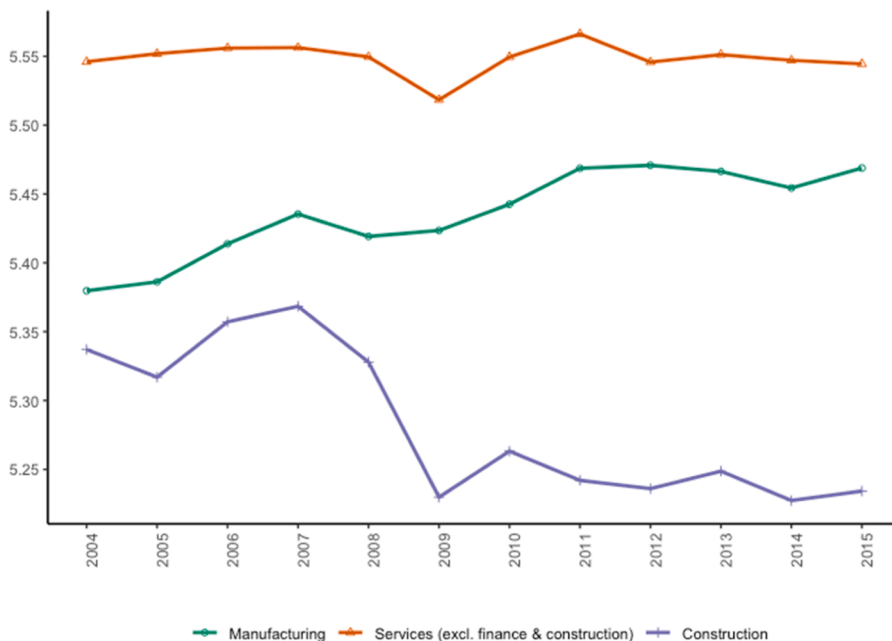## Appendix F. Sectoral labour productivity

Fig. A.1

Fig. A.1. Sectoral labour productivity **Source:** Dincer et al. (2022)'s calculations based on National Income data. **Note:** There are differences in labour productivity calculations based on firm-level and aggregate data. Here, only calculations based on national accounts data are presented because firm level data is not publicly available. While the two estimations produce differences in trends, labour productivity in manufacturing is higher in absolute terms than in construction. See Dincer et al. (2022) for a detailed discussion of labour productivity calculations in Turkey.

References

Aboobaker, A., Ugurlu, E.N., 2023. Weaknesses of MMT as a guide to development policy. Cambridge J. Econ. 47, 555–574.

Akçay, Ü., Güngen, A.R., 2022. Dependent financialisation and its crisis: the case of Turkey. Cambridge J. Econ. 46, 293–316.

Akçay, Ü., Hein, E., Jungmann, B., 2021. Financialisation and macroeconomic regimes in emerging capitalist economies before and after the Great Recession (IPE Working Paper No. 158/2021). Berlin School of Economics and Law, Institute for International Political Economy (IPE).

Bilimciler, B.S., 2001. Güçlü ekonomiye geçiş programı üzerine değerlendirmeler. Mülkiye Dergisi 25, 11–70.

Bakir, C., Öniş, Z., 2010. The regulatory state and Turkish banking reforms in the age of post-Washington Consensus. Dev. Change 41, 77–106.

Barba, A., Pivetti, M., 2009. Rising household debt: its causes and macroeconomic implications—a long-period analysis. Cambridge J. Econ. 33, 113–137.

Baskaya, Y.S., Di Giovanni, J., Kalemli-Özcan, Ş., Peydró, J.-L., Ulu, M.F., 2017. Capital flows and the international credit channel. J. Int. Econ. 108, 15–22.

Başçı, E., 2006. Credit growth in Turkey: drivers and challenges, BIS Papers No 28. Bank for International Settlements.

Benigno, G., Converse, N., Fornaro, L., 2015. Large capital inflows, sectoral allocation, and economic performance. J. Int. Money Finance 55, 60–87.

Benigno, G., Fornaro, L., 2014. The financial resource curse. Scand. J. Econ. 116, 58–86.

Boratav, K., 2018. Türkiye İktisat Tarihi. İmge Kitabevi.

Botta, A., 2018. The Long-Run Effects of Portfolio Capital Inflow Booms in Developing Countries: Permanent Structural Hangovers after Short-Term Financial Euphoria (No. 221), Production Development. ECLAC.

Brochier, L., Macedo e Silva, A.C., 2016. The macroeconomic implications of consumption: state-of-art and prospects for the heterodox future research. Brochier, L. and Macedo e Silva, AC (2017). The Macroeconomic Implications of Consumption: state-Of-Art and Prospects for the Heterodox Future Research. Revista Análise Econômica 35.

Can, R., Günay, H., Kılınç, M., 2016. Türkiye'de kredi genişlemesinin sektörel dönüşüm üzerine etkisi. ODTÜ Gelişme Dergisi 118–128.

Corden, W.M., Neary, J.P., 1982. Booming sector and de-industrialisation in a small open economy. Econ. J. 92, 825–848.

Demiralp, S., Demiralp, S., 2019. Erosion of central bank independence in Turkey. Turk. Stud. 20, 49–68.

Diao, X., McMillan, M., Rodrik, D., 2019. The recent growth boom in developing economies: a structural-change perspective. The Palgrave Handbook of Development Economics. Springer, pp. 281–334.

Dincer, N.N., Eichengreen, B., Tekin-Koru, A., 2022. Manufacturing and service-sector productivity in Turkey: a perspective from firm-level data. World Econ. 1–26.

Dos Santos, P.L., 2013. A cause for policy concern: the expansion of household credit in middle-income economies. Int. Rev. Appl. Econ. 27, 316–338.

Dutt, A.K., 2006. Maturity, stagnation and consumer debt: a Steindlian approach. Metroeconomica 57, 339–364.

Ergüneş, N., 2009. Global Integration of the Turkish Economy in the era of Financialisation. Res. Money Finance.

Fields, G.S., 2004. Dualism in the labor market: a perspective on the Lewis model after haf a century. Manchester Sch. 72, 724–735.

Financial Stability Report., 2020. Central Bank of the Republic of Turkey.

Fine, B., Lapavitsas, C., Pincus, J., 2003. Development Policy in the Twenty-First century: Beyond the Post-Washington Consensus. Routledge.

Günay, H., Kılınç, M., 2015. Credit market imperfections and business cycle asymmetries in Turkey. J. Empir. Finance 34, 79–98.

Günçavdı, Ö., Ülengin, B., 2017. Tradable and non-tradable expenditure and aggregate demand for imports in an emerging market economy. Econ. Syst. 41, 445–455.

Hein, E., 2012. Finance-dominated capitalism, re-distribution, household debt and financial fragility in a Kaleckian distribution and growth model. PSL Q. Rev. 65, 11–51.

Kara, H., 2016. A brief assessment of Turkey's macroprudential policy approach: 2011–2015. Centr. Bank Rev. 16, 85–92.

Karaçimen, E., 2015. Tüketici Kredisinin Ekonomi Politiği: Türkiye Üzerine Bir Değerlendirme. Praksis 38, 71–97.

Karaçimen, E., 2014. Financialization in Turkey: the case of consumer debt. J. Balkan Near East. Stud. 16, 161–180.

Karamollaoğlu, N., Yalçin, C., 2020. Exports, real exchange rates and dollarization: empirical evidence from Turkish manufacturing firms. Empir. Econ. 59, 2527–2557.

Kurt, O.E., 2020. Functional income distribution, capacity utilization, capital accumulation and productivity growth in Turkey: A post-Kaleckian analysis. Metroeconomica 71, 734–766.

Lapavitsas, C., Dos Santos, P.L., 2008. Globalization and contemporary banking: on the impact of new technology. Contrib. Polit. Econ. 27, 31–56.

Lewis, W.A., 1954. Economic development with unlimited supplies of labour. Manchester Sch. 22, 139–191.

Martins, G.K., Skott, P., 2021. Sources of inflation and the effects of balanced budgets and inflation targeting in developing economies. Indus. Corp. Change 30, 409–444.

Mian, A., Sufi, A., Verner, E., 2020. How does credit supply expansion affect the real economy? The productive capacity and household demand channels. J. Finance 75, 949–994.

Müller, K., 2018. Credit Markets Around the World, 1910-2014 (SSRN Scholarly Paper No. ID 3259636).

Müller, K., Verner, E., 2021. Credit Allocation and Macroeconomic Fluctuations (SSRN Scholarly Paper No. ID 3781981).

Orhangazi, Ö., Yeldan, A.E., 2021. The Re-making of the Turkish Crisis. Dev. Change 52, 460–503.

Palley, T.I., 1994. Debt, aggregate demand, and the business cycle: an analysis in the spirit of Kaldor and Minsky. J. Post. Keynes Econ. 16, 371–390.

Palma, G., 2005. Four sources of de-industrialisation and a new concept of the Dutch Disease. In: Ocampo, J.A. (Ed.), Beyond Reforms: Structural Dynamics and Macroeconomic Vulnerability. Stanford University Press and World Bank, New York.

Porcile, G., Lima, G.T., 2010. Real exchange rate and elasticity of labour supply in a balance-of-payments-constrained macrodynamics. Cambridge J. Econ. 34, 1019–1039.

Razmi, A., 2015. The limits to wage-led growth in a low-income economy. Metroeconomica 66, 740–770.

Razmi, A., Rapetti, M., Skott, P., 2012. The real exchange rate and economic development. Struct. Change Econ. Dyn. 23, 151–169.

Rodrik, D., 2016. Premature deindustrialization. J. Econ. Grow. 21, 1–33.

Rowthorn, R.E., 1977. Conflict, inflation and money. Cambridge J. Econ. 1, 215–239.

Ryoo, S., Kim, Y.K., 2014. Income distribution, consumer debt and keeping up with the Joneses: distribution, debt and keeping up with the Joneses. Metroeconomica 65, 585–618.

Skott, P., 2020. Aggregate demand policy in mature and dual economies. Conflict, Demand and Economic Development. Routledge India, pp. 88–102.

Skott, P., Gómez-Ramírez, L., 2018. Credit constraints and economic growth in a dual economy. Struct. Change Econ. Dyn. 45, 64–76.

Stockhammer, E., Wildauer, R., 2018. Expenditure cascades, low interest rates or property booms? Determinants of household debt in OECD countries. RBE 5, 85–121.

Temple, J., 2005. Dual economy models: a primer for growth economists. Manchester Sch. 73, 435–478.

Tok, E.Ö., Sevinç, O., 2019. Import Content of Production: Input-Output Analysis. CBRT Research Notes in Economics No. 19/06. Central Bank of the Republic of Turkey.

Tornell, A., Westermann, F., 2002. Boom-bust cycles in middle income countries: facts and explanation. IMF Staff Pap. 49, 111–155.

van der Ploeg, F., 2011. Natural resources: curse or blessing? J. Econ. Lit. 49, 366–420.

Verner, E., 2019. Private Debt Booms and the Real Economy: do the Benefits Outweigh the Costs? https://doi.org/10.2139/ssrn.3441608.

Voyvoda, E., Yeldan, E., 2005. IMF programmes, fiscal policy and growth: investigation of macroeconomic alternatives in an OLG model of growth for Turkey. Comp. Econ. Stud. 47, 41–79.

Yeşilbağ, M., 2020. The state-orchestrated financialization of housing in Turkey. Hous. Policy Debate 30, 533–558.

Yilmaz, E., Kiliç, İ.E., 2021. Estimating firm-level capital stock: the evidence from Turkey. Dev. Econ. 59, 371–404.